EHP5

Editorial

Angela Rodrigues
Northumbria University

Pamela Rackow
University of Stirling

Introduction

Health psychologists can make an important contribution to the practice of public health at different levels. Firstly, health psychologists can provide theoretical ground for the understanding of health and illness and its determinants; and they can theoretical models for understanding health-related behaviour. Secondly, health psychology can also provide the necessary knowledge base about health behaviours that can guide the development of behaviour change interventions. Finally, health psychologists can also support public health research by using methodological approaches that complement epidemiological methods, including theory test, statistics widely used in psychology (i.e. multivariate analysis techniques), and the use of assessment tools.

The goals of this special issue are to provide examples of health psychology contributions across: 1) health improvement, health protection and commissioning of services to improve health and well-being; 2) design, implementation and evaluation of services, working collaboratively across the local public health system and with local communities; 3) design and delivery of targeted public health campaigns; and 4) evidence-based recommendations for change and public policy development.

This special issue focuses on health psychology in public health settings. The articles provide an overview of how health psychology is influencing public policy in EHPS members' countries. Articles also reflect on how members have brought forward their areas of concern and had them adopted as a policy priorities, championing the synergy of health psychology and public health.

Overview of the special issue

The contents of this special issue include: the design and evaluation of theory-based intervention in public health; working with health care professionals to design and implement changes in practice; the introduction of health psychology into multidisciplinary public health teams; and practicing health psychology. A brief overview of the papers included in this special issue can be found below.

We start this special issue with an article written by Andrew Steptoe where he describes the improvements in this specific area during the last 14 years, since he and colleague and his late wife Jane Wardle wrote an article about "Public Health Psychology" in the British Psychological Society magazine "The Psychologist" in 2005. He emphasises the need for collaboration with other health professionals and with public health policy makers. The partnership with police makers and other stakeholders within public health is a key aspect highlighted throughout the papers in this special issue.

Calan et al. describe the development of the Choosing Healthy Eating for Infant Health (CHErIsH) intervention, a multi-disciplinary, cross-institutional infant feeding intervention to support and promote healthy infant feeding practices among parents and primary caregivers. This intervention has been developed using practitioners

and public health policy stakeholder involvement engagement action. The partnership with a primary care provider shaped the development as well as the use of theory and evidence base. The authors conclude that the ongoing engagement with practice and policy has contributed to success of the program and they reflect on lessons learnt and how this approach can inform future activities.

Levy et al. describe how they developed and tested a theory-based intervention to improve the quality of life for patients diagnosed with chronic obstructive pulmonary disease within a public health service in the UK. Through the lens of social identity theory, they provide some balanced reflections on the utility of the social identity approach to inform public health interventions. The authors discuss challenges that have occurred that were due to using this particular theoretical approach as well as due to the patient group.

McGregor and von Wagner write about their experiences in recruiting general practitioners into their trial which tested several interventions to improve the uptake of bowel cancer screening. It was planned that interventions would be delivered through primary care and different options for involving GP-practices were incorporated. The authors describe the different ways how they approached GP practices, their recruitment strategy and overall experience. In their conclusion the authors open up the space for other researchers to share their experience and to learn from each other.

In their article, Amorim et al. describe the scope and the aims of the the P5 Digital Medical Center (ACMP5) at the School of Medicine of University of Minho (Portugal). The P5 Digital Medical Center is a platform that offers a sustained environment for behaviour change and for health monitoring and promotion. In this centre, psychologists work as health coaches alongside other professionals to make sure that the benefits of using digital technology in healthcare can be utilized.

Rodrigues et al. describe the pragmatic formative evaluation process of the LiveWell Dorset service. As part of the service health coaches support individuals to change several health behaviours by matching and prioritising individual specific barriers to appropriate interventions. The authors conclude that using a pragmatic formative evaluation approach is an excellent approach to meet the time and financial constrains under which public health services need to work and, at the same time, perform a sound evaluation with results that can inform practice.

Lucy Porter writes about her experience in working first as an intern and then as a member of staff at Public Health England. The author describes where difference between the work circumstances of academics and practitioners are, one being the very different timeframes. Lucy Porter concludes that there is still a big scope for further translation of approaches between academia, policy and practice. Only when those three parties work together closely, innovation and improvement can happen.

Angela Rodrigues
Department of Psychology,
Northumbria University

angela.rodrigues@northumbria.ac.uk

Pamela Rackow
Faculty of Natural Sciences,
University of Stirling

pamela.rackow@stir.ac.uk

Revisiting Public Health Psychology

Andrew Steptoe

University College London, UK

My late colleague and wife Jane Wardle and I wrote an article in 2005 in the British Psychological Society magazine *The Psychologist* entitled 'Public Health Psychology' (Wardle & Steptoe, 2005). This was itself an elaboration of earlier thoughts on the topic that Jane had published in the *British Journal of Health Psychology* (Wardle, 2000). This special issue of the European Health Psychologist is a welcome opportunity to reflect on the developments in this field over the 15 years since these articles were written.

The motivation for our 2005 article was to encourage health psychologists to complement their well-established expertise in clinical studies of individuals and small groups by considering broader aspects of population health. This involves translating the insights into issues such as behaviour change and psychological processes in physical health to a larger scale, and embracing the methodologies of population health sciences including epidemiology and clinical trials.

We focused on a number of topics, starting with health behaviour and behaviour change. Then, as now, the central behaviours relevant to population health were smoking, physical inactivity, poor diets, excessive alcohol consumption, and sexual and other risky actions. Health psychology was at the forefront of theoretical perspectives on behaviour change at the time, and this remains the case, although the frameworks for understanding behaviours have become much more sophisticated (Michie, van Stralen, & West, 2011). The field has received a further impetus over the past decade from the emergence of nudge methods of behaviour change based on external contingencies and choice architecture promulgated by behavioural economists (Thaler & Sunstein, 2008); these have been important in stimulating the interest of public policy makers and governmental organisations. Understanding the interplay between attitudes and habits, environmental contingencies and social determinants of health behaviour has increased greatly. In 2005, we also predicted greater use of computers in behaviour change, though we did not anticipate the great success of digital health and phone-based apps.

Health communication was an area in which we encouraged health psychologists to become more involved, based on the promise of individual genetic risk profiling and pharmacogenomics. We expected these developments to stimulate the need to understand better people's decisions about treatments, concern about genetic risk, and so forth (Sanderson, Wardle, & Humphries, 2008). This area has not evolved at quite the pace we imagined, partly because individual risk profiling and tailoring of medical treatments have not developed very rapidly. Nevertheless, issues such as awareness of risk and decisions about preventive procedures have become prominent internationally (Nickel et al., 2017), while psychological insights into effective communication have borne fruit in fields such as cancer screening (Wardle et al., 2016). At the same time, the internet has transformed health communication over the past decade, so health psychologists and other professionals work in a very different context of public knowledge and debate than in the past.

Psychobiology was another topic we

highlighted, investigating the mechanisms that might translate population-level factors such as social inequalities, stress, and impoverished social relationships into risk of serious physical illness. This field has evolved markedly, through the increased sophistication of biological measures available, through the growth of genetic and epigenetic research, and through the use of large-scale longitudinal epidemiological cohorts to investigate psychosocial factors, biological mediators, and health outcomes (e.g. Kivimaki et al., 2012). We are also beginning to understand how positive psychological attributes can be protective and reduce risk of disease and premature mortality (Steptoe, 2019).

One of the major themes of our 2005 article was a call for health psychologists to use the methodologies of epidemiology and population sciences. For example, we encouraged greater awareness in the selection of representative samples for studies, instead of the more traditional psychological approach that often involves convenience samples of university students and the like. The biases and lack of generalisability that can arise with convenience sampling are now well recognised and are often punished by journal editors. Another aspect of the population perspective is the recognition that small effects may be hugely significant when applied at the population level. In the past, psychologists have been disappointed if their interventions stimulate a 2-3% change in the outcome. But a tiny percentage point change in thousands of people could be of vital benefit at the population level; for example, in a country the size of the UK, every 2 percentage point fall in tobacco smoking prevalence results in more than 8,000 deaths averted per year. We also stressed the issues of effectiveness and implementation, pointing out that psychologists often prefer to carry out efficacy studies. These test whether an intervention has its desired effect when administered faithfully to the target population, whereas effectiveness refers to the

impact of the intervention when implemented in the real world where there may be multiple barriers to proper administration. Although some apparently promising interventions have fallen by the wayside, health psychology is playing an important role in the emerging field of implementation science with regard to the prevention and management of physical disease (Gaglio, Shoup, & Glasgow, 2013).

Another point we emphasised in our 2005 article was the use of clinical trial methodology to test the effects of psychological interventions. In the past, many health psychologists coming from an experimental tradition would test their treatments in small scale underpowered studies that failed to make much impact in health care. In the UK, the guidance provided in the MRC framework for complex interventions has proved influential (recently updated in https://mrc.ukri.org/ documents/pdf/complex-interventions-guidance/). Formal clinical trials methodology has now become axiomatic in intervention research internationally. Although researchers are often frustrated by what some see as the pedantry of a clinical trials industry that is not well suited to behaviour change research, the fact is that decision-makers in health systems rely on evidence derived from properly conducted, well-powered trials when making choices about new interventions. Studies of this type are expensive and can take long periods to develop. But if health psychology is to have the impact on prevention and health care that it deserves, these procedures need to be adopted.

These developments in public health psychology typically require collaborative work with other health professionals, and with public health policy makers. It is therefore very appropriate that the challenges of collaborative working underlie several of the articles in this special issue. They underscore the originality and vitality of applications of health psychology in the domains of disease prevention and management and health promotion, and bode well for the future of our discipline.

References

Gaglio, B., Shoup, J. A., & Glasgow, R. E. (2013). The RE-AIM framework: a systematic review of use over time. *Am J Public Health, 103*(6), e38-46. doi:10.2105/AJPH.2013.301299

Kivimaki, M., Nyberg, S. T., Batty, G. D., Fransson, E. I., Heikkila, K., Alfredsson, L., . . . Theorell, T. (2012). Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data. *Lancet, 380* (9852), 1491-1497. doi:10.1016/S0140-6736(12)60994-5

Michie, S., van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci, 6*, 42. doi: 10.1186/1748-5908-6-42

Nickel, B., Dodd, R. H., Turner, R. M., Waller, J., Marlow, L., Zimet, G., . . . McCaffery, K. (2017). Factors associated with the human papillomavirus (HPV) vaccination across three countries following vaccination introduction. *Prev Med Rep, 8*, 169-176. doi:10.1016/j.pmedr.2017.10.005

Sanderson, S. C., Wardle, J., & Humphries, S. E. (2008). Public health genomics and genetic test evaluation: the challenge of conducting behavioural research on the utility of lifestyle-genetic tests. *J Nutrigenet Nutrigenomics, 1*(5), 224-231. doi:10.1159/000149826

Steptoe, A. (2019). Happiness and health. *Annu Rev Public Health, 40*, 339-359. doi:10.1146/annurev-publhealth-040218-044150

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven: Yale University Press.

Wardle, J. (2000). Public health psychology: expanding the horizons of health psychology. *Br J Health Psychol, 5*, 329-336.

Wardle, J., & Steptoe, A. (2005). Public health psychology. *The Psychologist, 18*(11), 672-675.

Wardle, J., von Wagner, C., Kralj-Hans, I., Halloran, S. P., Smith, S. G., McGregor, L. M., . . . Raine, R. (2016). Effects of evidence-based strategies to reduce the socioeconomic gradient of uptake in the English NHS Bowel Cancer Screening Programme (ASCEND): four cluster-randomised controlled trials. *Lancet, 387*(10020), 751-759. doi:10.1016/S0140-6736(15)01154-X

Andrew Steptoe
Department of Behavioural Science and Health, University College London
a.steptoe@ucl.ac.uk

Role of integrated knowledge translation in developing and implementing a multi-component infant feeding intervention: Insights from the CHErIsH study

Susan Calnan

University College Cork, National University of Ireland[1]

Elaine Toomey

National University of Ireland, Galway[2]

Karen Matvienko-Sikar

University College Cork, National University of Ireland[1]

Catherine Hayes

Trinity College Dublin, Ireland[3]

Sheena McHugh

University College Cork, National University of Ireland[1]

Caragh Flannery

University College Cork, National University of Ireland[1]

Kate O'Neill

University College Cork, National University of Ireland[1]

Edel Doherty

National University of Ireland, Galway[4]

Marita Hennessy

National University of Ireland, Galway[5]

Colette Kelly

National University of Ireland, Galway[6]

Caroline Heary

National University of Ireland, Galway[2]

Michelle Queally

National University of Ireland, Galway[4]

Tony Heffernan

Mallow Primary Healthcare Centre, Ireland[7]

Molly Byrne

University College Cork, National University of Ireland[2]

Patricia M Kearney

University College Cork, National University of Ireland [1]

Introduction

This article provides an overview and insights from the process of using integrated knowledge translation in developing and implementing the Choosing Healthy Eating for Infant Health (CHErIsH) intervention. Integrated knowledge translation involves collaboration between researchers and research users in the research process, including shaping the research questions, interpreting the results and helping to disseminate the research results (Graham and Tetroe, 2009). The central premise of integrated knowledge translation is that involving knowledge users as equal partners alongside researchers will lead to research that is more relevant to, and more likely to be useful to, the knowledge users (Canadian Institutes of Health Research (CIHR), 2012).

CHErIsH is a multi-disciplinary, cross-institutional project that aims to develop, implement and evaluate an intervention to support and promote healthy infant feeding practices among parents and primary caregivers within primary care settings. A defining feature of CHErIsH was the partnership approach adopted in the development and implementation of this multi-component intervention, which involved integrated knowledge translation between researchers, primary care healthcare practitioners (HCPs) and public health policy stakeholders. The CHErIsH researchers comprise a multi-disciplinary team from epidemiology, health psychology, developmental psychology, implementation science, public health, nutrition and health economics across three

universities: University College Cork (UCC), National University of Ireland, Galway (NUIG) and Trinity College Dublin (TCD). Establishing a multi-disciplinary team at the outset was a further key element of this study, providing a breadth of expertise to guide intervention development and implementation.

The theoretical underpinnings, intervention development process and study design of CHErIsH are described elsewhere (Toomey et al, 2019, under review; Matvienko-Sikar et al, 2019). Development of the CHErIsH intervention and implementation strategy was guided by the Behaviour Change Wheel, which provided a structured and systematic approach to develop this multi-component intervention (Toomey et al, 2019, under review). Currently, the intervention is undergoing feasibility testing at a leading primary healthcare centre in southwest Ireland, and funding for the study has been provided by Ireland's Health Research Board (HRB) – a major Irish national health research funder.

This paper focuses specifically on the completed integrated knowledge translation activities for intervention development and implementation, as well as planned activities in this area and the insights arising from this process.

Overview of the intervention

The primary impetus for the CHErIsH study was to identify ways to reduce the risk of childhood obesity and overweight within primary care settings. Within this context, improving infant feeding was identified as a potential means through which parents and/or primary caregivers could reduce the risk of childhood obesity and overweight, as well as improve their child's overall health, well-being and development. CHErIsH therefore seeks to improve infant feeding by providing an intervention targeting parental infant feeding behaviours at the time of routine infant

vaccination visits. It also encompasses an implementation strategy to support behaviour change at the level of the healthcare practitioners delivering the intervention, which is essential to ensure that parents receive the intervention.

In summary, brief infant feeding messages are provided to parents/caregivers by primary healthcare practitioners, along with additional information materials and signposting to online resources. These messages focus on the timing, frequency and types of solid foods to be introduced to babies as well as responsive feeding practices (i.e. identifying and responding to cues that signal when a baby is hungry or full). The intervention components are outlined in Table 1 below.

Description of the integrated knowledge translation activities

The integrated knowledge translation process in CHErIsH involved a number of distinct components: co-creation of the original concept and grant application with the primary care partner; informal consultations with public health policy stakeholders and practitioners throughout the evidence synthesis phase; establishment of an international steering committee to provide feedback and advice on the proposed intervention; and a formal policy submission.

Partnership with a primary care provider was a defining feature of the CHErIsH study, and the original idea of developing an infant feeding intervention to reduce childhood obesity/overweight was proposed by the primary care partner. CHErIsH is an example therefore of a practice-led intervention and illustrates the value of integrated knowledge translation between researchers and primary care practitioners to identify practice gaps and co-create research proposals. Regular contact, involving ongoing and evolving discussions about the project, was also maintained with a number of healthcare

Table 1: Main components of CHErIsH intervention and implementation strategy

	Component	Description
Parent–level intervention	Brief verbal infant feeding messages	• Messages are delivered by primary healthcare practitioners to parents or caregivers during their baby's first routine vaccination visits • Vaccinations are administered at five standardised time points: at 2, 4, 6, 12 and 13 months of age
	Additional infant feeding resources for parents/caregivers	• Information leaflet and fridge magnet – displaying the key infant feeding messages and signposting to child health website (MyChild.ie) • Baby bib – signposting to child health website (MyChild.ie)
HCP-level implementation strategy	Implementation strategy for primary healthcare practitioners delivering the intervention	• Identifying a local opinion leader • Providing incentivised training for healthcare practitioners • Distributing supporting HCP resources and educational materials • Creating electronic delivery prompts for healthcare practitioners • Raising awareness across all healthcare practitioners within the practice • Providing local technical support and assistance

practitioners during the development phase. These included GPs and practice nurses from the primary care centre feasibility site, as well as a dietician from the national health service – all of whom provided significant input into the intervention and implementation strategy design process.

Informal knowledge exchange consultations also took place with public health policy stakeholders, involving regular contact with a number of key stakeholders from Ireland's national Health Service Executive (HSE) with expertise in the area of infant health and well-being. Early in the project, it was identified that there was considerable synergy between CHErIsH and the HSE-led Nurture

programme– a recently implemented national initiative to support change in the delivery of infant health and well-being services. Establishing and building links with members of the Nurture team proved hugely beneficial, enabling the researchers to share resources and expertise and seeking to enhance the perceived legitimacy of CHErIsH among parents/caregivers due to its links with the HSE. Signposting to HSE resources (MyChild.ie) in the intervention messages and materials ensured that there was consistency between the messages of both CHErIsH and Nurture.

Establishing an international steering

committee was planned as part of the original grant application. This committee included research collaborators from the project as well as international experts in infant feeding and childhood obesity, and stakeholders from the HSE and the Health Research Board. A committee meeting was convened over a two-day period to facilitate knowledge exchange and discussion on the proposed intervention components. The first day consisted of a smaller group meeting on intervention outcomes and an overview presentation on CHErIsH for all delegates. On the second day, presentations on intervention developments were followed by activity-based feedback sessions. These sessions gave participants the opportunity to provide feedback on the study design, intervention components and economic elements. The format of these sessions ensured that the feedback was comprehensive, documented and informed the final intervention design.

During the development phase, the CHErIsH team, in response to a call for submissions on tackling childhood obesity to the government's Joint Committee on Children and Youth Affairs, also prepared a policy submission to Ireland's legislature (the 'Oireachtas'). This policy submission highlighted the significance of infant feeding practices in reducing the risk of childhood obesity/overweight and provided clear and practical recommendations on how to improve infant practices based on the comprehensive research conducted by the CHErIsH research team to date. A member of the CHErIsH team also met with the Oireachtas committee directly to outline the CHErIsH submission proposals.

Ensuring that knowledge translation is maintained beyond the intervention development and pilot testing phase is a further aim of this study. In this regard, the CHErIsH team has secured additional funding to co-create a knowledge translation strategy with its primary care partner. This strategy will seek to address a number of key goals including: to inform and generate awareness about CHErIsH; to share knowledge between researchers and healthcare practitioners involved in CHErIsH, including results of the CHErIsH feasibility study and process evaluation; to encourage buy-in among other healthcare practitioners in the event of future scale-up of CHErIsH; and to facilitate policy change in the broader area of childhood obesity/overweight through continued engagement with policy stakeholders and policymakers.

Challenges and lessons learnt

CHErIsH provides an example of how an integrated knowledge translation approach has been embedded throughout the development of an evidence-based behaviour change intervention. This ongoing knowledge translation process represents a novel approach to intervention development that seeks to leverage the expertise, skills and knowledge of research users rather than adhere to the traditional top-down approach. Notwithstanding the potential benefits of such an approach (CIHR, 2012), it is not without its challenges. Some of the key challenges and lessons learnt from this approach are outlined in Table 2 below.

It is a key aim to ensure that the challenges experienced and learning from this study will help to inform future development of CHErIsH and other similar interventions. Moreover, it is intended that these challenges and lessons will be communicated to stakeholders and researchers in a clear and practicable way as part of the ongoing knowledge translation process that has defined the CHErIsH project to date.

For further information on CHErIsH, visit www.cherishstudy.com

Table **2:** Challenges and lessons learnt from the CHErIsH integrated knowledge translation process

	Challenge/lesson	Description
Challenges	Time constraints	Limited capacity of healthcare practitioners and other stakeholders to engage due to busy work schedules and organisational culture
	Professional differences	Differences in language and culture of academic researchers and healthcare practitioners – accentuated when researchers and practitioners engage
	Skills and capacity	Limited skills and capacity of researchers to implement the integrated knowledge translation process – requires particular skills and sufficient capacity to implement
	Evaluation	Difficulty of evaluating the knowledge translation process to prove its efficacy over more traditional processes
Lessons learnt	Engage early and on an ongoing basis	Need to ensure and plan for early and regular engagement with healthcare practitioners and other stakeholders, rather than engagement that is tokenistic or ad hoc
	Improve clarity	Importance of increasing clarity on complex academic terms and concepts for practitioners and stakeholders from the outset
	Facilitate engagement	Need to facilitate engagement by acknowledging the time/organisational constraints of healthcare practitioners and other stakeholders and finding ways to work around these constraints
	Be strategic	Importance of developing a clear strategy for integrated knowledge translation from the outset, which includes identifying specific goals, knowledge users, key performance indicators and time points for your strategy

Correspondence to:
Dr Susan Calnan
School of Public Health, University
College Cork, National University of
Ireland, Cork, Ireland
susan.calnan@ucc.ie

Elaine Toomey
[2]School of Psychology, National
University of Ireland, Galway,
Ireland

Karen Matvienko-Sikar
[1]School of Public Health, University
College Cork, National University of
Ireland, Cork, Ireland

Catherine Hayes
[3]Public Health and Primary Care,
Trinity College Dublin, the
University of Dublin, Ireland

Sheena McHugh
[1]School of Public Health, University
College Cork, National University of
Ireland, Cork, Ireland

Caragh Flannery
[1]School of Public Health, University
College Cork, National University of
Ireland, Cork, Ireland

Kate O'Neill
[1]School of Public Health, University
College Cork, National University of
Ireland, Cork, Ireland

Edel Doherty
[4] J.E. Cairnes School of Business &
Economics, National University of
Ireland, Galway, Ireland

Marita Hennessy
[5]Health Behaviour Change Research
Group, National University of
Ireland, Galway, Ireland

Colette Kelly
[6]Health Promotion Research Centre,
National University of Ireland,
Galway, Ireland

Caroline Heary
[2]School of Psychology, National
University of Ireland, Galway,
Ireland

Michelle Queally
[4] J.E. Cairnes School of Business &
Economics, National University of
Ireland, Galway, Ireland

Tony Heffernan

[7] Mallow Primary Healthcare Centre,
Co. Cork, Ireland

Molly Byrne

[2] School of Psychology, National
University of Ireland, Galway,
Ireland

Patricia M Kearney

[1] School of Public Health,
University College Cork, National
University of Ireland, Cork, Ireland

Applying the Social Identity Approach to Public Health.

A Case Example of Theory in Practice

Andrew Levy
Edge Hill University

Adrian W. Midgley
Edge Hill University

Samantha Pilsworth
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Adrian Mcgonigle
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Lyndsey Wigelsworth
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Linda Jones
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Dennis Wat
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Nicola Pott
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Max Bettany
Knowsley Community Respiratory Service, Liverpool Heart & Chest Hospital

Bashir Matata
Clinical Trials Unit, Liverpool Heart & Chest Hospital

Abstract

Public health interventions play a major role in protecting, enhancing and maintaining the health of a population. At present, there is a plethora of public health interventions that promote a range of health behaviours for improving the lives of people suffering from chronic disease. Psychological theories can help us to understand the mechanisms that underpin health promotion interventions. However, the application and operationalisation of theory is not always transparent when utilised in public health systems for improving chronic health outcomes. Through the lens of social identity theory, the current article aims to provide a commentary on the content and practical delivery of a health intervention used within a public health service in the UK. Specifically, we present a case example detailing the application of social identity theory within a community pulmonary rehabilitation service to improve the quality of life for patients diagnosed with chronic obstructive pulmonary disease. Furthermore, we provide some balanced reflections on the utility of the social identity approach to inform a public health intervention. Our article provides practical applications and recommendations for using a novel theoretical approach in a public health setting to help bridge the theory to practice nexus.

Keywords: Group Membership, Exercise, Rehabilitation, Health

Public health interventions aim to promote or protect health or prevent ill health in communities or populations and are complex. Complex interventions require theoretical underpinning to understand the mechanisms responsible for achieving change (Craig, Dieppe, Macintyre, Michie, Nazareth, & Petticrew, 2008). However, theory-based change techniques used in public health interventions are not always transparent. The obscurity of theoretically-derived techniques and their practical application can undermine the utility of public health interventions, creating a theory to practice nexus. As an example, descriptions of group-based change techniques often omit information about features relating to content and delivery (Borek, Abraham, Smith, Greaves, & Tarrant, 2015). The current article, therefore, provides an insight into the content and delivery of a group-based social identity intervention used within a community pulmonary rehabilitation service in the UK, which was based on a collaborative partnership between academic researchers and healthcare practitioners.

The social identity approach comprises of two related theories, namely social identity theory (Tajfel & Turner, 1979) and self-categorisation theory (Turner, 1985). At its core, the social identity approach stipulates that the way a person thinks and feels about self is derived from their group memberships. Group memberships can provide individuals with a sense of who they are in terms of a defined group identity (i.e., 'we' and 'us' rather than 'I' and 'me'). According to the social identity approach, two salient social processes are responsible for developing a group identity:

1)*categorisation*: awareness of similarities that collectively connect members as a group, and

2)*identification*: positively valuing the importance of belonging to a group membership. The social identity approach is particularly useful for informing interventions where people have limited access to social groups and networks (Haslam, Jetten, & Haslam, 2012). In public heath

settings, many chronically ill people often experience social isolation (Johnson, Campbell, Bowers & Nichol, 2007) and impaired social interactions due to stigmatisation and as such have limited opportunities to develop new group memberships. The social identity approach, therefore, can usefully inform public health interventions that undertake programmes in group contexts (Steffens, La Rue, Haslam, Walter, Cruwys, Munt et al., 2019). Based on the social identity approach, recent research has developed an intervention for chronic obstructive pulmonary disease (COPD) patients attending the group-based exercise component of pulmonary rehabilitation (Levy, Matata, Pilsworth, Mcgonigle, Wigelsworth, Jones, et al., 2018). Preliminary findings suggest the social identity intervention improved COPD patients' social experiences and compliance with pulmonary rehabilitation (Pilsworth, Mcgonigle, Wigelsworth, Jones, Pott, Bettany, et al., 2018). To provide a further insight into the intervention's application, what follows next is a nuanced account of the content and delivery of social identity principles in a pulmonary rehabilitation setting.

The aim of the social identity intervention was to train healthcare practitioners to create a new group identity for COPD patients attending an 8-week pulmonary rehabilitation programme (see table 1). In view that COPD patients did not know each other before embarking upon pulmonary rehabilitation, the first phase of the intervention involved healthcare practitioners leading a 1-hour group discussion to create an awareness of a COPD pulmonary rehabilitation group membership. This process of categorisation accentuated the similarities between COPD patients and their differences from non-COPD suffers to build the foundations of a COPD pulmonary rehabilitation ingroup. Establishing the COPD ingroup or the sense of 'us' was facilitated by the use of three categorisation techniques;

Table 1. TIDieR table (in accordance with Hoffmann et al., 2014) for the social identity intervention in pulmonary rehabilitation

Item	Description
Name:	Social identity intervention in pulmonary rehabilitation
Why:	Chronic obstructive pulmonary disease (COPD) is a debilitating lung condition that affects many people's lives in the UK. One of the main aims of pulmonary rehabilitation are to improve the quality of life for patients who have been diagnosed with COPD. The challenge for pulmonary rehabilitation is that many patients do not complete or engage appropriately with their pulmonary exercise rehabilitation programme. Doctors and other healthcare professionals delivering pulmonary rehabilitation care believe that patients who are working together as part of a group (intervention) may better attend and engage with the exercise component of pulmonary rehabilitation. Accordingly, the intervention aims to build a social identity to encourage patients to interact and support each other and work as a team during the rehabilitation sessions to achieve mutually agreed pulmonary group exercise goals. However, there is an absence of research evidence to guide such desired changes to current practice.
What (materials):	Healthcare practitioners delivering pulmonary rehabilitation were trained on the development of social identity using categorisation and group goal setting techniques. Healthcare practitioners used worksheet materials during their training to facilitate the aforementioned techniques in practice. The process of categorisation utilised two worksheets. The first worksheet established shared characteristics and associated group meanings that COPD patients perceived to have in common with each other. The second worksheet consolidated the most important shared characteristics for establishing the foundation of a COPD exercise in-group. Group goal setting was documented using a further two worksheets. Worksheet three established specific goals, both performance and process, alongside the timeframe for goal completion and sources of evidence for recognising goal achievement. Worksheet three was also used to monitor the group's performance and process goals and were amended accordingly to ensure goals remain realistic and achievable. Worksheet four facilitated goal evaluation by documenting the group's thoughts about their collective goal achievements.
What (procedures):	Healthcare practitioners attended two educational workshops, both of a two-hour duration. The first workshop facilitated an understanding of social identity principals and its application to a pulmonary rehabilitation setting. The second workshop aimed to provide healthcare practitioners with practical knowledge and dissemination of social identity derived intervention techniques into pulmonary rehabilitation practice. Both workshops conveyed educational material using various implementation activities, such as focused group discussions, skills practice, and problem solving. Resources used to support such activities were handouts containing formal notes, PowerPoint slides, flip charts and video material.

Table 1. *(continued)*

Who provided:	The intervention provider was healthcare practitioners who were qualified in delivering pulmonary rehabilitation for COPD patients. In addition to their responsibility for providing standard pulmonary rehabilitation care, healthcare practitioners were trained to deliver the intervention component by a Health and Care Professions Council (UK), Registered Psychologist. Healthcare practitioners were supported by the psychologist throughout the duration of the study to ensure the intervention was delivered as expected. Healthcare practitioners delivering the intervention did so for the purpose of the study and were not incentivised.
How (mode of delivery):	The intervention was provided to a group of COPD patients attending an 8-week pulmonary rehabilitation. Four COPD patient groups received the intervention, each comprising of between 6 and 15 patients. The intervention was delivered face-to-face by healthcare practitioners and composed of 3 x 1 hour interactive discussion sessions over the 8-week period.
Where:	The intervention took place across two leisure centres, as part of National Health Service (NHS) community care service. The leisure centre sites where located within a single UK borough.
When and how much:	The intervention took place over an 8-week period of pulmonary rehabilitation. COPD patients engaged in 3 x 1 hour discussion groups prior to rehabilitation (week 0), midway through rehabilitation (week 4) and after rehabilitation (week 9). To obtain a sufficient sample size, the intervention was repeated four times, with each rehabilitation period lasting 8-weeks in duration. In total, the study spanned 32-weeks and delivered 12 intervention discussion group sessions.
Tailoring:	All participants received the same intervention. Healthcare practitioners received the same training and resources for delivery.
Modification:	The intervention was not modified during the study.
How well (planned):	All healthcare practitioners having responsibility for delivering the intervention, attended the 2 x 2-hour training workshops in full (100% attendance). One healthcare practitioner was later added to the intervention delivery team and received the same workshop content on an individual basis, prior to the start of the study.
How well (actual):	Over the 32-week study, all 12-intervention discussion group sessions of 1-hour duration were delivered in full by healthcare practitioners to COPD patients attending pulmonary rehabilitation programme (100% delivery completion).

1) *self-anchoring*: projecting self-characteristics and attributes on the ingroup to provide meaning to one's new COPD pulmonary rehabilitation group membership,

2) *intergroup differentiation*: facilitating the differences between established COPD in-group attributes from those who do not suffer from COPD (out-group) to provide a sense of unity among the COPD pulmonary rehabilitation group membership, and

3) *self-stereotyping*: healthcare practitioners projecting professional knowledge of collective COPD in-group characteristics and attributes on individuals that constitute the group membership to provide a sense of belonging.

At each rehabilitation session, COPD patients wore specially designed uniform t-shirts that depicted the individual's name and an in-group logo. We believed the use of t-shirts facilitated a tangible sense of in-group distinctiveness to help facilitate the categorisation processes.

The second phase of the intervention attempted to help COPD patients positively identify as being a part of the COPD group membership. This process of identification was necessary for COPD patients to internalise the concept of being a member of a group with a common purpose. We used group goal setting to help COPD patients identify with their group and subsequently develop a collective sense of 'we'. To this end, the setting of group goals provided COPD patients with a collective sense of fate and purpose (e.g., cohesion), direction and meaning, (e.g., achievement), effort and persistence (e.g.,motivation). Healthcare practitioners implemented goal setting across three stages.

Stage one involved the setting of performance and process goals prior to pulmonary rehabilitation commencing. The former refers to collective group exercise performance attainments (e.g., collective rowing meters) and the latter refers to implementation strategies to help achieve collective performance goals (e.g., prosocial

supportive behaviours). At stage two, healthcare practitioners discussed the group's goal progression through a 1-hour group discussion midway through the pulmonary rehabilitation programme. This stage allowed for the adjustment of goals to ensure they remained realistic and achievable. Some patients, for example, were likely to experience exacerbations that did affect rehabilitation attendance, completion and dropout, therefore requiring the adjustment of group goals. In stage three, healthcare practitioners evaluated the group's goal achievements towards the end of pulmonary rehabilitation. During a 1-hour group supportive discussion meeting, healthcare practitioners were able to constructively communicate appropriate evaluative feedback by attributing goal successes to the group's collective endeavours (i.e., in-group internal bias), and attributing goal shortcomings to factors outside the group's control (i.e., in-group external bias). Additionally, healthcare practitioners were able to reinforce collective goal achievements by communicating personal gains from being a part of the group such as confidence and enjoyment (i.e., positive reinforcement) and how the group has helped remove unpleasant individual experiences such as isolation and anxiety (i.e., negative reinforcement).

Our article provides a case example of social identity processes in action to support COPD patients derive a sense of self during pulmonary rehabilitation as a member of a group. To date, the application of social identity has mainly focused on naturalistic identities (e.g., gender, nationality, sports teams) where the development of social identity processes and group memberships are ubiquitous. However, in public health contexts, naturalistic identities are not always prevalent, as was the case for COPD patients engaging with pulmonary rehabilitation. At present, there is a nexus between the social identity approach and public health practice, particularly with respect to developing new health-related group memberships

and the social identities that exist within them. Bridging the theory-practice nexus is important for utilising the social identity approach for creating new group memberships in public health interventions. "There is nothing as practical as a good theory" (Lewin, 1952, p.169), therefore we encourage the greater publication of material that informs the application of social identity processes in the public health domain.

A caveat in the development of new social identities is the ability of individuals to sustain their group membership. This is an important issue as public health interventions are often not sustainable due to being of finite duration resulting from funding restrictions (Walugembe, Sibbald, Le Ber, & Kothari, 2019). In the present case example, COPD patients attended an 8-week pulmonary rehabilitation programme and as such it was not possible for all patients to maintain their new group membership beyond this period. Potentially, this can be damaging for chronic disease populations, such as COPD patients, who can be often isolated and therefore unable to draw upon a broader network of group memberships. It is essential, therefore, to consider group membership continuity when developing new social identities for public health interventions. One fruitful area to explore is the role of peer-led support groups as an adjunct to public health service programmes to maintain group memberships and the multiple social identities that underpin them. Peer support groups have the potential to initiate a shared sense of identification that can facilitate the formation of constructive supportive relationships for people living with lifelong health conditions.

Healthcare practitioners have responsibility for leading pulmonary rehabilitation and are in a unique position to influence the social interactions of COPD patients. As such, healthcare practitioners can play an important role in delivering social identity-based interventions for public health services. Healthcare practitioners, in our

intervention, undertook training on the application of social identity principles and processes within a pulmonary rehabilitation setting. However, this would not have been possible without a collaborative working partnership, alongside the development of relevant and bespoke training materials. Social identity interventions will have a greater chance of acceptance in public health settings with the establishment of effective partnerships between healthcare practitioners and the academic community, and when the application of the social identity approach has clear fit and relevance within existing health service provision.

Generally, when applying interventions within a public health service there is always the potential to experience unique organisational challenges. In our case, we encountered an issue whereby, for theoretical purposes, we wanted rehabilitation groups to have uniform structure and composition to foster patient categorisation and identification. Doing so, however, resulted in delaying the start dates for some patients enrolling on a pulmonary rehabilitation programme. The challenge for us, therefore, was to ensure that we obtained a homogenous cohort of COPD patients in the social identity intervention within an appropriate waiting timeframe, as determined by the health service provider. We recommend that social-identity based interventions in public health will benefit from ascertaining, as early as possible, the organisational factors external to the intervention that might influence how it operates.

To conclude, this article provides a nuanced insight towards the application of the social identity approach in a public health setting. We attempt to bridge the gap between social identity principles and practice and in doing so raise some issues about maintaining social identities and the challenges of applying this approach in a public health context. The social identity approach holds promise to innovate and inform the development and sustainability of new and existing group structures across a spectrum of public health

interventions. To realise this potential, we encourage the publication of applied and contextualised insights on the practicality and usability of the social identity approach in a variety of public health settings.

References

Borek, A. J., Abraham, C., Smith, J. R., Greaves, C. J., & Tarrant, M. (2015). A checklist to improve reporting of group-based behaviour-change interventions. *BMC Public Health, 15*(1), 963. doi: 10.1186/s12889-015-2300-6

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: the new Medical Research Council guidance. *British Medical Journal, 337*, 979-983. doi: 10.1136/bmj.a1655

Haslam, C., Jetten, J., & Haslam, A. (2012). Advancing the social cure: Implications for theory, practice and policy. In J. Jetten, C. Haslam & S.A Haslam (Eds.), *The social cure: identity, health and wellbeing* (pp. 319-343). Hove: East Sussex: Psychology Press.

Hoffmann, T., Glasziou, P., Boutron, I., Milne, R., Perera, R., Moher, D et al. (2014). Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ*, 348, g1687. doi.org/10.1136/bmj.g1687

Johnson, J.L., Campbell, A.C., Bowers, M., & Nichol, A.M. (2007). Understanding the social consequences of chronic obstructive pulmonary disease: the effects of stigma and gender. *Proceedings of the American Thoracic Society, 4*, 680–682. doi.org/10. 1513/pats.200706-084SD.

Levy, A.R., Matata, B., Pilsworth, S., Mcgonigle, A., Wigelsworth, L., Jones, L et al. (2018). An intervention for pulmonary rehabilitators to develop a social identity for patients attending exercise pulmonary rehabilitation: A feasibility and pilot randomised control trial protocol. *Pilot and Feasibility Studies, 4,* 40. doi: 10.1186/s40814-018-0238-z

Lewin, K. (1952). *Field theory in social science: Selected theoretical papers by Kurt Lewin* (D. Cartwright Ed.). London, UK: Tavistock.

Pilsworth, S., Mcgonigle, A., Wigelsworth, L., Jones, L., Pott, N., Bettany, M., et al. (2018). Group-based social identity intervention during pulmonary rehabilitation improves COPD patients experience and promotes compliance with exercise programme. Thorax, 73(4), 156. doi.org/10.1136/thorax-2018-212555.257

Steffens, N.K., La Rue, C.J., Haslam, C., Walter, Z.C., Cruwys, T., Munt, K.A., et al. (2019). Social identification-building intervention to improve health: A systematic review and meta-analysis. *Health Psychology Review*. Advance online publication. 10.1080/17437199.2019.1669481

Tajfel, H., & Turner, J.C. (1979). An integrative theory of intergroup conflict. In W.G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33-47). Monterey, CA: Brooks/Cole.

Turner, J.C. (1985). Social categorisation and the self-concept: A social cognitive theory of group behaviour. In E.J. Lawler (Ed.), *Advances in group processes* (Vol. 2, pp. 77-122), Greenwich, CT: JAI Press.

Walugembe, D.R., Sibbald, S., Le Ber, M.J., & Kothari, A. (2019). Sustainability of public health interventions: Where are the gaps? *Health Research Policy and Systems, 17,* 8.doi.org/10.1186/s12961-018-0405-y

Andrew Levy

Department of Psychology and the Health Research Institute, Edge Hill University, UK

Levya@edgehill.ac.uk

Trials and tribulations: When Academic Research and Public Health Worlds Collide

Lesley M. McGregor
University of Stirling, UK
Christian von Wagner
University College London, UK

Three years ago, we received funding to develop, trial and evaluate a series of interventions to promote attendance at Bowel Scope Screening (BSS) in Hull, Yorkshire, UK (McGregor et al., 2018). The last of these interventions has now been delivered and in just a couple of months we will receive NHS data (from the Bowel Cancer Screening Programme) which will tell us how successful each intervention has been. While we await the results, we reflect on our trial experience and the difficulties faced in pursuit of improving public health.

CRC (Colorectal cancer; bowel cancer) is a common cancer with 42,000 people on average being given a diagnosis, and over 16,000 dying from the disease, each year in the UK (CRUK, n.d.). This ranks CRC as the fourth most common cancer and the second most common cause of cancer deaths. While these figures are improvements from previous years, they remain concerning. Bowel scope screening is a test that has a strong evidence base for not only reducing mortality, but chiefly preventing bowel cancer from developing in the first place. It was introduced as part of the English NHS Bowel Cancer Screening Programme in 2013 and is currently offered to adults aged 55 and registered with a General Practice. However, the test involves a one-off inspection of the lower part of the bowel, a procedure also known as Flexible Sigmoidoscopy, making it a particularly invasive, potentially embarrassing, procedure. Uptake is rather unsurprisingly very low, limiting any benefits associated with the test.

As Psychologists, we are interested in why people in England don't take part in BSS. We explore the reasons and apply psychological theory to an understanding of low uptake, with a focus on developing interventions to encourage informed decision making and support for screening participation.

General Practitioner (GP) endorsement is reliably shown to improve uptake of cancer screening opportunities (Duffy et al., 2016). We wanted to capitalise on this by devising simple interventions to be delivered through primary care, specifically a GP practice-based primer letter, a self-referral reminder letter, and a patient navigation phone call. All interventions have a growing evidence base in other contexts or countries but have not yet been evaluated in respect to bowel scope screening in England. Things started positively, with enthused, knowledgeable and experienced collaborators and advisors on board, including GPs, but the essential recruitment of GP practices to the study proved to be a challenge bigger than any of us had imagined.

At our first funder meeting, we were introduced to members of the local NHS Clinical Research Network (CRN), who offered reassurance as to our recruitment aims. However, while they proved to be a great support on many levels, their influence on GP practices was not as anticipated. As part of the development phase of our interventions we considered it imperative to involve local GPs and practice staff members so that we could better understand the anticipated barriers the local population would face with regard to accessing health care and glean a more practical response to our proposed GP practice-based interventions. The

Figure 1
Flyer (A6) distributed at the 3rd Annual Yorkshire and the Humber CRN Primary Care Academic Research Day to supplement presentation (February 2018)

Using primary care to increase uptake of bowel scope screening (BSS) in Yorkshire: evaluating paper and telephone based interventions

We need your help to increase patient uptake of BSS.

Please contact us to find out if your practice is eligible to take part in the above study

John Hodgson
NIHR CRN Yorkshire and Humber
john.hodgson@nihr.ac.uk
0113 206 0442 / 52

Lesley McGregor
University College London
l.mcgregor@ucl.ac.uk
0207 679 8268

Trish Green
Hull York Medical School
Trish.Green@hyms.ac.uk
01482 463 392

Sign up by the
14th February and receive an extra*
£100
*Support Costs currently £283

yorkshire cancer research
Registered charity 516898

CRN sent an 'Expression of Interest' email to 21 practices, inviting staff members at any level to take part in a brief telephone interview with the researchers. This was followed up with multiple emails and calls, but resulted in zero responses. Only opportunistic direct conversation between the CRN team and practice managers was found to help; we eventually gleaned valuable insights regarding our targeted population from six staff members representing three practices.

Recruitment of GP practices to the main trial continued to be problematic. The disconnect between us as non-clinical academic researchers trying to engage with GPs was incredibly frustrating. Emails to practice managers were mostly futile and read receipts suggested many were perhaps not even read. Calls were cut short, being informed that the practice manager was not in or not currently available, information only communicated once we responded to questions of who we were and why we were calling! When our efforts were successful, the joy was real, and staff proved to be welcoming, interested and helpful, but getting 'a foot in the door', and getting a chance to be heard, was incredibly hard, time consuming, and with a limited funded research timeline, extremely anxiety provoking.

In support of our mission, the CRN provided us a platform to promote our study at primary care events. We presented our research aims and plans, highlighting monetary rewards guaranteed for practices that took part and a bonus for those who signed up before a certain date. Our stall even tried to draw in the crowd with chocolates (see photo). Both had a certain level of success, with a number of attendees wanting to know more about our research, but neither were the 'silver recruitment bullet' we desperately needed.

Understanding how busy GP practices are, we incorporated into our research protocol a research nurse to perform and oversee most of the tasks required for the study and use of a third-party mailing company to support the distribution of our paper-based interventions. While an attractive

Figure 2
Photo of our study recruitment stall at Hull CCG meeting

aspect for the GP practices, the processes required to secure a research passport and letter of access for our research nurse took far longer than anticipated, and the use of a third-party mailing company was a concern for Practice Managers, in light of the then imminent General Data Protection Regulation (GDPR) changes. Despite security certificates, contracts and ethical approvals in place, a protocol amendment had to be written, reviewed and approved, allowing GP practices to oversee the mailed interventions in-house instead. In addition, despite approval from the NHS Confidentiality Advisory Group (CAG)[1] to conduct this research study without written consent from patients, one GP practice who originally showed interest in the study stated this absence of written consent as a reason for not continuing with participation. It is likely that this was also the reason for other practices, with uncertainty and apprehension around new GDPR regulations and fines with respect to the protection of patient information; however, a lack of engagement meant we could not collate information on the factors influencing GP practice decision making. It is important to stress that in our previous feasibility study exploring patient navigation calls, we had asked for consent from people who were invited for bowel scope screening and only 14.5% agreed to be part of our study (McGregor et al., 2019). This was a clear demonstration that obtaining prior consent for this type of intervention is not feasible and at best returns a biased sample of highly motivated people who do not require any further support for making screening decisions, thus defeating the very purpose of our trial.

An additional barrier to GP recruitment was evident from a higher, organisational level. The roll out for BSS in Hull and East Riding was slower than expected meaning that we lost access to around

nine practices who had their expected 'live' date delayed out with the timeline of our study. In the end, we recruited 12 practices from a list of 31 eligible to take part.

It often feels as though Primary Care in the UK exists in a parallel universe to the research world we live in. What takes researchers an endless amount of approvals can often be implemented immediately in GP practices as part of their routine care. GPs have more flexibility and their ideas are not reviewed by multiple committees, with subsequent delays, disagreements and lengthy amendment procedures to comply with. They can also react more positively to problems encountered whereas we are limited by our funded timeline, employment contracts etc.; we can't simply stop the study until problems are fixed.

The best example for this imbalance are phone-based reminders. We as researchers have been very keen to emulate the evidence base coming from the US for the effectiveness of patient navigation. Patient navigation involves more than a simple phone-based reminder. It is a thoughtful theory-based approach to empowering patients, identifying and, only where considered appropriate, trying to remove obstacles to engaging with various behaviours on the cancer care continuum, including screening. For every attempt to deliver PN via phone calls, there are hundreds of phone-based reminders being made from local GP practices and community organisations. Community care providers like GPs have, to a large degree, the freedom to just 'run' with things that feel intuitive. There is very little incentive for GP practices to take the long way round and wait for researchers to secure funding and approvals for scientific evaluations, especially if they have uptake targets, which need to be met by a set deadline. However, the main problem with this approach, is that many of these activities are often not sustainable, relying on short-term resources and incentivisation schemes, and are rarely evaluated (impact and cost-effectiveness) and/or shared with the wider

---

[1]The Confidentiality Advisory Group must give approval for studies in England and Wales where consent is not to be sought for access to confidential patient information.

community.

There is no denying both parties are concerned with enhancing the health of patients and preventing illness, but how can primary care and psychology researchers work more closely to achieve this aim in a timelier, evidence-based manner? An obvious way forward is for academia to support the development and evaluation of audits. This will rely on academics embracing different approaches to evaluation, as traditional RCT approaches do not address the needs of primary care commissioners. The need for a control group not receiving the intervention can be an obstacle if there is an urgent need to improve uptake across the whole population. On the other hand, there is a clear need for practitioners and commissioners to understand the research cycle and work with academic researchers to implement interventions with a clear evidence base.

These views reflect our own experiences, we suspect other researchers to have faced similar difficulties and we are keen to start a conversation as to how we can improve things going forward so that both parties, and of course patients, benefit. How can we manage our competing priorities and workloads to allow a more collaborative approach to improving health and preventing illness? What can and should be done differently in future public health-based work?

While we highlight frustrations with the processes involved in working to improve public health through primary care, we have also achieved great things with this research project. We have developed what we think are some excellent study materials, co-produced with local people for local people, and have helped promote the very existence of BSS to GP practice staff and the general public. Time will tell if our interventions have had a positive effect on BSS uptake, but we remain hopeful and positive of our achievements so far.

References

Cancer Research UK (n.d.). *Cancer statistics for the UK: Bowel cancer statistics*. Retrieved 14 October 2019 from https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/bowel-cancer

Duffy S, Myles JP, Maroni R, Mohammad A. (2016). Rapid review of evaluation of interventions to improve participation in cancer screening services. *Journal of Medical Screening, 24*(3), 127-145. doi: 10.1177/0969141316664757

McGregor LM, Kerrison RS, Green T, Macleod U, Hughes M, Gibbins M, Morris S, Rees C, von Wagner C. (2018). Using primary care-based paper and telephone interventions to increase uptake of bowel scope screening in Yorkshire: a protocol of a randomised controlled trial. *BMJ Open 8*:e024616. doi:10.1136/bmjopen-2018-024616

McGregor LM, Skrobanski H, Ritchie M, Berkman L, Miller H, Freeman M, Patel N, Morris S, Rees C, von Wagner C. (2019). Using Specialist Screening practitioners (SSPs) to increase uptake of bowel scope (flexible sigmoidoscopy) screening: results of a feasibility single-stage phase II randomised trial. *BMJ Open, 9*:e023801. doi: 10.1136/bmjopen-2018-023801

Lesley M. McGregor
Division of Psychology, University of Stirling, UK

l.m.mcgregor@stir.ac.uk

Christian von Wagner
Department of Behavioural Science and Health, University College London, London

c.wagner@ucl.ac.uk

P5 Medical Centre, a platform to improve health and promote behavioural change in a Digital Era

Liliana Amorim

Association P5 Digital Medical Centre (ACMP5), Portugal

Fábio Borges

Association P5 Digital Medical Centre (ACMP5), Portugal

Inês Fernandes

Association P5 Digital Medical Centre (ACMP5), Portugal

Marina Gonçalves

Association P5 Digital Medical Centre (ACMP5), Portugal

Nuno Santos

Association P5 Digital Medical Centre (ACMP5), Portugal

Pedro Morgado

Association P5 Digital Medical Centre (ACMP5), Portugal

Nuno Sousa

Association P5 Digital Medical Centre (ACMP5), Portugal

Abstract

Digital technologies have changed the way we manage our health. In fact, they not only contributed to health transformation by delivering care in people's homes, but also by addressing weaknesses in health systems and improving the training and performance of the health workforce. Taking advantage of the ubiquitous use of mobile phones and computers/ tablets, the P5 Digital Medical Center (ACMP5) at the School of Medicine of University of Minho (EM-UMinho) aims at strengthening the Portuguese health care system through a platform that enables a sustained environment for behaviour change and for health monitoring and promotion. This pilot project combines the use of mobile apps and platforms with personalized feedback and guidelines from different health professionals, to empower individuals with non-controlled hypertension and type II diabetes in the appropriate monitoring of their health status, so
that they can properly manage their health. To do so, P5 has a multidisciplinary team composed by psychologists, family doctors (GP's), nurses, nutritionists and computer scientists working together and with the digital technology to improve individuals' health.

The use of digital platforms for health improvement and behaviour change

Preventable and treatable conditions continue to be at the top of mortality and morbidity rates worldwide (World Health Organization, 2019), increasing the need for effective programs guiding people towards healthier choices and lifestyles, helping them in maintaining it and allowing for a long-term assessment of the programs' effectiveness (Pellmar, Brandt, & Baird, 2002). With digital technologies, new avenues are observed with the possibility of a universal health care coverage, as well as the acquisition of day-to-day data that not only can aid in monitoring individual's progress, but also in obtaining a reliable mean to assess interventions efficacy (Rathbone & Prescott, 2017; Redfern, 2019). Thus, with P5 project, we take advantage of these aspects and use different platforms and mobile apps (Haas, Hayoz, & Maurer-Wiesner, 2019; Jamaladin et al., 2018; Rohde, Lorkowski, & Dawczynski, 2017; Cianflone et al., 2016) to monitor users' health status and provide them personalized feedback that will help them adjusting behaviours and maintaining it for a longer period of time. The use of digital platforms and mobile apps to promote

behaviour change has increased (Groarke et al., 2019; Morrissey, Glynn, Casey, Walsh, & Molloy, 2018; Walsh & Groarke, 2019). Results from these studies show an improvement not only on its' individual health status and well-being (Avery et al., 2012; Lean et al., 2018), but also in decreasing the economic burden related to disease (OECD/EU, 2016). However, it is also important to recognize that there is still limited evidence in what concerns to these programs efficacy and sustainability across time (Grist, Porter, & Stallard, 2017; Marshall, Dunstan, & Bartik, 2019; Walsh & Groarke, 2019; Wang, Varma, & Prosperi, 2018). Indeed, despite many individuals having smartphones and being able to use health apps, there is still the possibility that *they* do not engage in these type of interventions given their lack of motivation to change behaviour or their different needs (Ernsting et al., 2017).

P5: project description, aims and future steps

The P5 Digital Medical Centre (ACMP5) was created at the School of Medicine of University of Minho (EM-UMinho) and aims at improving the health of citizens by providing digital platforms combined with the action of a multidisciplinary team to empower the individual to achieve a healthier lifestyle. The central idea of the P5 Digital Medical Centre is to promote better health care at the following levels: prevention, interconnection between primary health care and hospitals, and chronic disease monitoring (starting with hypertension and type 2 diabetes). There are two ways to register in ACMP5: individuals can register by themselves through a specific link in ACMP5 webpage or they can be recommended by their GP to be followed in one of our platforms - hypertension (Cianflone et al., 2016; Jamaladin et al., 2018) or type 2 diabetes (Haas et al., 2019;

Rohde et al., 2017) (the later also being used by the NHS England; https://www.england.nhs.uk/ 2019/05/online-diabetes-support/). According to the Medical Research Council's evaluation framework, at this point, we are assessing the feasibility of our interventions (Craig et al., 2008; Dowding, Lichtner, & Closs, 2017). A description of the hypertension and type 2 diabetes programs, using the TIDieR guidelines (Campbell et al., 2018; Hoffmann et al., 2014) is provided in Table 1.

P5's strategy is focused on providing personalized attention and care to its users. For this, psychologists will act as "health coaches", guiding and motivating the user to keep on track for a healthier lifestyle and follow their doctor indications. Importantly, the role of psychologists as "health coaches" is to be highlighted. In the literature there is still heterogeneity regarding the importance of health coaches in the success of the interventions (Canadian Agency for Drugs and Technologies in Health, 2016). Since there has been positive results when combining digital health and coaching in behavioural change (Castro Sweet et al., 2018), we are interested in determining the impact that a psychologist as a health coach has in the success of implementing and maintaining behaviour change (Dixon & Johnston, 2010). Specifically, the health coaches will work alongside with nutritionist and nurses to actively promote healthier lifestyles in service users. Particularly for chronic conditions like hypertension and type 2 diabetes, personalized approaches will be adopted to increase the number of individuals with the control of the disease and that adhere to the treatment. By specifically addressing these two conditions, with a program aimed to increase the adherence to treatments and healthier life choices, we aim to help the primary care providers with their work on these patients.

As stated above, it is vital to find a reliable and effective way to enable people to make health-enhancing choices that promote behaviours with a long-term positive impact on their health and well-

Table 1. TIDieR checklist for the hypertension and type 2 diabetes programs.

Item	Item description
1. Brief Name	P5: a digital platform to monitor, intervene and support patients' health management.
2. Why	A combination between a digital platform and the action of a multidisciplinary team composed by GP's, nurses, psychologists and nutritionists is considered to increase the potential of the intervention and promote long term effects in behaviour change.
3. Materials	Materials that support the intervention will be provided to the participants through the platform and/or by email. The materials include: an educational package about hypertension and/or diabetes; cards that are shown throughout the program (in the app) highlighting the most important aspects of a healthier lifestyle; and a personalized program that is sent every month with the detailed information for the 8 days or 30 days ahead (for example, with the nutritional plan or the scheduled calls with the psychologist or nutritionist).
4. What and how	The program duration can vary between 60 and 90 days (hypertension and the type 2 diabetes programs respectively). In the hypertension program, there is an initial call by a nurse that collects the clinical history and then another call from a psychologist for an initial psychological assessment. Then, all the monitoring and implementation of the program in made automatically by the app. At specific times (defined with each patient throughout the program), there will be a call from the health psychologist to promote the adherence to the program and therapeutics. In the beginning of each month, the user receives a detailed program for that 30 days. Regarding the type 2 diabetes program, the use of the platform will be mainly to facilitate the communication between health psychologists and the nutritionist and to provide the materials relevant for the program. There is also a notification service that will allow the user to be notified every time there is a session scheduled or that he/she has a new aim to fulfil that week. Through the platform, they have also the opportunity to message the professional that is following him/her. Contrary to the hypertension program, in the type 2 diabetes program, there will be set aims every 8 days.
5. Who provided	A multidisciplinary team provides the services. At this moment our time is composed by experienced GP's, nurses, health psychologists and nutritionists, all registered in professional boards. Health psychologists are responsible for the implementation of the programs and for promoting the compliance to it; nurses have the responsibility to collect the clinical data and nutritionists are responsible for elaborating the nutritional plan. GP's supervise the therapeutic plan.
6. Where	All the interventions are performed with the use of a platform or mobile app. Video chat, calling and messaging is also applied.
7. When and how often	Interventions are designed for a period of 90 days or 60 days and the interaction with the health professionals is determined by each user when they initiate the program.
8.1. Planned variation	Not applicable.
8.2. Unplanned variation	Not applicable.
9.1. How well	The intervention activities delivered for each program will be recorded within the P5 platform. An audit will also be implemented periodically (quarterly) to monitor the notes about intervention delivery for each program.

NOTE: we are still working on the programs and changes are possible to be performed after the pilot.

being. A healthcare shift from a disease reactive mode of action, to a predictive, preventive, personalized and participatory care (P4 medical concept) was already observed (Hood & Friend, 2011; Vogt, Hofmann, & Getz, 2016). Adding to the mobile applications and behaviour change platforms, P5 counts with a multidisciplinary that will individualize the intervention to the specific needs of the user and provide the proximity between the individual and his/her health care providers (i.e. the reason why we call the project P5). Importantly, this proactive mode of action in healthcare enables more effective and sustainable actions by focusing on the preventive and personalized dimension; furthermore, in this approach, causes rather than symptoms, are the focus of intervention. By working together in healthcare networks of different levels of complexity (from primary care to the highest hospital differentiation) and with the appropriate digital support, we can reduce the incidence of chronic diseases, which are currently responsible for 75% of global healthcare costs.

We are currently conducting focus groups with different stakeholders, including with patients, caregivers and health professionals in order to obtain information about the real needs of each of these groups, as well as the best strategies to tackle them with our interventions. We will use specific platforms and apps that set specific aims for each week of the intervention, and that will be complemented by the action of the health coaches at the level of health literacy and motivation.

When working with digital technology, data safety is a crucial topic to address. Within P5 project, we assured that sensitive data is protected. For this, we have a data protection office (DPO) that helps us in understanding and implementing the best strategies to ensure data safety. Ethic committees were also considered in this process. There is also a policy to ensure transparent data governance and security, responsibility, time and place of storage, traceability, property and market value of such data. Another aspect that makes our pilot very valuable is the fact that we will evaluate each platform used, in order to contribute to the real understanding of the value and long-term sustainability of such interventions.

In conclusion, the P5 initiative aims to bridge the benefits of digital technology to healthcare in a humanized context, assured by a multidisciplinary team that is critical for the success of behavioural and therapeutic interventions.

References

Avery, L., Flynn, D., Wersch, A. van, Sniehotta, F. F., & Trenell, M. I. (2012). Changing Physical Activity Behavior in Type 2 Diabetes: A systematic review and meta-analysis of behavioral interventions. *Diabetes Care, 35*(12), 2681–2689. https://doi.org/10.2337/dc11-2452

Campbell, M., Katikireddi, S. V., Hoffmann, T., Armstrong, R., Waters, E., & Craig, P. (2018). TIDieR-PHP: A reporting guideline for population health and policy interventions. *BMJ, 361*, k1079. https://doi.org/10.1136/bmj.k1079

Canadian Agency for Drugs and Technologies in Health. (2016). Trained Health Coaches for Chronic Disease Prevention or Management: A Review of Clinical and Cost-Effectiveness and Guidelines. Obtido de http://www.ncbi.nlm.nih.gov/books/NBK343957/

Castro Sweet, C. M., Chiguluri, V., Gumpina, R., Abbott, P., Madero, E. N., Payne, M., … Prewitt, T. (2018). Outcomes of a Digital Health Program With Human Coaching for Diabetes Risk Reduction in a Medicare Population. *Journal of Aging and Health, 30*(5), 692–710. https://doi.org/10.1177/0898264316688791

Cianflone, D., Del Mauro, G., Colombo, E., Bordignon, T., Costeri, S., Fabi, M., & Viscone, I. (2016). Prevalence of optimal blood pressure

values in digital-savvy hypertensives. *Journal of the American Society of Hypertension, 10*(4), e23. https://doi.org/10.1016/j.jash.2016.03.052

Craig, P., Dieppe, P., Macintyre, S., Michie, S., Nazareth, I., & Petticrew, M. (2008). Developing and evaluating complex interventions: The new Medical Research Council guidance. *The BMJ, 337*. https://doi.org/10.1136/bmj.a1655

Dowding, D., Lichtner, V., & Closs, S. J. (2017). Using the MRC Framework for Complex Interventions to Develop Clinical Decision Support: A Case Study. *Studies in Health Technology and Informatics, 235*, 544–548.

Ernsting, C., Dombrowski, S. U., Oedekoven, M., O Sullivan, J. L., Kanzler, M., Kuhlmey, A., & Gellert, P. (2017). Using Smartphones and Health Apps to Change and Manage Health Behaviors: A Population-Based Survey. *Journal of Medical Internet Research, 19*(4), e101. https://doi.org/10.2196/jmir.6838

Grist, R., Porter, J., & Stallard, P. (2017). Mental Health Mobile Apps for Preadolescents and Adolescents: A Systematic Review. *Journal of Medical Internet Research, 19*(5), e176. https://doi.org/10.2196/jmir.7332

Groarke, J. M., Richmond, J., Kelly, M. G., McSharry, J., Groarke, A., Kerr, T., … Walsh, J. (2019). Examining the Impact of a Personalized Self-Management Lifestyle Program Using Mobile Technology on the Health and Well-Being of Cancer Survivors: Protocol and Rationale for a Randomized Controlled Trial (The Moving On Study). *JMIR Research Protocols, 8*(8), e13214. https://doi.org/10.2196/13214

Haas, K., Hayoz, S., & Maurer-Wiesner, S. (2019). Effectiveness and Feasibility of a Remote Lifestyle Intervention by Dietitians for Overweight and Obese Adults: Pilot Study. *JMIR MHealth and UHealth, 7(*4), e12289. https://doi.org/10.2196/12289

Hoffmann, T. C., Glasziou, P. P., Boutron, I., Milne, R., Perera, R., Moher, D., … Michie, S. (2014). Better reporting of interventions: Template for

intervention description and replication (TIDieR) checklist and guide. *BMJ, 348*, g1687. https://doi.org/10.1136/bmj.g1687

Hood, L., & Friend, S. H. (2011). Predictive, personalized, preventive, participatory (P4) cancer medicine. *Nature Reviews Clinical Oncology, 8*(3), 184–187. https://doi.org/10.1038/nrclinonc.2010.227

Jamaladin, H., van de Belt, T. H., Luijpers, L. C., de Graaff, F. R., Bredie, S. J., Roeleveld, N., & van Gelder, M. M. (2018). Mobile Apps for Blood Pressure Monitoring: Systematic Search in App Stores and Content Analysis. *JMIR MHealth and UHealth, 6*(11), e187. https://doi.org/10.2196/mhealth.9888

Lean, M. E., Leslie, W. S., Barnes, A. C., Brosnahan, N., Thom, G., McCombie, L., … Taylor, R. (2018). Primary care-led weight management for remission of type 2 diabetes (DiRECT): An open-label, cluster-randomised trial. *The Lancet, 391*(10120), 541–551. https://doi.org/10.1016/S0140-6736(17)33102-1

Marshall, J. M., Dunstan, D. A., & Bartik, W. (2019). Clinical or gimmickal: The use and effectiveness of mobile mental health apps for treating anxiety and depression. *The Australian and New Zealand Journal of Psychiatry*, 4867419876700. https://doi.org/10.1177/0004867419876700

Morrissey, E. C., Glynn, L. G., Casey, M., Walsh, J. C., & Molloy, G. J. (2018). New self-management technologies for the treatment of hypertension: General practitioners' perspectives. *Family Practice, 35*(3), 318–322. https://doi.org/10.1093/fampra/cmx100

Pellmar, T. C., Brandt, E. N., & Baird, M. A. (2002). Health and Behavior: The Interplay of Biological, Behavioral, and Social Influences: Summary of an Institute of Medicine Report. *American Journal of Health Promotion, 16*(4), 206–219. https://doi.org/10.4278/0890-1171-16.4.206

Piko, B. F. (2004). Interplay between self and community: A role for health psychology in

Eastern Europe's public health. *Journal of Health Psychology, 9*(1), 111–120. https://doi.org/10.1177/1359105304036105

Rathbone, A. L., & Prescott, J. (2017). The Use of Mobile Apps and SMS Messaging as Physical and Mental Health Interventions: Systematic Review. *Journal of Medical Internet Research, 19*(8), e295. https://doi.org/10.2196/jmir.7740

Redfern, J. (2019). Can Older Adults Benefit from Smart Devices, Wearables, and Other Digital Health Options to Enhance Cardiac Rehabilitation? *Clinics in Geriatric Medicine, 35*(4), 489–497. https://doi.org/10.1016/j.cger.2019.07.004

Rohde, A., Lorkowski, S., & Dawczynski, C. (2017). Dietary mobile apps: Acceptance among young adults. A qualitative study. *Ernahrungs Umschau, (64*(2)), 36–43. https://doi.org/10.4455/eu.2017.007

Vogt, H., Hofmann, B., & Getz, L. (2016). The new holism: P4 systems medicine and the medicalization of health and life itself. *Medicine, Health Care and Philosophy, 19*(2), 307–323. https://doi.org/10.1007/s11019-016-9683-8

Walsh, J. C., & Groarke, J. M. (2019). Integrating Behavioral Science With Mobile (mHealth) Technology to Optimize Health Behavior Change Interventions. *European Psychologist*. Obtido de https://econtent.hogrefe.com/doi/abs/10.1027/1016-9040/a000351

Wang, K., Varma, D. S., & Prosperi, M. (2018). A systematic review of the effectiveness of mobile apps for monitoring and management of mental health symptoms or disorders. *Journal of Psychiatric Research, 107*, 73–78. https://doi.org/10.1016/j.jpsychires.2018.10.006

OECD/EU. (2016). *Health at a Glance: Europe 2016*. Paris, France: OECD Publishing.

World Health Organization. *World Health Statistics Overview 2019. Monitoring health for the sustainable development goals (SDGs)*. https://apps.who.int/iris/bitstream/handle/10665/311696/WHO-DAD-2019.1-eng.pdf assessed at 30/08/2019.

World Health Organization 2018. *Digital technologies: shaping the future of primary health care. Technical Series on Primary Health Care*. https://www.who.int/docs/default-source/primary-health-care-conference/digital-technologies.pdf?sfvrsn=3efc47e0_2.

Liliana Amorim

Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Campus Gualtar, Braga, Portugal

ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal.

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal.

liliana@p5.pt

Fábio Borges

Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Campus Gualtar, Braga, Portugal

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal.

fabioborges@med.uminho.pt

Inês Fernandes

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal.

ines@p5.pt

Marina Gonçalves

Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Campus Gualtar, Braga, Portugal

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal

marinagoncalves@med.uminho.pt

Nuno Santos

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal.

nsantos@icognitus.com

Pedro Morgado

Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Campus Gualtar, Braga, Portugal

ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal

pedromorgado@med.uminho.pt

Nuno Sousa

Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Campus Gualtar, Braga, Portugal

ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal

Association P5 Digital Medical Centre (ACMP5), Braga, Portugal

njcsousa@med.uminho.pt

A behavioural analysis of a locally produced public health intervention: Optimisation of the LiveWell Dorset service

Angela M Rodrigues
Newcastle University, UK

Sarah Long
Dorset City Council, UK

Stuart Burley
Dorset City Council, UK

Falko F Sniehotta
Newcastle University, UK

Abstract

LiveWell Dorset (LWD) is an integrated health improvement service that tackles physical activity, weight management, smoking and alcohol consumption, developed using the Behaviour Change Wheel framework. LWD is delivered by Health Coaches who help users eliciting barriers to change and deliver behaviour change techniques (BCTs) mapped onto these barriers. This paper reports a pragmatic formative process evaluation of the LWD by conducting an external behavioural analysis of the interventions' active ingredients, and identifying opportunities for optimisation. Two independent researchers conducted the process of behavioural analysis used to identify users' barriers to behaviour change by mapping these barriers onto COM-B categories (capability, motivation, or opportunity). The barriers were mapped onto the COM-B model with 88% agreement between raters, demonstrating the reliability of the process of behavioural analysis. This pragmatic formative process evaluation provided a validation of the intervention's active ingredients and recommendations to further specify the barriers.

Keywords: *Behaviour change, Intervention development, Public health, Health coaching*

Introduction

LiveWell Dorset is an integrated health improvement service launched in April 2015. As part of the service, health coaches support people to quit smoking, be more physically active, lose weight and drink less alcohol, based on an evidence-based behaviour change model. The LiveWell Dorset service aims to match and prioritise individual specific barriers to appropriate interventions most likely to support behaviour change. Health coaches aim to support clients in identifying goals, eliciting specific barriers and link intervention content to these individual barriers (Please see table 1 for TIDieR table).

The LiveWell Dorset service was designed and developed using a behaviour change framework; the Behaviour Change Wheel (Michie, Atkins, & West, 2014). The service focus primarily on the provision of support at scale and on behaviour change based on an evidence-based model as recommended by the NICE guidance PH49 (National Institute for Health and Care Excellence, 2014).

The present study focus on a pragmatic formative process evaluation (Evans, Scourfield, & Murphy, 2015) and optimisation of an existing intervention which has been implemented since April 2015 and used by just over 17,000 people until April 2018. Process evaluation aims to understand the implementation process, in particular the fidelity of interventions before continuing its dissemination (G. F. Moore et al., 2015). The term pragmatic formative process evaluation is used here to describe the process evaluation of an intervention currently

Table 1: TIDieR table (Hoffmann et al., 2014) for the LiveWell Dorset intervention.

TIDieR checklist item	LiveWell Dorset intervention
What	The LiveWell Dorset service provides telephone health coaching to support people to quit smoking, be more physically active, lose weight and drink less alcohol. The intervention includes an introductory call to explain the service and to support client to set a SMART goal. If more than one behaviour is raised, the client is asked to identify the most important. The health coach then establishes barriers, by using the questions provided in the intervention guide to identify barriers the client faces. In each subsequent coaching calls, the health coach talks through possible solutions, by using the BCT Plan on the COM-B tab (the customer relationship management solution – CRM).
Who delivered	The LiveWell Dorset intervention is delivered by Health Coaches with experience in working with behaviour change theories (e.g. Stages of Change) / coaching models (e.g. GROW) and experience of working with people in a coaching environment. Health Coaches have a recognised coaching qualification or demonstrable experience of supporting people using coaching models within a behaviour change setting (e.g. including, but not limited to RSPH Level 1 or 2 Health and Wellbeing accreditations, Qualifications in MECC). The intervention was delivered by 5 Health Coaches
How	Individual, telephone-based intervention
Where	Telephone-based delivery
When and How much	Up to 6 coaching calls of 10-20 minutes each. A review is completed at session 3. Follow ups completed at 3, 6 & 12 months.
Tailoring	Behavioural intervention is matched to the specific barriers mentioned by the client, using the COM-B model. Each specific barrier has a list of BCTs aligned with it. The Health Coach works with the client to decide which BCT the client will try from that list.
Fidelity	BCTs used for each specific barrier are recorded within the CRM system.

implemented in routine practice, but lacking systematic development and evaluation. This study aimed to conduct a behavioural analysis of the key processes involved in the development of the LiveWell Dorset service, and to provide recommendations for the optimisation of the service. Specifically, we wanted to understand if the process of conducting a behavioural analysis of identified barriers, according to the COM-B model is reliable.

Methods

A mapping exercise was conducted to match identified barriers to intervention activities, through the lens of the COM-B model (Michie et al., 2014). The list of identified barriers for the different behaviours was provided by the LiveWell Dorset management team.

Two reviewers from the research team at Newcastle university (NCL) independently classified each barrier under relevant categories of the COM-B (capability, motivation, or opportunity) (Michie,
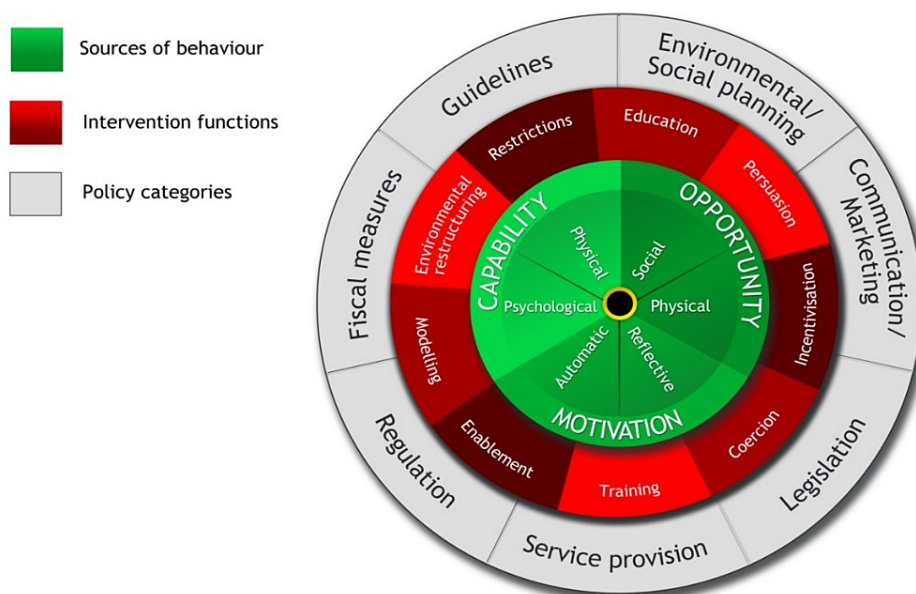
Figure 1: The Behaviour Change Wheel (1).

van Stralen, & West, 2011), applying more than one category where appropriate. Inter-rater reliability (i.e. the degree of agreement between the two reviewers) was compared by calculating percent agreement and Kappa of agreement, and any discrepancies were reconciled through discussion. These results were compiled and compared to the coding performed by LiveWell Dorset (LWD).

After this initial coding, we shared our findings with the LiveWell Dorset team and any discrepancies were solved through discussion.

Results

There was excellent agreement between the coding produced by both teams (NCL and LWD),), who independently categorized the barriers using the COM-B model (88% agreement for all barriers across the four behaviours; Kappa= 0.75). Please see Table 2 for details on the degree and percentage of agreement between both teams across the COM-B model. The degree of agreement

between the coding performed by both teams ranged from fair (Psychological Capability) to very good (Social opportunity).

There were ten (13%) discrepancies in the COM-B coding. The main discrepancies occurred in cases where barriers related to self-efficacy, self-confidence and self-esteem were classified differently (i.e. one of the reviewers classified these barriers under 'motivation', the other reviewer classified these as 'psychological capability'). Barriers related to automatic processes (e.g. impulses, fears) also generated some discrepancies, with reviewers using 'automatic motivation' and 'psychological capability to classify those barriers.

LiveWell Dorset service optimisation

Some of the discrepancies were linked to different interpretation of the barriers and, for this reason, a list of scenarios was proposed to better support health coaches implementation of the

Table 2. Summary of agreement for the classification of identified barriers according to the COM-B model.

COM-B components	Agreement	
	Kappa	*% observed agreements*
Physical capability	0.54	91.3
Psychological capability	0.27	71.3
Social Opportunity	0.84	95.0
Physical opportunity	0.66	86.3
Automatic motivation	0.42	80.0
Reflective motivation	0.65	85.0

LiveWell Dorset service (please see Table 3 for details).

Discussion

The process of identifying behaviour change techniques appropriate to the barriers as part of the LiveWell Dorset service, using to the COM-B model was reliable. The COM-B coding revealed challenging for some components (i.e. Psychological capability) and when barriers were too vague. The barriers were mapped onto the COM-B behaviour change theory with an excellent level of agreement between raters. Comparable levels of agreement have been found by studies conducting a similar procedure of COM-B coding (J. E. Moore et al., 2014). Psychological capability coding seemed to pose the most discrepancies in coding. Other authors have also stated the difficulty of matching COM-B components to barriers that were too general or vague (Seppälä, Hankonen, Korkiakangas, Ruusuvuori, & Laitinen, 2018). The vagueness of the barriers might be a necessary element of the service as the barriers fit two different purposes: 1) they help the mapping

within the CRM; and 2) the support the identification of BCTs according to the COM-B model. If the barriers are further specified, we might risk the individual narrative to be constructed around the barriers. However, for the purpose of developing the interventions further specifying the barriers, perhaps by providing different the scenarios, could facilitate the identification of barriers and potential BCTs in a more reliable way. Matching individual specific barriers to appropriate interventions is an innovative approach and recent studies show that interventions are more likely to influence change if they are tailored to target the factors underlying barriers to behaviour change (Michie, Johnston, Francis, Hardeman, & Eccles, 2008). Another advantage of this mapping is that it provides a schema through which implementers can easily identify potential strategies to overcome barriers that are relevant at the local level.

The pragmatic formative process evaluation was conducted as a desk-based research, capitalising on available funding and time. The main focus of this research was to be responsive to the research request from LiveWell Dorset and produce rapid, responsive and relevant research evidence to inform

Table 3: Example Scenarios to facilitate specification of barriers within the LiveWell Dorset service.

Barrier	NCL coding	Scenario
Alcohol		
1. Something to do	Automatic motivation/ Physical Opportunity/ Social Opportunity	Automatic motivation: drinking alcohol would occur as an impulse/reflex (e.g. always having a glass of wine when home from work). Physical opportunity: the availability of alcohol would facilitate the use of alcohol (e.g. having alcohol in the house). Social opportunity: the availability of alcohol would facilitate the use of alcohol (e.g. having a drink on the table when in group).
Weight loss		
2. Eat when feel down	Automatic motivation/ Psychological capability/ Physical capability	Automatic motivation: Individuals may feel down about their lives and turn to food to comfort them (e.g. Emotional eating). Psychological capability: Individuals may lack knowledge of emotional eating and might need skills to deal with low mood (e.g. lack of knowledge of alternative things to do when feeling low). Physical capability: Individuals might need skills to use tools to record low mood (e.g. skills to use a digital tool or paper-and-pencil tool to monitor mood).
3. Portion size difficulty - too big	Physical Opportunity/ Psychological capability/ Physical capability	Physical Opportunity: Individuals may not have the physical opportunity in terms of the necessary tool to measure portion size (e.g. having a digital scale to measure portion size). Psychological capability: Individuals may lack knowledge of the potential negative effect of over-eating and might need skills to monitor portion size (e.g. unaware of link between portion size and overeating). Physical capability: Individuals might need skills to use tools to record portion size (e.g. skills to use different methods of measuring portion size).

the service. This research was conducted in the context of Fuse: Centre for Translational Research in Public Health, which mission includes the translation public health research into value-for-money policy and practice in a relevant and timely manner (http://www.fuse.ac.uk/).

More flexible and rapid research designs are needed to answer the increasing demands to produce timely and relevant research findings (Riley, Glasgow, Etheredge, & Abernethy, 2013). The

slow pace of health research contributes to findings that are less relevant and potentially even obsolete. An approach to increase relevance of research is through stakeholder involvement by increasing the likelihood of findings being readily adopted into practice (Riley et al., 2013).

The current financial climate of LAs brings a further challenge for public health evaluation with greater constraints on research funding and research capacity. Several guidance documents to support public health evaluation exist and a recent project produced an integrative tool of existing evaluation guides (Denford et al., 2017). A recent study also found that practitioners felt that there was a need to consult and collaborate with academic partners who are more skilful and resources to complete evaluations (Denford, Lakshman, Callaghan, & Abraham, 2018). Practitioners also acknowledged the need to enhance their own evaluation skills in order to produce high quality public health evaluations (Denford et al., 2018). Pragmatic format process evaluation might offer practitioners the opportunity to better understand the process of theoretical development that due to dissonant policy and research timescales might not be conducted before implementation.

LiveWell Dorset is an integrated health improvement service, supporting people to quit smoking, be more physically active, lose weight and drink less alcohol, based on a behaviour change framework; the Behaviour Change Wheel (12). Our

pragmatic formative process evaluation provided a validation of the intervention's active ingredients.

References

Denford, S., Abraham, C., Callaghan, M., Aighton, P., De Vocht, F., & Arris, S. (2017). A review of Grey and academic literature of evaluation guidance relevant to public health interventions. *BMC Health Services Research, 17*(1), 643. doi: 10.1186/s12913-017-2588-2

Denford, S., Lakshman, R., Callaghan, M., & Abraham, C. (2018). Improving public health evaluation: a qualitative investigation of practitioners' needs. *BMC public health, 18*(1), 190. doi:10.1186/s12889-018-5075-8

Evans, R., Scourfield, J., & Murphy, S. (2015). Pragmatic, formative process evaluations of complex interventions and why we need more of them. *Journal of Epidemiology and Community Health, 69*(10), 925-926. doi:10.1136/jech-2014-204806

Hoffmann, T. C., Glasziou, P. P., Boutron, I., Milne, R., Perera, R., Moher, D., . . . Michie, S. (2014). Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ : British Medical Journal, 348*. doi:10.1136/bmj.g1687

Michie, S., Atkins, L., & West, R. (2014). The behaviour change wheel: a guide to designing interventions. Needed: physician leaders, 26.

Michie, S., Johnston, M., Francis, J., Hardeman, W., & Eccles, M. (2008). From Theory to Intervention: Mapping Theoretically Derived Behavioural Determinants to Behaviour Change Techniques. *Applied Psychology, 57*(4), 660-680. doi:10.1111/j.1464-0597.2008.00341.x

Michie, S., van Stralen, M., & West, R. (2011). The Behaviour Change Wheel: a new method for characterising and designing behaviour change

interventions. *Implementation Science, 6*(1), 42.

Moore, G. F., Audrey, S., Barker, M., Bond, L., Bonell, C., Hardeman, W., . . . Baird, J. (2015). Process evaluation of complex interventions: Medical Research Council guidance. *BMJ : British Medical Journal, 350*. doi:10.1136/bmj.h1258

Moore, J. E., Mascarenhas, A., Marquez, C., Almaawiy, U., Chan, W.-H., D'Souza, J., . . . Straus, S. E. (2014). Mapping barriers and intervention activities to behaviour change theory for Mobilization of Vulnerable Elders in Ontario (MOVE ON), a multi-site implementation intervention in acute care hospitals. *Implementation Science, 9*(1), 160.

National Institute for Health and Care Excellence. (2014). Public health guideline [PH49]. Behaviour change: individual approaches. Retrieved from https://www.nice.org.uk/guidance/ph49

Riley, W. T., Glasgow, R. E., Etheredge, L., & Abernethy, A. P. (2013). Rapid, responsive, relevant (R3) research: a call for a rapid learning health research enterprise. *Clinical and Translational Medicine, 2*(1), 10. doi: 10.1186/2001-1326-2-10

Seppälä, T., Hankonen, N., Korkiakangas, E., Ruusuvuori, J., & Laitinen, J. (2018). National policies for the promotion of physical activity and healthy nutrition in the workplace context: a behaviour change wheel guided content analysis of policy papers in Finland. *BMC public health, 18*(1), 87.

Angela Rodrigues
Fuse: the Centre for Translational Research in Public Health, UK
Newcastle University, UK
Department of Psychology, Northumbria University
angela.rodrigues@northumbria.ac.uk

Sarah Long
Public Health Dorset, Dorset City Council, UK
s.long@dorsetcc.gov.uk

Stuart Burley
Public Health Dorset, Dorset City Council, UK
stuart.burley@dorsetcouncil.gov.uk

Falko F Sniehotta
Fuse: the Centre for Translational Research in Public Health, UK
Newcastle University, UK
falko.sniehotta@newcastle.ac.uk

Original article

Putting Academia into Action: Lessons Learned From a Year in Public Health

Lucy Porter

Public Health England Behavioural Insights

This article is the perspective of Lucy Porter and does not necessarily reflect the full range of work conducted by PHEBI or the opinions of Public Health England.

The brief was simple enough. 'Design an intervention to reduce the amount of food people consume from takeaways'. It said that we could be as creative as we liked, as long as we could prove that it was likely to be effective.

This was going to be easy.

A couple of weeks later, I found myself sitting in front of a panel of impassive faces as I presented my intervention. It was 2017 and I was applying for a three-month internship at Public Health England's Behavioural Insights team (or PHEBI) as part of a scheme for PhD students like me. I had been keen to work with the team since I discovered their existence at the start of my postgraduate life.

We know that behaviour is a significant determinant of some of the biggest causes of mortality and disability-adjusted life-years such as obesity, cancer and cardiovascular disease (Khaw et al., 2008). We also know that the majority of interventions targeting behavioural risk factors still focus on education and information-provision alone, despite evidence that this is not sufficient to support change (Marteau, Hollands, & Fletcher, 2012). However, PHEBI aims to embed evidence from a wide range of behavioural and social sciences in their work and, in collaboration with partners, strengthen its use in health and

wellbeing (PHE, 2018b). Health Psychology is particularly influential to the team's work, which is unsurprising given that two registered Health Psychologists have been part of the core team that has guided PHEBI's approach since its inception. Part of this approach involves taking a dual-process approach to behaviour change, acknowledging the importance of conscious decision-making in behaviour but also the crucial influence of automatic cognitive processes (Hofmann, Friese, & Strack, 2009). The prospect of applying empirical evidence to solve real-life policy issues was hugely appealing to me, and with my own Psychology PhD research focusing on targeting implicit processes in order to encourage healthy eating behaviours, the internship with PHEBI seemed like a natural fit.

For my interview intervention, I took inspiration from some of the team's work - looking at past trials that made smart changes to micro-environments (PHE, 2018a) and communications in order to target implicit (as well as reflective) processes in decision making (Sallis et al., 2016) - and constructed my intervention accordingly. I combined elements of psychology (a marketing campaign based on social norms) and behavioural economics (restructuring the choice architecture of the takeaway environment) to encourage people to purchase smaller portions from their favourite takeaway restaurants. On the day, I distributed sample leaflets from my marketing campaign, which I had printed specially on nice, shiny paper. I was feeling very proud of myself.

And then the questions started.

"So how would you pay for your intervention -

the marketing campaign, the takeaway incentives, the new packaging sizes - if you were working with a restricted budget?"

"Well... How restricted is restricted?" I asked.

"Imagine you had no budget at all actually."

Ah. This wasn't going to be the cinch I'd anticipated - but I did get the placement.

After completing my internship and then successfully applying for an externally advertised position, I have now been with PHEBI for 18 months, and I have learnt a lot more about integrating the promises of behavioural science and health psychology into low-cost, scalable interventions, as well as into the structures and systems within which people carry out their lives. Our team frequently collaborates with others across Public Health England, and we often seek opportunities to embed behavioural science into existing programmes, making incremental changes to improve the services and structures across the public health network. We aim to make healthy behaviours easier for people, whether they are the general public, clients or patients in contact with services, professionals delivering public services or in the private sector, or organisational management and leaders. This means that we are often working across a wide range of work streams on a highly variable set of target behaviours. Some of these will be one-off behaviours, such as attendance at screening appointments, and others will be habitual behaviours, such as sugar intake. Regardless of the specific behaviour under focus, the goal is to improve the health and lives of the nation, but in a way that respects financial feasibility.

For example, some of the projects that I have been involved in focus on simple ways to enhance the content of communications to patients and healthcare professionals so that messages are conveyed in a clear and attention-grabbing manner. Insights from social, cognitive and health psychology are often core to these enhancements. In a recently published randomised controlled trial, we made a few low-cost changes to a weight feedback letter as part of the National Child Measurement Programme and almost doubled uptake of weight management services by parents of children with overweight and obesity (Sallis, Porter, et al., 2019). Based on evidence that rising obesity rates are shifting parents' perceptions of what a healthy weight looks like (Hansen, Duncan, Tarasenko, Yan, & Zhang, 2014), the enhanced letters aimed to communicate social norms using tailored, descriptive social norms (i.e., X% of children in [local area] are a healthier weight) and providing computer-generated pictorial scales of children across weight categories (Jones et al., 2017). As well as enhancing risk communication in this way, we also made it easier for families to access local services by informing them that they had been reserved a place at the local family lifestyle club and providing a pre-populated booking form for them to use, thus reducing the number of steps required to access support. Although uptake rates remained low, doubling them increased the economic viability of local services for the people who want them and benefit from them.

Some of our other recent work has found that simplifying the content of NHS Health Check invitation letters, adding a planning prompt (a space for patients to jot down their appointment details) and sending reminder SMS messages can significantly improve uptake of the programme (Sallis, Sherlock, et al., 2019), while in the context of tackling antimicrobial resistance, we found that providing GPs with feedback on how their antibiotic prescribing rates compare to others can significantly reduce the number of unnecessary prescriptions (Hallsworth et al., 2016). These trials show that when budgets are restricted, it's possible to harness the opportunities available in routine

practice to promote tangible change.

Many of the enhancements listed above may appear simplistic. It seems obvious that letters to patients should be written clearly or that removing some of the steps in appointment booking processes will improve programme uptake. However, in practice, these details can often get lost within complex health systems that are already striving to balance a multitude of priorities. Furthermore, the very fact of this simplicity makes these findings even more exciting – they prove that interventions do not always need to be prolonged and intense to effect significant change. We are already seeing more academics take up these approaches of incremental innovation that can deliver valuable impact when implemented at scale.

For more complex interventions, the team use scientifically validated approaches that integrate behavioural science with systems thinking, which will be familiar to many academics. As noted earlier, the range of behaviours that we consider in our interventions can be highly variable, and so tailoring our approach based on theory and evidence is crucial. The first stage involves whole systems mapping and the tracing of behavioural pathways to identify priorities for change. Next, a comprehensive assessment of our target behaviour and the barriers and facilitators associated with it is conducted with a systematic review. These barriers and facilitators are then grouped and categorised so that we can understand which overarching influences should be targeted in an intervention. From here, we can identify which behaviour change techniques and intervention functions are most appropriate for targeting these influences, and we compare this against the current offering of national behaviour change interventions for the target behaviour to identify which opportunities are currently being missed in practice. This Strategic Behavioural Analysis procedure can also be used to evaluate and identify opportunities for policy, as well as helping us to assess gaps where behavioural science could be

better embedded within wider systems. The frameworks we most commonly use for this are the Behaviour Change Wheel (Michie, Van Stralen, & West, 2011), the Theoretical Domains Framework (Cane, O'Connor, & Michie, 2012) and the Behaviour Change Techniques Taxonomy version 1 (Michie et al., 2013). The benefits of using these models are that they encourage you to assess all aspects of the behaviour with their fairly comprehensive scopes, while also being accessible and intuitive for those who are not familiar with psychological theory. We are also interested to learn more about the frameworks and models being developed by other academic teams for use in this area.

Having recognised that there is huge demand for behavioural science to improve health and wellbeing outcomes and that many partner organisations also work to this shared aim, the team led the collaborative and participatory development of a national strategy for behavioural and social science (PHE, 2018b). This brings national organisations together in a coordinated way to better enable regional and local stakeholders to use the behavioural and social sciences across the entire public health system. This Strategy is the first in the world of its kind and is already delivering enhanced resources for practitioners and communities of practice to build capacity and capability. One small part of this work that I have contributed to involves building capacity in other teams by delivering masterclasses across England on behavioural insights, both to local authority staff working behind the scenes and those working with patients. These classes are often oversubscribed by interested stakeholders. Here there is a great opportunity for Health Psychology to impact upon public health practice directly, as we introduce healthcare professionals and commissioners to models and theories from the discipline. Through these classes, we aim to increase awareness of the importance of embedding the behavioural and social sciences into systems, service design and everyday practice, whilst also

enabling the workforce to implement and evaluate interventions informed by behavioural science.

All of this work involves us working with academics, practitioners, managers and policy-makers to conduct research and translate the subsequent knowledge into practice. There are challenges, but also immense rewards, associated with this translational work due to differences in how research operates in universities versus the public sector. For example, we often need to work rapidly in order to catch small windows of opportunity that open within the existing timescales of larger programmes, which can be a challenge when the timeframes imposed on academics and practitioners are very different. We also need to focus on making the best of the resources available and delivering an intervention that is likely to have immediate impacts upon behaviour, meaning that exploring the contributions of individual behaviour change techniques in complex factorial designs is often not feasible. In addition, assessing the psychological mechanisms behind any change can be close to impossible as our interventions often fit within the bounds of programme improvement and our outcomes are assessed using routinely-collected data; the "participants" in our studies do not necessarily engage with the research team directly and while we can send out questionnaires probing the underlying psychological processes at work, we all know how infamously low return rates can be.

Future priorities for public health include developing predictive, personalised behaviour change interventions at scale, and using a whole systems approach to tackle the wider determinants of health and wellbeing. For these, the role of Health Psychology within transdisciplinary approaches is becoming ever more crucial. There is still a huge scope for further translation of approaches between academia, policy and practice to drive innovation and improvement. PHEBI's strategy aims to start filling this gap by encouraging the use of behavioural and social sciences such as Health Psychology across the public health system. As the importance of behavioural science is increasingly recognised across the public sector, academics and public health professionals hold the potential to facilitate change and collaboratively improve the lives of people across the nation. It's an exciting time to be a part of both sides.

References

Cane, J., O'Connor, D., & Michie, S. (2012). Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implementation science, 7*(1), 37.

Hallsworth, M., Chadborn, T., Sallis, A., Sanders, M., Berry, D., Greaves, F., . . . Davies, S. C. (2016). Provision of social norm feedback to high prescribers of antibiotics in general practice: a pragmatic national randomised controlled trial. *The Lancet, 387*(10029), 1743-1752. doi:10.1016/s0140-6736(16)00215-4

Hansen, A. R., Duncan, D. T., Tarasenko, Y. N., Yan, F., & Zhang, J. (2014). Generational shift in parental perceptions of overweight among school-aged children. *Pediatrics, 134*(3), 481-488. doi:10.1542/peds.2014-0012

Hofmann, W., Friese, M., & Strack, F. J. P. o. p. s. (2009). Impulse and self-control from a dual-systems perspective. *4*(2), 162-176.

Jones, A. R., Tovee, M. J., Cutler, L. R., Parkinson, K. N., Ells, L. J., Araujo-Soares, V., . . . Adamson, A. J. (2017). Development of the MapMe intervention body image scales of known weight status for 4-5 and 10-11 year old children. *J Public Health* (Oxf), 1-9. doi:10.1093/pubmed/fdx129

Khaw, K.-T., Wareham, N., Bingham, S., Welch, A., Luben, R., & Day, N. J. P. m. (2008). Combined impact of health behaviours and mortality in men and women: the EPIC-Norfolk prospective population study. *5*(1), e12.

Marteau, T. M., Hollands, G. J., & Fletcher, P. C. (2012). Changing human behavior to prevent disease: The importance of targeting automatic processes. *Science, 337*(6101), 1492-1495. doi: 10.1126/science.1226918

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., . . . Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine, 46*(1), 81-95.

Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation science, 6*(1), 42.

PHE. (2018a). Hospital vending machines: helping people make healthier choices. Retrieved from https://www.gov.uk/government/publications/hospital-vending-machines-helping-people-make-healthier-choices

PHE. (2018b). Improving people's health: applying behavioural and social sciences. Retrieved from https://www.gov.uk/government/publications/improving-peoples-health-applying-behavioural-and-social-sciences

Sallis, A., Bunten, A., Bonus, A., James, A., Chadborn, T., & Berry, D. (2016). The effectiveness of an enhanced invitation letter on uptake of National Health Service Health Checks in primary care: a pragmatic quasi-randomised controlled trial. *BMC Fam Pract, 17*, 35. doi:10.1186/s12875-016-0426-y

Sallis, A., Porter, L., Tan, K. S., Howard, R., Brown, L. J., Jones, A. R., . . . Chadborn, T. (2019). Improving child weight management uptake through enhanced National Child Measurement Programmed parental feedback letters: a Cluster Randomised Controlled Trial. *Prev Med, 121*, 128-135.

Sallis, A., Sherlock, J., Bonus, A., Saei, A., Gold, N., Vlaev, I., & Chadborn, T. (2019). Pre-notification and reminder SMS text messages with behaviourally informed invitation letters to improve uptake of NHS Health Checks: a factorial randomised controlled trial. *BMC public health, 19*(1), 1162. doi:10.1186/s12889-019-7476-8

Lucy Porter
Behavioural Insights Advisor, Public Health England Behavioural Insights, UK
Lucy.Porter@phe.gov.uk