Men on the Move;
An investigation of a 'real world' community-based physical activity programme for adult men.

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Statement of Originality

I declare that this thesis is entirely my own work other than the counsel of my supervisor Dr. Noel Richardson of the National Men's Health Centre, Department of Science and Health, Institute of Technology Carlow, Dr. Paula Carroll and Dr. Michael Harrison of the Health, Sports and Exercise Science Department in the Waterford Institute of Technology, and Prof. Steve Robertson of Centre of Men's Health, Leeds Beckett University. This thesis has not been submitted for an award at this or any other institution.

Liam Kelly **September 2019**

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Due to the nature and scale of the this study, a collaborative approach was adopted amongst the research team (Dr. Paula Carroll, Principal Investigator and Co-supervisor; Dr. Noel Richardson, Supervisor; Dr. Michael Harrison, Co-supervisor; Prof. Steve Robertson, Programme Mentor; Aisling Keohane, Postgraduate Researcher; Alex Donohue, Research Assistant; Dr. Tom Egan, Economic Evaluation; and Dr. Gillian Ormond, Economic Evaluation) in terms of the development of the programme, the data collection, and the dissemination of findings. I would like to acknowledge their contributions to the body of work, some of which is represented in this thesis.

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List of Abbreviations

ACSM	American College of Sports Medicine
AHA	American Heart Association
ASA	American Stroke Association
AUD	Australian Dollars
BCT	Behavioural Change Theory
BF%	percentage bodyfat
BMI	Body Mass Index
BP	Blood Pressure
CAD	coronary artery disease
CBPA	community-based physical activity
cebr	Centre of Economic and Business Research
CG	Comparison-in-waiting Group
CHD	coronary heart disease
CI	Confidence Interval
CV	cardiovascular
CVD	cardiovascular disease
cm	centimetres
DALY	diability adjusted lifeyears
DoH	Department of Health
Dr	Doctor
ENGAGE	Ireland's National Men's Health Training Programme
EPH	European Public Health
EPL	English Premier League
EU	European Union
FFIT	Football Fans in Training
FFM	fat free mass
FM	fat mass
GDP	gross domestic product
GP	general practitioner
HEPA	Health-Enhancing Physical Activity
HRQoL	health related quality of life
HSE	Health Service Executive
ISBNPA	International Society of Behavioural Nutrition and Physical Activity
ISCA	International Sport and Culture Association
ISPAH	International Society of Physical and Health
IT	Institute of Technology
ITC	Institute of Technology Carlow
ICER	incremental cost-effectiveness ratio
ICS	Irish Cancer Society

IG	Intervention Group
IHF	Irish Heart Foundation
IUNA	Irish National Adult Nutrition Survey
kg	kilograms
LE	life expectancy
LSP	Local Sport Partnerships
m:dm	minutes : decimal minutes
MET	metabolic equivalent
MetS	Metabolic Syndrome
MOM	Men on the Move
NCD	non-communicable diseases
NHF	Nutrition & Health Foundation
NICE	National Institute of Health and Care Excellence
NMHP	National Men's Health Policy
NSW	New South Wales
MIn	Moderately Integrated
MI	Moderately Isolated
ml/kg/min	millilitres per kilogram per minute
m^2	metres squared
N	Number
PA	physical activity
PAF	population attributable fractions
PAR-Q	Physical Activity Readiness Questionnaire
PEPAYS	Physical Education, Physical Activity and Youth Sport
QALY	Quality Adjusted Life Year
RCT	randomised controlled trial
RR	relative risk
SCT	Social Cognitive Theory
SD	Standard Deviation
Sin	Socially Integrated
SI	Socially Isolated
SLAN	Survey of Lifestyle, Attitudes and Nutrition
TILDA	The Irish LongituDinal Study on Ageing
TTP	Traditional Translational Pipeline
T2DM	Type 2 Diabetes Mellitus
UK	United Kingdom
UN	United Nations
VAT	visceral adipose tissue
VO_{2max}	maximal oxygen consumption
W	Week(s)
WC	waist circumference

WEMWBS	Warwick-Edinburgh Mental Well-being Scale
WHO	World Health Organisation
WHR	waist-to-hip ratio
WIT	Waterford Institute of Technology
yrs	years
%	percentage

Abstract

Background: The burden of ill-health and mortality experienced by men across the developed world has prompted calls for more gender-sensitised, health interventions that appeal to men. Using physical activity as a 'hook', 'Men on the Move' (MOM) is a community-based physical activity (CBPA) programme designed to engage inactive and 'at risk' men to improve their health and well-being. This thesis reports on the profile of men who engaged in MOM, the impact of the programme on their health and well-being, and evaluates the cost-effectiveness of the programme.

Methods: Inactive males (n=927) were recruited across 8 counties (4 'intervention' [n=501]; 4 'comparison-in-waiting' [n=426]). Self-administered questionnaires combined with objective outcome measures (weight, waist circumference (WC) and time-to-complete one mile) were used to assess participants at baseline, 12, 26 and 52 weeks (W).

Results: Findings indicate that the programme succeeded in reaching its target population with the majority presenting as inactive (59.2%), overweight/obese (89.7%) and having at least two cardiovascular disease (CVD) risk factors (53.1%). Results post-intervention at 12W, 26W and 52W time-points ($p \leq 0.05$) respectively found 73%, 71% and 52% achieved a 1 MET increase in fitness; 14%, 16% and 22% achieved a 5% reduction in bodyweight; and 49%, 46% and 43% achieved a 5cm reduction in WC. The corresponding reduction in CVD risk was noteworthy, particularly in the context of a previously inactive and overweight cohort. The strategy was less successful in engaging more marginalised or 'hard to reach' groups. An economic evaluation also found MOM to be cost-effective.

Conclusions: A gender-sensitised, community outreach recruitment strategy can maximise reach and recruitment of an 'at risk' cohort for CBPA initiatives, but a more targeted approach is needed when recruiting marginalised groups of men. Notwithstanding dropout issues, MOM is effective, and cost-effective, in delivering significant long-term health improvements in previously inactive men.

Dissemination of findings

The sharing of study findings was and is a key priority that was encouraged by my supervisors. Consequently, to date, the findings from this study have been disseminated widely. Two full academic papers have been published; the first outlines the pre-adoption characteristics of participants who presented for the programme (Kelly *et al.*, 2018) and the second presents the impact of the intervention on the fitness and fatness profile of participants (Kelly *et al.*, 2019). A third paper that focuses on the economic value of the MOM programme is close to completion. In addition to these papers, I have also presented study findings at conferences both nationally (n=7) and internationally (n=5; ISPAH 2016, EPH 2017, HEPA 2017, ISPAH 2018, and ISBNPA 2019) winning the Early Researcher Award at the HEPA 2017 conference in Croatia. As part of my professional development, I attended the HEPA Europe 2016 conference as a Research Assistant.

Peer Reviewed (Lead Author) Academic Papers (Appendix B):

1. Kelly L., Harrison M., Richardson N., Carroll P., Robertson S., Keohane A., and Donohoe A. (2018). Reaching beyond the 'worried well': Pre-adoption characteristics of participants in 'Men on the Move', a community-based physical activity programme. *Journal of Public Health*, fdy134.
   Available online at https://doi.org/10.1093/pubmed/fdy134
2. Kelly L., Harrison M., Richardson N., Carroll P., Robertson S., Keohane A., and Donohoe A. (2019). The impact of a gender-specific physical activity intervention on the fitness and fatness profile of men in Ireland. *European Journal of Public Health*, ckz100,
   Available online at https://doi.org/10.1093/eurpub/ckz100
3. Kelly L., Harrison M., Richardson N., Carroll P., Egan T., Ormond G., and Robertson S. (2019). Economic evaluation of 'Men on the Move', a 'real world' community-based physical activity programme for men. *European Journal of Public Health*, (In Preparation).

Conference Presentations:

International

- 10th Annual HEPA Europe Conference (Odense, Denmark, August 2019). Economic evaluation of 'Men on the Move', a community-based physical activity programme for men.

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- 18th International Society of Behavioural Nutrition and Physical Activity (Prague, Czech Republic, June 2019). Are there any pre-adoption characteristic differences in the men who registered for, but failed to partake in, a community-based physical activity intervention for adult men; aka 'Men on the Move'. *Oral Presentation*
- XV International Congress of Behavioural Medicine (Santiago, Chile, 2018). Does engaging in a gender-sensitised community-based physical activity reduce the risks associated with cardiovascular disease? *Accepted for Oral Presentation – Withdrew Abstract*
- 7th International Society for Physical Activity and Health Congress (London, 2018). Does engaging in a gender-sensitised community-based physical activity reduce the risks associated with cardiovascular disease? *Oral Presentation*
- 8th Conference of HEPA Europe (Zagreb, Croatia, 2017). 'Men on the Move': A community-based physical activity programme for adult men in Ireland. *Oral Presentation*

  Plenary Session Presentation; First Prize for the HEPA Europe 2017 Early Career Research Awards.
- 10th European Public Health Conference (Stockholm, 2017). An investigation of a community based physical activity intervention for adult men, 'Men on the Move'. *Oral Presentation*
- International Society of Behavioural Nutrition and Physical Activity Conference (Victoria, Canada, 2017). Physical activity and its relationship to Health: An investigation of a community based physical activity intervention for adult men, aka 'Men on the Move'. *Accepted for Oral Presentation – Withdrew Abstract*

- The International Congress on Physical Activity & Public Health (Bangkok, 2016). 'Men on the Move' – An investigation of a community based physical activity programme for adult men. *Oral Presentation*
- Attended the HEPA Europe Conference (Belfast, 2016). Post-graduate Assistant

National

- All-Ireland Post Graduate Conference in Sport Science, Physical Activity and Physical Education (Athlone IT, May 2019). Do pre-adoption characteristics differ between 'participants' and 'drop-outs' in a community-based physical activity intervention for adult men; aka 'Men on the Move'? *Oral Presentation*
- Men's Health Symposium: 'Men in the Middle' (Dublin, 2018). Effectiveness of a community-based physical activity programme in reaching inactive middle-aged men? *Oral & Poster Presentation*
- All-Ireland Postgraduate Conference in Sport Sciences, Physical Activity and Physical Education (ITC, 2017). Physical activity and its relationship to Health: An investigation of a 12-week community based physical activity intervention for adult men, aka 'Men on the Move'. *Oral Presentation*
- Men's Health Symposium: 'A New Chapter: Healthy Ireland - Men' (Dublin, 2016). 'Men on the Move' – An investigation of a community based physical activity programme for adult men. *Oral & Poster Presentation*
- 20th Anniversary Health Promotion Conference - Knowledge to Action: Using Research Evidence in Health Promotion Policy and Practice (Galway, 2016). Men on the Move (MOM) – The impact of a 12-week community based intervention on physical fitness and body morphology (composition) in sedentary Irish males. *Oral Presentation*
- PEPAYS Ireland Annual Forum "Charter for Change" (Tralee, 2016). Baseline characteristics of sedentary Irish males recruited to participate in a 12-week community based PA intervention programme; 'Men on the Move'. *Oral Presentation*

- All-Ireland Postgraduate Conference in Sport Sciences, Physical Activity and Physical Education (WIT, 2016). Men on the Move (MOM) a group community based physical activity intervention for sedentary Irish males – baseline characteristics. *Oral Presentation*

As an integral part of the wider MOM research team, I have also played a key role in the collection of data and preparation of manuscripts for other aspects of the study. Therefore, I have been recognised in the following related publications;

- the first, a protocol paper on 'Men on the Move' which was published in the Journal of Physical Activity (Carroll *et al.*, 2018);

  Carroll P., Harrison M., Richardson N., Robertson S., Keohane A., Kelly L., and Donohoe A. (2018) Evaluation of a Gender-Sensitive Physical Activity Programme for Inactive Men in Ireland: Protocol Paper for a Pragmatic Controlled Trial. Journal of Physical Activity Research, 2018, Vol. 3, No. 1, 20-27

  Available online at; http://pubs.sciepub.com/jpar/3/1/4 DOI:10.12691/jpar-3-1-4.
- and the second, a process evaluation of the programme which was published in the International Journal of Men's Social and Community Health (Robertson *et al.*, 2018);

  Robertson S., Carroll P., Donohoe A., Richardson N., Keohane A., Kelly L., and Harrison M. (2018) 'The environment was like they were in the pub but with no alcohol' - A process evaluation of engagement and sustainability in Men on the Move an Irish community-based physical activity intervention. International Journal of Men's Social and Community Health, Vol 1(1):e1-e14.

  Available online at; http://ijmsch.com/index.php/IJMSCH/article/view/14 DOI:10.22374/ijmsch.v1i1.14
- Evaluation Report: Executive Summary; MEN ON THE MOVE – A Community Based Physical Activity Programme for Adult Men in Ireland.

  Citation: Carroll P., Richardson N., Harrison M., Robertson S., Keohane A., Kelly L., Donohoe A. (2018). Men on the Move: A Community Based Physical Activity Programme for Adult Men in Ireland. Evaluation Report. Dublin: Health Service Executive. ISBN No: 978-1-78602-091-8.

The findings from the papers for which I am the lead author are the focus of this thesis. 'Men on the Move' is highly innovative in its gender-sensitive approach to a critical public health issue and its potential to inform evidence-based and sustainable practice in targeting increased PA among an 'at risk' population group. 'Men on the Move' is the first step to establishing a nationwide PA programme that specifically targets inactive men in Ireland.

Chapter 1 Introduction

"The north is to south what the clock is to time.

There's east and there's west and there's everywhere life.

I know I was born and I know that I'll die.

The in-between is mine.

I am mine."

- Eddie Vedder (Pearl Jam)

Chapter 1 Introduction

This chapter provides the background, context and rationale for conducting this study; an investigation of a gender-sensitised, community-based physical activity (CBPA) programme 'Men on the Move' (MOM) for men in Ireland. It also provides a brief overview of each chapter, including a description of the programme, and describes the contribution of the partnership network that was integral to developing the programme.

1.1 Introduction

Within Ireland, and indeed globally, issues surrounding men's health present significant public health concerns (Richardson, 2004; White, de Sousa, de Visser, *et al.*, 2011; World Health Organisation, 2018a, 2018b). Men in Ireland have a life expectancy 3.8 years lower than women (Central Statistics Office, 2015), with higher death rates for all of the leading causes of death and at all ages. Research to date has identified that, compared to females, males are less likely to engage in healthy lifestyle behaviours (Department of Health, 2015); less likely to attend annual health checks; less likely to interact with health professionals (Carroll, Kirwan and Lambe, 2014; Hunt, Gray, *et al.*, 2014); less likely to engage with health education and less concerned with information on ill health (Deeks *et al.*, 2009; Wilkins and Savoye, 2009). Within an Irish context, we also know that men are more likely to become inactive with age (Department of Health, 2018b), which is a particular source of concern in light of the role of physical activity (PA) in ameliorating the risk of developing chronic disease (Shook *et al.*, 2015; Soares-Miranda *et al.*, 2016). The recent exponential increase in obesity among men in Ireland (Department of Health and Children, 2008) is also of particular concern. Men's health therefore represents a significant public health issue with considerable associated personal, social and economic costs.

Presently there is a dearth of literature focusing on management of complex lifestyle behaviours in men, that accounts for social, structural and behavioural determinants of health. To date much of the research conducted has focused on mixed or female populations, making it challenging to interpret or extrapolate how such results might

apply specifically to males. Notably, Ireland's National Men's Health Policy (NMHP) calls for the development of gender sensitive health promotion initiatives for men (Department of Health and Children, 2009). This study therefore has an explicit focus on gender and recognises gender in the context of Ireland's NMHP as a dynamic construct, encompassing culturally defined masculine or feminine traits that are deemed to be socially appropriate to the sexes (Department of Health and Children, 2009). The rationale for focusing specifically on men in the study is also underpinned by a rapidly expanding literature that calls for an increased focus on gender-sensitised approaches to health.

This thesis targeted a distinct 'at risk' group within the population (i.e. 'inactive' men who did not meet PA guidelines and who were therefore more likely to have multiple risk factors for cardiovascular disease (CVD)). Paradoxically, these men have traditionally been reluctant to engage in preventative health or health promotion programmes, and are less likely to regularly visit health professionals or take an active role in managing their physical health (Chapple, Ziebland and McPherson, 2004; Richardson, 2004; Wang *et al.*, 2013). However, the study also recognises that the category 'men' is not a homogenous group and that focusing on diversity between different groups of men is important in avoiding essentialist or stereotypical approaches to gender. A key focus of the study therefore, is on situating gender within the wider socio-cultural context of men's lives, and considering how gender interacts with factors such as social class, age and employment status. The European Commission's first state of men's health in Europe report in 2011, noted that disadvantages in men's health were issues of inequity and not biological inevitability (White *et al.*, 2011). The report concluded that whilst the causes of such disparities were multiple and complex, they were linked to services and programmes not being made available to men in the form that they would readily avail of, or in places that they would easily access. A key aim of this study therefore was to address some of the gaps in the current literature relating to men's health, specifically focusing on community-based interventions which promote men's engagement with PA.

1.2 'Men on the Move'

The initiative that is the focus of this thesis, 'Men on the Move', was designed with the intention of establishing a nationwide PA programme in Ireland that specifically targets inactive men. In essence, MOM has a primary focus on PA and health behaviour change. The purpose of the programme is to use PA as a 'hook' to engage men with their health, as evidence in Ireland and elsewhere indicates that PA can be a safe and acceptable way for men to engage with their health (Oliffe *et al.*, 2011; Carroll, Kirwan and Lambe, 2014; Hunt, Gray, *et al.*, 2014; Robertson *et al.*, 2014; Lefkowich, Richardson and Robertson, 2015).

In brief, the MOM programme is a free, 12-week CBPA programme for 'beginners' (inactive adult men) that aims to improve the overall health and well-being of participants. Locally the delivery of the MOM programme is the responsibility of the Local Sport Partnerships (LSPs) working in conjunction with primary care, health promotion and community groups. For the purposes of this study, MOM was delivered in three communities in each of four 'intervention' counties engaging a total of 415 men. It assessed the effect [biopsychosocial health measures] of the intervention up to 12 months post and compared with matched peers [n=415] in four 'comparison-in-waiting' counties (refer to Appendix A for a more detailed background and overview of the MOM programme).

1.3 Aim of study / Research questions

This study is part of the wider MOM project evaluation and will make up one of many pieces of research that sought to investigate the following; 1) the effect [biopsychosocial health measures] of the intervention (quantitative – and the key area of interest for this thesis); 2) the broader impacts of MOM (qualitative), and 3) the process of delivering a community based practitioner led PA programme for inactive men. It should also be acknowledged that due to the scale and design of such a project, all members of the research team contributed to the development of the methodology outlined, and subsequent data collection. Figure 1.3.1 outlines these broad areas of research that

form the evaluation of the MOM programme. The primary aim of this study was to investigate the impact of a free (LSP funded) 12-week CBPA programme (MOM) on the physical fitness, weight status, general health and health behaviours of sedentary Irish males. Participants were encouraged to continue with the programme on a self-funded basis following the initial 12-week LSP funded intervention; with effects investigated up to 52-weeks post-baseline.

The study explored the following research questions;

1. What type of men engage in and adhere to a CBPA programme? Did the programme succeed in reaching men most in need or 'at risk' (e.g. previously inactive men; and were therefore more likely to have multiple risk factors for CVD, poorer/more marginalised groups of men). These are important questions in targeting health promotion programmes beyond the 'worried well'.
2. What is the impact of participation in a 12-week CBPA programme up to 52 weeks post baseline? Most studies adopt a gender-neutral approach; overlook key principles associated with sustainability; and fail to track outcome measures over time (1 year). This study is unique in addressing these issues in an Irish population.
3. Is a gender-sensitised CBPA for men in Ireland cost effective? Are 'Quality Adjusted Life Years' (QALYs) gained over the 52-week intervention programme?
4. What are the key lessons learned from this study that can inform the approach to a national scale-up of MOM?

This study is explicitly orientated towards delivering impact-focused research activity that forges strong links between research and practice. The findings will contribute to advancing public health knowledge through original research. It will inform policy and practice in men's health, obesity prevention, PA and health promotion, as well as the national roll-out of the MOM programme.

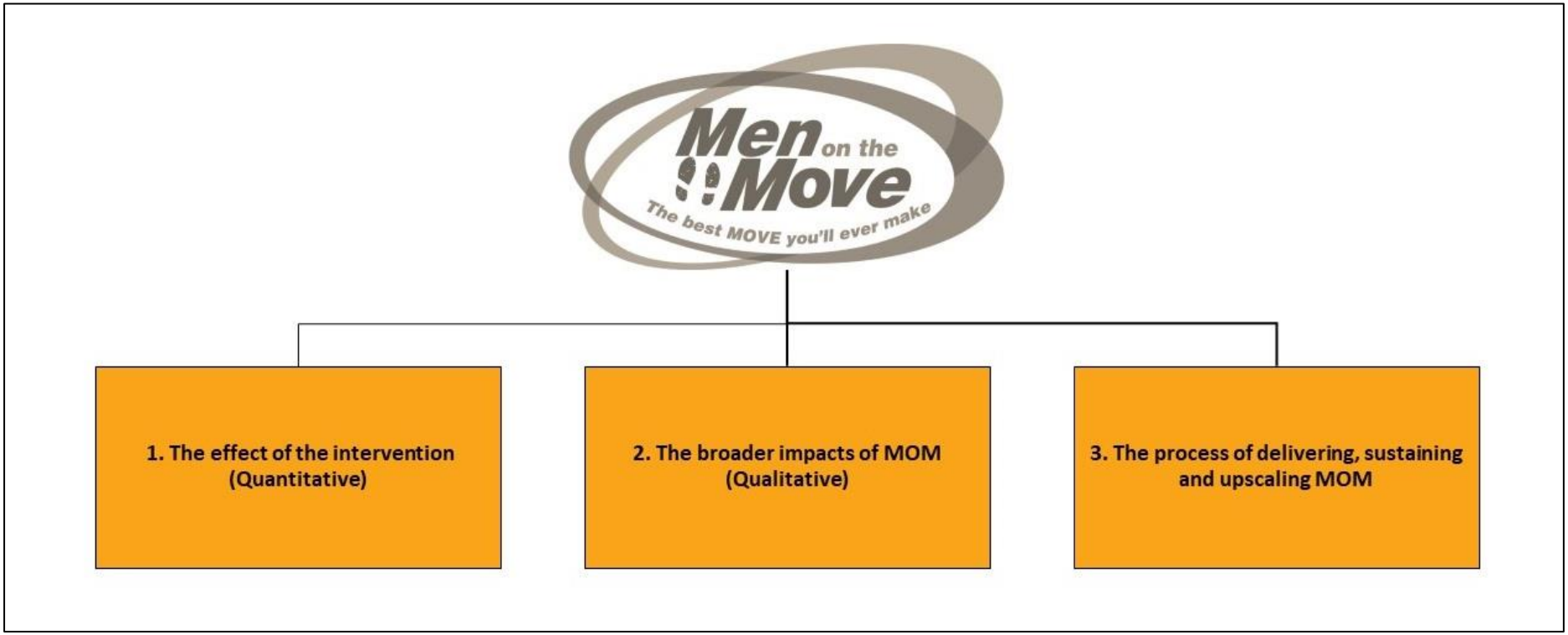


Figure 1.3.1 An overview of the research strands evaluating Men on the Move

1.4 Overview of chapters

Chapter 2 comprises a review of current literature investigating sex and gender differences in health outcomes, and the impact of the social determinants of health in shaping differences in health outcomes between different population groups of men. This chapter identifies the current issues and health implications surrounding physical activity and obesity at both global and national levels, and reviews the evidence relating to current PA recommendations and guidelines, along with national and International statistics for obesity and its assessment. Best methods of assessing and classifying PA and obesity were also explored, with particular focus on those best suited to CBPA interventions; particularly those addressing men's health. This literature review also explored current interventions aimed at engaging men in PA, to ascertain; (i) the rationale for adopting gender-sensitised CBPA programmes targeting men; and (ii) whether such programmes are effective in reaching those for whom they were intended.

Within the context of this thesis, a review of this literature is important for a number of reasons; (i) it identifies 'why' there is a need for CBPA targeting men; (ii) it explores best practice approaches to the assessment of health promotion interventions in community-based settings; and (iii) it seeks to explore an important gap in the literature; namely, the under-representation of men in CBPA programmes. In tracing this gap principally to a failure to account for gender differences in programme design and programme implementation, it sets out a clear rationale for the approach that has been taken in the design and delivery of the CBPA programme 'Men on the Move' that is the focus of this thesis. 'Men on the Move' draws on existing models and theoretical frameworks (Commission on Social Determinants of Health, 2008) to guide its evaluation and planning for implementation and scale-up (Glasgow, Vogt and Boles, 1999) during development, testing and ongoing adaptation. Detailing these protocols may support others engaged in translational research to ensure that their research translates into meaningful outcomes in practice. The chapter also aims to identify the challenges associated with estimating the economic costs of inactivity and obesity. While the primary purpose of MOM was to investigate the effects of the programme on physical

fitness and other associated outcome measures, secondary analysis was conducted to evaluate both the economic impact of the programme and the cost-effectiveness of the intervention.

Chapter 3 reports on the research design and methodology employed to investigate the impact of MOM, with particular focus on the recruitment strategy implemented, data collection and data analysis. The programme was designed to work with, rather than against, prevailing conceptions of masculinity (Gray, Hunt, Mutrie, Anderson, Leishman, *et al.*, 2013; Hunt, Gray, *et al.*, 2014), and was gender-sensitised in relation to the context, content and style of delivery (Hunt, Wyke, *et al.*, 2014). A non-randomised control trial was adopted, which may be considered a limitation, but reflects the 'real-world' nature of the programme. Additionally, methods that evaluated the cost effectiveness, often lacking with community-based interventions, are also outlined.

Chapter 4 reports on the principal findings from the study. The results section will be presented in four distinct sections; Section 4.1 reports on the participant flow through the 'Men on the Move' programme, whilst Section 4.2 presents baseline characteristics of participants. These findings also provide important insights into the challenges facing service providers when trying to establish a sustainable CBPA for men, while the baseline characteristics presented highlight the pre-adoption characteristics of men who registered for MOM, and demonstrate whether the programme reached those for whom it was intended, i.e. adult men who did not meet PA guidelines and were likely to be 'at risk' of CVD. The findings presented in Section 4.3 outline the impact of the intervention across all time-points on men who engaged in the programme; (i) specifically on the physical fitness and body composition adaptations; and (ii) more broadly on measures of wellbeing and social integration, as well as the impact of the intervention on associated CVD risk factors. In considering the effectiveness of the programme over a 12-month period – including what type of man did *not* engage in the programme - findings will advance public health knowledge by informing gender-sensitive and strengths-based approaches to community-based health promotion interventions. While the primary purpose of this study was to investigate the effects of the programme on physical fitness and other associated outcome measures, secondary

analysis evaluates the cost-effectiveness of MOM, and these findings are presented in Section 4.4.

The final chapter, Chapter 5, reviews the key findings that have emerged in the wider context of gender-sensitised interventions in community settings, and the implications for scale-up and further translational research. Limitations and recommendations from the study are also discussed, which will support future research and allow for the translational scale-up of small controllable gender-sensitised PA intervention trials to the implementation of large scale 'real world' population based intervention programmes.

Chapter 2 Literature Review

Chapter 2 Literature Review

2.1 Introduction

Issues surrounding men's health often fail to receive adequate attention from policy makers and continue to be of global concern (Baker, 2016). More broadly, efforts to address gender issues at a health policy level have more typically fallen short in accounting for a true understanding of gender within policy design (Connell, 2012). More recent attempts, both globally (World Health Organisation, 2018a, 2018b), and in terms of national men's health policy (NMHP) development (Department of Health and Children, 2008; Ministério da Saúde Brasil, 2008; Department of Health and Ageing, 2010; Esmailzade *et al.*, 2016; Health Service Executive, 2016) represent significant developments in approaching men's health from a gendered perspective and addressing this gap. Indeed, as the first country in the world to publish a NMHP, Ireland is generally regarded as a world leader in this regard (Baker, 2016). Evidence suggests that innovations in physical activity (PA) programmes that recognise the role of gender in their design and implementation, may provide useful strategies in promoting men's health (Bottorff *et al.*, 2015). This literature review will attempt to identify and examine the key components that need consideration in the design and implementation of a gender-sensitised community-based physical activity (CBPA) programme for inactive men in Ireland.

Section 2.2 provides a brief overview of key men's health developments, nationally and internationally, and aims to facilitate an understanding of 'men's health' and the role of gender in shaping health behaviours. It considers the rationale for having a specific focus on men's health, including men's poorer health outcomes relative to women and differences in health outcomes between different population sub-groups of men. This section provides an important backdrop and context to the study by setting out a clear rationale for adopting a gender-sensitised approach to targeting men as well as for the approach taken in this study to programme design and implementation.

Section 2.3 explores the relationship between PA and health, outlines the health benefits of PA, along with a review of national and international recommendations for

PA and population adherence to PA guidelines, with particular attention on key factors underpinning issues concerning the health and well-being of men in Ireland. This section also reports on the growing prevalence and impact of physical inactivity on health, against a backdrop of an ageing population, rapid unplanned urbanisation and globalisation. Finally, this section investigates approaches to classifying physical fitness, something that is often lacking from population based studies and community-based interventions.

Section 2.4 focuses on obesity and outlines some of the major challenges facing public health both globally and in Ireland due to rising levels of obesity. Evidence outlining how social, cultural and environmental factors may have an influence on obesity in men are considered. Section 2.4 also presents findings on the differences in fat accumulation between the sexes, and considers some of the risk factors associated with obesity. This section concludes by presenting evidence on the methods for measuring and classifying overweight and obesity best suited to community-based settings; particularly those that have been identified in the literature as most suitable for predicting and calculating risk of cardiovascular (CV) events.

Section 2.5 reports on the economic burden associated with the increasing prevalence of physical inactivity and obesity, and best practice in estimating the economic impact and cost-effectiveness of PA interventions such as MOM.

Section 2.6 reflects on current research investigating effective practices in engaging men, and highlights a historical failure to account for gender differences in health promotion programme design and delivery. The section pays particular attention to community-based gender-sensitised strategies for engaging men, and highlights the difficulties encountered by health professionals when designing such interventions.

Section 2.7 explores the area of 'pragmatic trials' from the point of view of their potential to be sustained in 'real world' settings, and highlights the need for research to move beyond 'efficacy testing' under controlled-conditions. The section also highlights the challenges researchers face due to the varying conceptual frameworks and toolkits available for translational research, and presents the rationale behind the model

adapted for the MOM programme. Evidence outlining the importance of developing partnerships and capacity-building between public health agencies and community organisations are also considered.

2.2 Why focus on men's health?

2.2.1 Introduction

There has been a recent upsurge of interest in gender and men's health (Brown and Hunter, 2017; World Health Organisation, 2018a), not least within an Irish context (Department of Health and Children, 2009). Recent statistics published for Ireland (Department of Health, 2018a), and indeed Europe (Brown and Hunter, 2017; World Health Organisation, 2018b), report men living healthier and longer lives, yet there are still some concerning trends evident. For example, high levels of premature mortality among men are still evident, particularly in Eastern Europe with reported life expectancy (LE) figures ranging from 64.7 (Turkmenistan) to 81.2 (Switzerland) years in males in 2016, which is indicative of the socioeconomic divide between East and West (World Health Organisation, 2018b). Similar variations have been reported within countries between men from different socioeconomic backgrounds (World Health Organisation, 2018b), for example in Ireland it is reported that socioeconomic differentials are driving general socioeconomic differentials in all-cause mortality (Layte and Banks, 2016).

The recently published men's health strategy by World Health Organisation (WHO) Europe (World Health Organisation, 2018a) refers to the growing body of evidence that offers an enhanced understanding of how gender intersects with other determinants of health, many of which will be discussed in further detail in this chapter. The strategy is aimed at reducing premature mortality among men as well as improving their mental health and well-being, and is based on commitments outlined in the United Nations (UN) 2030 Agenda for Sustainable Development (United Nations, 2015). However, it should be noted the sustainable development goals outlined in the UN agenda only make specific reference to women when referring to equality and empowerment (United Nations, 2015). The failure to position gender as having a crucial bearing on the health

of both sexes, can only serve to perpetuate such inequalities. and although there have been advancements in recent times with recognising gender in policy development, further work is needed. Efforts to promote gender equality are best achieved through the integration of the health concerns of men and women in the development, implementation and evaluation of policies (Department of Health and Children, 2008). National men's health policies can play a vital role in the development and awareness of men's health at both an inter-sectoral and inter-departmental level, while also providing a platform for further action that embeds men's health policy within the wider policy landscape (Richardson and Carroll, 2018).

2.2.2 Sex differences in health outcomes

In recent decades there has been a steady increase in the LE of men across European countries, yet a difference of 17 years still remains between the lowest- and highest-ranking countries, as well as large within-country differences (World Health Organisation, 2018b). Furthermore, many associated risk factors for chronic diseases have substantially increased despite the decline in mortality rates (World Health Organization; World Heart Federation and World Stroke Organization, 2011). Whilst advancements in medical care and the treatment of chronic diseases are contributing to overall increases in LE, and healthy LE, significant disparities in health outcomes between the sexes remain (Lunenfeld and Stratton, 2013; Baker, 2016; Brown and Hunter, 2017). Globally the average sex-difference in LE is 5 years (Baker, 2016), while in Ireland it is 3.8 years (Department of Health, 2018a). However, large between country sex-differences exist (3-12 years in Europe); with greater differences evident in poorer countries. Explanations for these differences vary but, within developed countries, there is general agreement that men's higher rates of smoking, drinking, substance misuse, obesity and similar 'lifestyle' factors, all play an important part in men's significantly higher rates of premature mortality (White *et al.*, 2011; Baker, 2016; Robertson and Baker, 2017).

Men's higher risk for premature mortality, as well as the large differences in health outcomes between different population groups of men, are nothing new, and perhaps

have become widely accepted as the 'norm'. Health inequities are not caused by biological factors alone and are influenced by many factors like exposure to risk, health-seeking patterns and responses from healthcare providers/systems (Solar and Irwin, 2010; Braveman and Gottlieb, 2014). Health outcomes in men, like women, are also greatly influenced by environment (both at home and at work), education, communities, and social networks. It is also important to note that men are not a homogenous group and that health outcomes are greatly influenced by age, ethnicity, migration status, sexual orientation, gender identity and other social determinants of health (see Section 2.3.2).

Recent figures published in Ireland's National Service Plan show Ireland as an ageing society (Figure 2.2.1), with the population aged 65 and over having increased by 35% since 2009 – an increase that is considerably higher than the European Union (EU) average of 16% (Department of Health, 2018a). Indeed, the predicted number of people aged 65 and over is set to double (Table 2.2.1) to approximately 1.2 million by 2038 (Department of Health, 2018a). Whilst LE in Ireland has increased by nearly 2.5 years since 2006, this improvement is largely due to lower mortality and better survival from conditions affecting older age groups. Inevitably, this will have a significant impact on the demand for health care services in Ireland in the future.

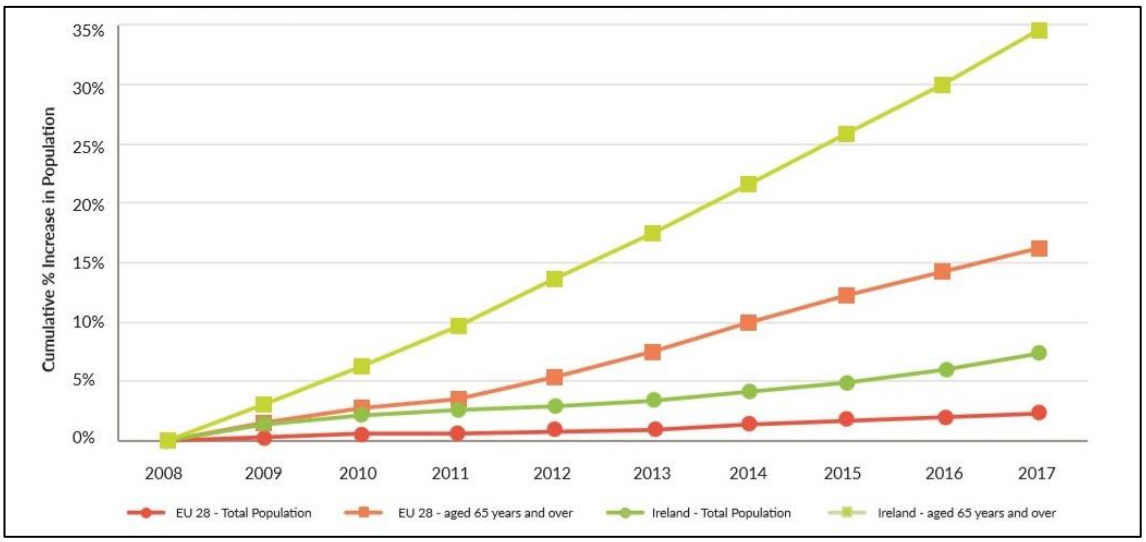


Figure 2.2.1 Cumulative percentage increase in population, all ages and 65+, Ireland and EU-28, 2008 to 2017 (**Source;** Eurostat)

Notes; (i) Data for 2017 are provisional.

Table 2.2.1 Population 2018 and projected population to 2038 ('000s) by age group, Ireland

						% change 2018-2038
Age Group	**2018(e.)**	**2023**	**2028**	**2033**	**2038**	
0-14	1008.7	986.0	907.0	863.0	855.0	-15.4
15-64	3175.0	3306.0	3458.0	3552.0	3590.0	13.6
65 and over	673.4	791.0	919.0	1052.0	1196.0	77.2
85 and over	73.0	90.0	112.0	150.0	191.0	163.5
Total	**4,857**	**5,082**	**5,284**	**5,466**	**5,641**	**16.4**

Notes; (i) Projections are based on the Central Statistics Office's M2F2 assumption of moderate growth in migration and a decrease in the total fertility rate to 1.6 by 2031, remaining constant thereafter; (ii) The projections should not be considered as forecasts; (iii) Projections were produced using data for 1 January 2016 as a starting point; (iv) (e.): The current CSO population estimate was used for 2018 figures.

(**Source;** Central Statistics Office)

Men in Ireland are living longer than their European counterparts (Figure 2.2.2), with a current LE of 79.9 years (Table 2.2.2); 3.8 years lower than their female counterparts (Department of Health, 2018a). It should be noted that this gap has narrowed in the past decade, with a difference of 5.6 years reported in 1996 (Table 2.2.2).

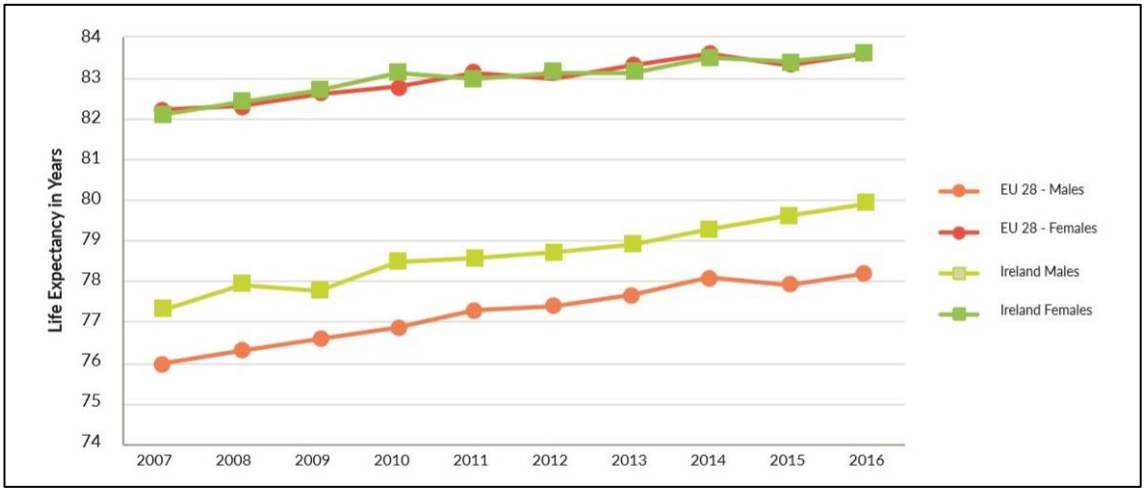


Figure 2.2.2 Life expectancy at birth by gender, Ireland and EU-28, 2007 to 2016

(**Source;** Eurostat)

Notes; (i) Data for 2015 and 2016 are provisional; (ii) There is a break in data for EU-28 for 2010-2012.

Table 2.2.2 Life expectancy, Ireland, by age and gender, 1996, 2006 and 2016

	Life expectancy at age	1996	2006	2016	% Change 1996-2016
Male	0	73.1	76.9	79.9	9.3
	1	72.6	76.2	79.2	9.1
	40	35.2	38.5	41.0	16.5
	65	13.9	16.6	18.6	33.8
	75	8.1	9.7	11.2	38.2
Female	0	78.7	81.7	83.6	6.2
	1	78.2	80.9	82.8	5.9
	40	39.9	42.6	44.3	11.0
	65	17.4	19.9	21.1	21.3
	75	10.3	12.0	13.1	27.2

Notes; (i) Data for 2016 are provisional (**Source;** Eurostat)

Mortality rates across all major causes have declined since 2008. Age-standardised death rates for cancers and circulatory system diseases, the major causes of deaths in Ireland, have declined by 11% and 32% respectively over the past ten years. Lifestyle factors such as PA, obesity, drinking and smoking continue to be issues which have the potential to jeopardise many of the health gains achieved in recent years. Taken together with an ageing population, adverse trends, if not addressed now, are likely to have significant economic and personal costs in the future.

Life expectancy figures should not be looked at in isolation. When the figures account for healthy life years, the gender gap is considerably smaller in terms of healthy life years than it is for overall LE, with just 0.7 years difference in favour of women. Therefore, while women have a greater overall LE, they can expect to live more of their lives with chronic health difficulties as compared to men (White *et al.*, 2011). Men, therefore, tend to spend a greater proportion of their somewhat shorter lives free from activity limitations. This pattern is also evident in Ireland, where healthy life years at age 65 for both men and women is above the EU average (Figure 2.2.3). One integral part of any health intervention is supporting the adoption of healthy lifestyles throughout the life course that will support healthy ageing and increased healthy LE.

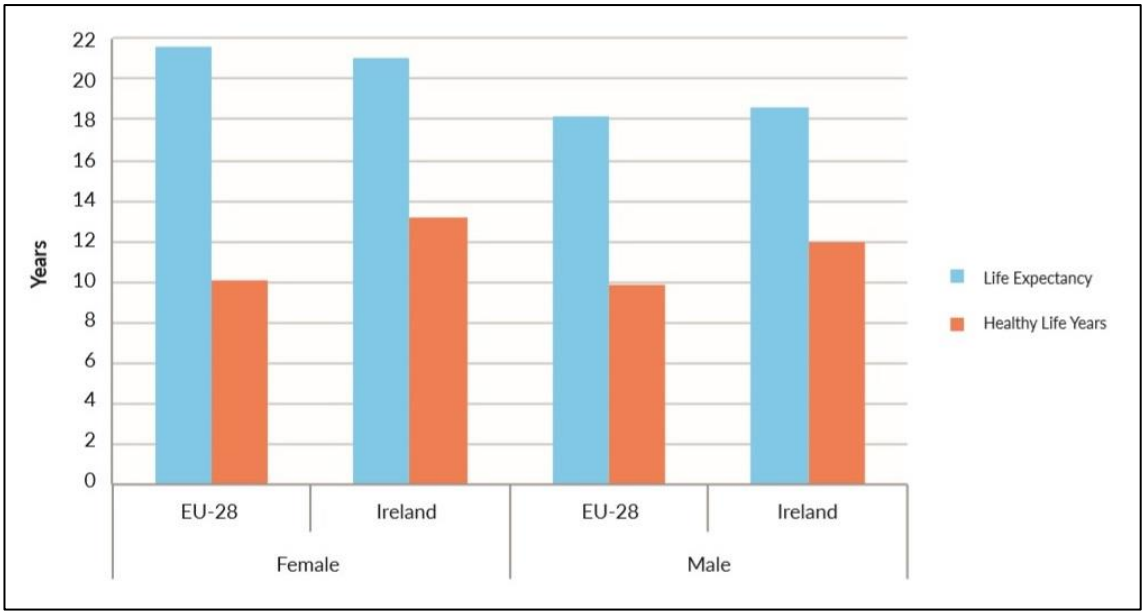


Figure 2.2.3 Healthy life years and life expectancy at Age 65 by gender, Ireland and EU-28, 2016 (**Source;** Eurostat)

It is also well documented that chronic disease increases with age, with the highest prevalence observed in the population aged 50 years and over. Reported figures for this age cohort living with one or more chronic diseases, are estimated to increase by 40% from 2016 levels, to 1.09m in 2030 (Turner, Donoghue and Kenny, 2018). The figures presented highlight an increasing onus on public health policy to adopt more proactive and targeted approaches to promoting healthy ageing. Underpinning the statistics presented are differences in lifestyle and health behaviours. Reported figures show Ireland is among the top performers for LE, self-perceived health status and stroke mortality rates. However rates for respiratory and acute myocardial infarction mortality are below the EU average. This is of particular importance in the context of this study as the target population, inactive men, are more likely to be 'at risk' of cardiovascular disease (CVD). Approximately 27% of the population report with chronic illness or health problems (Table 2.2.3). Although this is lower than the EU average of approximately 33%, nevertheless, it represents a significant burden on the health system and highlights the need for a greater focus on chronic disease prevention at a public health level.

Table 2.2.3 People with a long-standing illness or health problem, Ireland and EU-28, 2016

Age Group	Yes		No	
	% Male	% Female	% Male	% Female
16-24	13.0	13.5	87.0	86.5
25-34	19.1	13.4	80.9	86.6
35-44	17.8	18.2	82.2	81.8
45-64	30.9	30.4	69.1	69.6
65+	49.9	50.1	50.1	49.9
Total	**27.1**	**26.9**	**72.9**	**73.1**
EU-28	**30.8**	**35.1**	**69.2**	**64.9**

(**Source;** EU-SILC, Eurostat)

Although international figures show a decline in premature deaths in the past decade from the four major non-communicable diseases (NCDs – CVDs, cancers, diabetes and chronic respiratory diseases), male mortality rates are still consistently higher than female mortality rates (World Health Organisation, 2017). Reported statistics show NCDs were the leading cause of death for men in Europe between 2000 and 2015, accounting for over four million deaths (World Health Organisation, 2018b), while CVD and associated risk factors, accounted for 36.4 million disability-adjusted life years lost amongst men in Europe in 2015 (Wilkins *et al.*, 2017). According to the WHO, NCDs are attributable to almost 45% of the adult disease burden in low- and middle-income countries (Samuelson, 2004). Most recent global figures from the American Heart Association (AHA) and the American Stroke Association (ASA) report that, in 2014, 17.3 million global deaths per year were attributed to CVD (Mozaffarian *et al.*, 2014).

In Ireland, the three most common chronic diseases are cancer, CVD and respiratory disease, causing three quarters of all deaths. Notably, men in Ireland also have higher death rates than women for most of the leading causes of death at all ages. Latest quarterly figures published show that diseases of the circulatory system accounted for 29.9% (n=2,090) of the reported 6,987 deaths in quarter 3, 2017, with the majority 92.6% (n=977) of the 1,055 males who died being 55 years and over (Central Statistics Office, 2018). In Ireland, rates of mortality from diseases of the circulatory system were 9% below the European Union (EU) average, with rates of mortality from respiratory diseases 40% higher when compared with the EU average (Central Statistics Office, 2015).

Notwithstanding the many complexities in the aetiology of NCDs, it is well established that unhealthy lifestyle behaviours are a major contributing factor. Many diseases and premature deaths are preventable, with increased morbidity (and mortality) strongly related to lifestyle-based health determinants such as exercise, smoking, alcohol consumption, and healthy eating (Health Service Executive, 2018). Indeed, recently published figures for Ireland (Department of Health, 2018a) report a high prevalence of unhealthy lifestyle behaviours, particularly in men, many of which are associated with increased risk of CVD. Participation in exercise and PA are among the healthy lifestyle behaviours which can assist in prevention and also management of CVD. Despite almost two thirds (65%) of the population in Ireland being aware of recommended PA guidelines for health, only 32% reported undertaking a sufficient level of PA (Department of Health, 2018b), with women (34%) undertaking slightly more than men (31%; Department of Health, 2018b). Similar gender issues with other healthy lifestyle behaviours are seen with smoking rates, alcohol intake and consumption of healthy foods (Department of Health, 2018b). Despite a recent decline in smoking rates, men are still more likely to smoke than women, with 22% reporting as current smokers, compared to 17% of women. Men are more likely than women to drink alcohol (78% v 72%), with almost two out of every three (62%) men who drink doing so at least once a week, compared to 48% of women. Men are also much more likely to binge drink (drinking six or more standard drinks on a typical drinking occasion) than women (54% v 19%), and are less likely than women to consume 5 or more portions of fruit and vegetables a day (30% v 43%).

It is well established that men's unhealthy lifestyle behaviours are linked to poorer health outcomes in men. For example, within a Canadian context, largely preventable behaviours, such as those just outlined, were found to account for virtually all of the excess male mortality below age 45 years, and approximately 50% of the excess below 60 years (Phillips, 2006). Similarly, a report investigating the excess burden of cancer among men in the Republic of Ireland found that higher incidence and mortality for men from non sex-specific cancers were largely attributed to higher rates of tobacco use and alcohol consumption, unhealthy diets, higher levels of obesity, and lower levels of PA (Clarke *et al.*, 2013). While the report notes the complexity and multiplicity of factors

that underpin cancer risk and cancer rates, including genetics, it suggests that modifiable lifestyle behaviours are substantially more important in accounting for the 'excess burden' of cancer mortality among men. The report highlights the need for more gender-sensitised approaches when targeting men, particularly those in lower socio-economic groups (i.e. those most in need).

There is broad consensus, re-affirmed by the figures presented, that sex-differences in lifestyle factors such as smoking, drinking and diet play an important role in men's higher rates of premature mortality and therefore lower LE (White *et al.*, 2011; Baker, 2016). However, it is also worth noting that men develop bad habits early in life. Reported figures for young men in Ireland show that an increasing proportion are overweight or obese (31% of men aged 15-24); 33% of men aged between 25-34 years smoke; and 68% of men aged 35 and over drink at least once per week, with the majority (55%) binge drinking on a typical drinking occasion (Department of Health, 2015). This engagement in poor lifestyle behaviours over a prolonged period, combined with lower engagement in preventative health or health promotion initiatives, are key factors in chronic disease development (and highlights that prevention needs to start with young men). It is reasonable to hypothesise therefore, that by reducing health risk behaviours and improving health promoting behaviours, men's health outcomes would be significantly improved (Mahalik, Burns and Syzdek, 2007).

Despite men's poor lifestyle behaviours, the vast majority (84%) of men in Ireland rate their health as good or very good (Department of Health, 2018b), which is the highest self-perceived health status in the EU (Figure 2.2.4). Gender differences in self ratings of health are most evident amongst those aged 55 to 64, with 81% of men self-reporting their health to be good/very good, compared with 73% of women. In seeking to account for this anomaly, the Department of Health acknowledges that this may be due to the wording of questions asked and differences in men's and women's perception of what constitutes 'good' health (Department of Health, 2018b). As might be expected, self-reported 'good' health is lower among those living in more deprived areas compared to those living in more affluent areas, at 79% and 90% respectively. The figures presented highlight a paradox between how people rate their health and their largely unhealthy

profile, and also highlights a significant gender difference in a range of health-indicators, many of which are associated with increased risk of obesity and CVD.

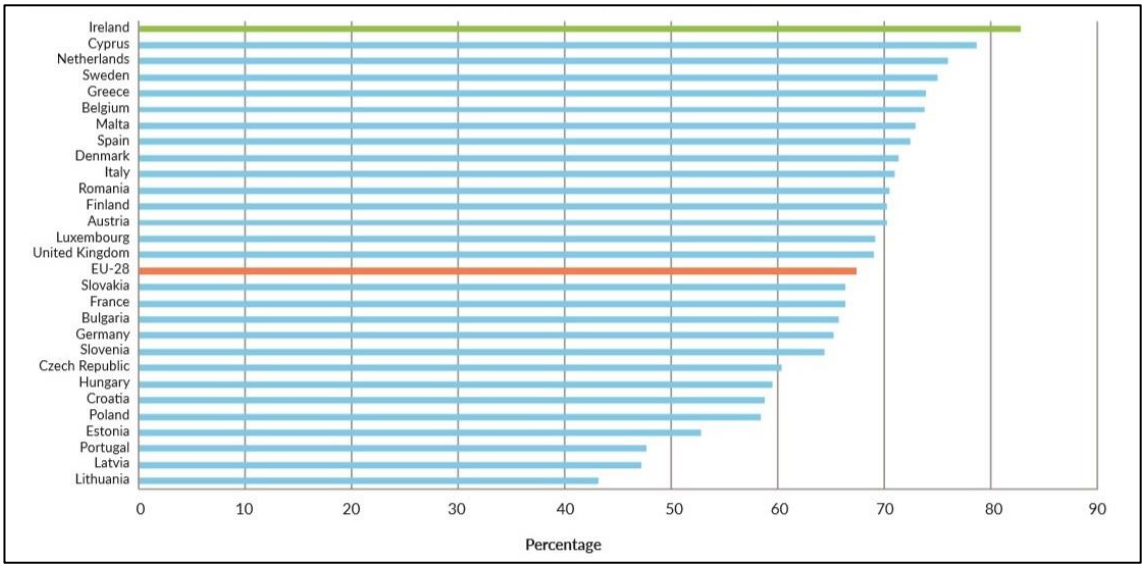


Figure 2.2.4 Percentage of the population reporting good or very good health in EU-28 countries, 2016 (**Source;** EU-SILC. Eurostat)

Whilst a focus on aggregated differences in health outcomes between males and females provide a strong rationale for focusing on men's health, this can lead to more reductionist and over-simplistic generalisations about binary differences between 'all' men and 'all' women (Richardson, 2013). It is therefore important to explore more nuanced differences between different population groups/sub-groups of men.

2.2.3 Differences in health outcomes between men

Whilst males may be more vulnerable to certain diseases and illnesses than females (Kraemer, 2000), such differences fail to account for more than a small proportion of overall sex differences in health outcomes and for any of the differences in health outcomes between different male population groups (Courtenay, 2003). The intersection of gender with other aspects of identity draws into focus those sub-populations of men for whom health outcomes are significantly worse than the general male population. However, inequalities in health are closely linked with wider social

determinants including deprivation, living and working conditions, issues of service access, and cultural and physical environments (Department of Health, 2016b). Deprivation may be defined as a *'state of disadvantage relative to the local community or the wider society or nation to which an individual, family or group belongs'* (Townsend, 1987). There is a well-established social gradient in mortality (Marmot, 2005) that has, within an Irish context, widened in recent decades (Layte *et al.*, 2015), with a greater widening of the gap being evident among men (Layte and McCrory, 2011). Layte (2016) reported a similar pattern of lower LE among unskilled workers compared to professional workers in Ireland from the 1990s (Layte and Banks, 2016). This has drawn attention in Ireland to disparities in health outcomes among 'at risk' or 'unreached' (Baker *et al.*, 2015) population groups of men, such as farmers (Smyth *et al.*, 2013), unemployed men (Institute of Public Health in Ireland, 2008) and Traveller men (All Ireland Traveller Health Study Team, 2010) and has important implications in terms of the targeting of health interventions to those most in need. It is well documented that minority groups who experience social exclusion, marginalisation, and social disadvantage experience a disproportionate burden of ill-health (Doherty, 2016). However, men are often seen as 'hard to reach' by service providers (Carroll, Kirwan and Lambe, 2014). Indeed, understanding how gender intersects with other determinants of health and influences health behaviour is essential when developing health promotion interventions that reach men most in need.

It is well reported how health status reflects income inequality, with fewer low income earners reporting good health both in Ireland and across the EU (Department of Health, 2018a; World Health Organisation, 2018b). In Ireland, wider social determinants of health suggest that socio-economic status, poverty and health are strongly linked (Health Service Executive, 2018). Unsurprisingly, negative lifestyle behaviours have been shown to more frequently cluster together for men who experience higher rates of socio-economic deprivation (Bellis *et al.*, 2016; Department of Health, 2018a). For example, rates of smoking are higher among men from lower socio-economic (defined by social class based on the level of skill and educational attainment of their occupation) groups (Hickey and Evans, 2014) and whilst men from lower socio-economic groups in Ireland drink less alcohol overall, they are more likely to binge drink and to experience

higher levels of alcohol-related harm (Department of Health, 2018a). Men aged 55 to 74 living in more deprived areas are more likely to report having a longstanding illness or health problems than men in this age group living in more affluent areas (57% v 33%; Department of Health, 2018b). Self-reported 'good' health is also lower among those unemployed (78%) compared to those working (93%; Department of Health, 2018b). Likewise, there is a strong correlation between socio-economic status and levels of obesity (see Section 2.3).

A seminal report from the WHO noted the key role our social environment plays in determining our health status, and identified factors including poverty, food insecurity, social exclusion and discrimination, poor housing, unhealthy early childhood conditions and low occupational status as important determinants of most diseases, deaths and health inequalities between and within countries (Commission on Social Determinants of Health, 2008). The first State of Men's Health in Europe report similarly noted how social and economic factors are key determinants of the health status of men, and are factors in the varied health differences between men.

A key focus of Ireland's national health strategy (Department of Health, 2016a) is to achieve a reduction in health inequalities. The strategy prioritises improved lifestyle and health behaviours through focusing on population health issues such as overweight and obesity, child health, mental health, smoking, alcohol and drugs, and positive ageing. However, in seeking to bring about change at a population level, such policies often fail to account for differences in gender, or health inequalities experienced by socially excluded/marginalised groups (i.e. the homeless, people with substance use disorders, Travellers, asylum seekers, prisoners and survivors of institutional abuse). In a review of the social determinants of health in Europe for WHO, Professor Michael Marmot argued that national governments should develop strategies that respond to the different ways health, prevention and treatment services are experienced by men and women, thus ensuring that policies and interventions are responsive to gender (World Health Organisation, 2014). Likewise, the health inequalities experienced by marginalised groups differ in severity and complexity, compared to those for the wider population, and thus require greater empathy and healthcare support (Health Service Executive, 2018). With due consideration to these issues, Men on the Move was developed as a

'free' all-inclusive programme aimed at engaging 'at risk' men, but also aimed at engaging 'hard to reach' men of all ages, regardless of race, sexual orientation, or social class.

2.2.4 Gender and men's health

A fundamental premise of social constructionist theories of gender is that rather than being fixed in advance of social interaction, gender is constructed in interaction and masculine 'practices' are actively produced in wide-ranging social interactions (Connell, 1995). Nevertheless, many public health policy documents typically define gender within narrow, binary terms, referring to 'women' and 'men' as fixed unproblematic groups, with masculinity and femininity seen as natural opposites (Connell, 2012). Effectively, gender becomes the statistical margin of difference between men and women (Schofield, 2009). In the context of men's health, there has been a tendency to see men as being 'programmed' and masculinity as 'fixed', and that men's health practices are therefore the product of unyielding male characteristics and that men cannot change (Connell, 1995). Connell (2012) notes that, historically, so-called 'fixed' gender patterns do change over time, and, in the context of health, should be a source of encouragement to policymakers and service providers.

Courtenay (2002) refers to gender as one of the most significant sociocultural factors influencing health and health-related behaviour due to the intricacy of societal relationships and practices linked to biological sex. In order to comprehend how gender interconnects with other social determinants of health, it is advantageous to observe gender as a reflection of societal structures and culturally fashioned characteristics that are maintained through the activities of daily life, which are themselves determined by the environments in which people are born, grow, live, work and age (Commission on Social Determinants of Health, 2008). Literature refers to masculinity as a set of characteristics, ideals, and behaviours that are assumed to be crucial to men in specific cultural context (Keizer, 2019). However, whilst these specific characteristics often have commonality with elements associated with dominant forms of masculinity, there are very diverse forms of being a man determined by factors such as ethnic group, class,

migrant status, sexual orientation, work or education (Connell and Huggins, 1988). It is the intersection of gender with these other socio-demographic variables that contributes to the wide-ranging health outcomes experienced by men. This intersectionality, or cross-classification of gender groups is nothing new (Crenshaw, 1989), and can assist in identifying health outcomes between social groups which are relevant to their race, social class, age, or other variables. This can at least partially explain why there are gender gaps in health outcomes, including mortality and morbidity, and also between social groups within the same country (World Health Organisation, 2018b).

Understanding how gender shapes men's health practices is a critical first step in developing effective health promotion strategies that might appeal to men (World Health Organisation, 2018a). For example, literature suggests that men who engage in health risk behaviours often do so to 'prove' their masculinity, and likewise, often avoid seeking help for fear of being considered 'feminine' (Courtenay, 1998). Despite men's poorer health outcomes relative to women, many men tend to underestimate or downplay the extent of health problems, with evidence suggesting a reluctance by men to avail of health services (Chapple, Ziebland and McPherson, 2004; Richardson, 2004; Wang *et al.*, 2013) and therefore being exposed to higher levels of potentially preventable health conditions (Mahalik, Burns and Syzdek, 2007). Recent research found that even after accounting for reproductive health visits, men aged between 16 and 60 years had fewer contacts with their general practitioner (GP). However, the same study (Wang *et al.*, 2013) found that for patients who were in receipt of medication for CVD or depression, similar patterns of consultation were evident between genders. The 'excess' in female consulting may reflect a reluctance among men to seek help for depression (Seidler *et al.*, 2018) or greater levels of 'need' in relation to depression in women (Wang *et al.*, 2013). These findings suggest that gender difference in utilising primary health care services are not constant (Wang *et al.*, 2013). Other studies have highlighted unappealing and/or unconnected healthcare systems as the reason for a lack of engagement of men, with calls for more creative approaches to engaging men with health services (White *et al.*, 2011; Pringle *et al.*, 2014).

The gender and health literature highlights the importance of recognising gender in the context of the design, development and implementation of gender-sensitised programmes targeting men, with particular attention to understanding male attitudes towards health behaviours. A study from Robertson (2006) suggests that when gender-sensitised strategies are embedded as part of the process, men can and will engage with health services. It is important that programmes move away from a 'one size fits all' approach, and that men are not seen as a homogenous group; instead programmes should be designed with suitable flexibility to engage with different subpopulations of men, as well as men as individuals. In addressing the need for gender-sensitised health interventions, the WHO Europe 'Strategy on the health and well-being of men in the WHO European Region' (World Health Organisation, 2018a) aims to:

> *'…improve men's health and well-being through evidence-informed, gender-responsive and equity-driven approaches that transform the gender roles, norms and structures that affect men's exposure to risk factors and act as a barrier to gender equality and health equity achievements in Europe.'*
>
> (WHO Europe, 2018, p7)

It is within this context of a 'gender transformative' approach to health that MOM was developed. In the first instance, the programme was gender-sensitised in relation to content, context and delivery (see Section 3.1.2). Attention was also drawn to the relationship between gender and obesity (see Section 2.4.3) which underpinned the inclusion of a nutrition workshop (Appendix C) as part of the MOM programme.

2.3 Physical activity

2.3.1 Definition of terms and health benefits of physical activity

Physical activity is a prophylactic to many of the chronic conditions associated with obesity and sedentary behaviour. Research provides strong evidence of the health benefits associated with PA and an active lifestyle (Warburton, 2006); including reduced risk of premature mortality, CVD, high blood pressure, diabetes, cancers and depression

(Shook *et al.*, 2015; Soares-Miranda *et al.*, 2016); as well as improved mental health and well-being (Paluska and Schwenk, 2000). These benefits relate to all individuals regardless of gender, ethnicity, capabilities, age or size, while also having additional economic and social benefits.

Despite the widespread adoption of the WHO PA guidelines, the interpretation of the terminology used for promoting PA and exercise intensities can vary greatly amongst health and fitness professionals. Physical activity, exercise, physical fitness and physical inactivity are often used interchangeably, when in fact they define different concepts. Caspersen, Powell and Christenson (1985) attempted to define and distinguish between the terms, defining PA as any bodily movement produced by skeletal muscles which causes energy expenditure greater than at rest and which is health enhancing (Caspersen, Powell and Christenson, 1985). Exercise, a subset of PA, differs as it has a specific outcome, aiming to improve or maintain an established level of fitness, through planned and structured activity. Physical fitness often refers to exercise where specific elements can be measured with very specific testing protocols. With reference to exercise intensity, a position statement developed by Norton, Norton and Sadgrove (2010) sought to standardise the terminology, allowing for greater consistency amongst prescribing practitioners. The statement, described in detail in Table 2.3.1, identified five key PA classifications (sedentary, light intensity, moderate intensity, vigorous intensity, and high intensity), along with detailed objective physiological and metabolic guidelines. These were developed to achieve greater consistency in descriptions and exercise intensity limits for health practitioners and their clients.

Rising obesity levels have led to a focus on lifestyle approaches to the prevention of weight gain. Physical activity is one such approach and has long been considered an integral component of weight management. Physical activity is widely regarded as being crucial in the prevention of weight gain and successful maintenance of weight loss, while also fostering improved cardiovascular health (Jones and Ekelund, 2019). It is reported that physically active obese individuals have a CVD risk profile that is more akin to that of thin, fit individuals than that of their obese, but sedentary/inactive, counterparts (Lee and Skerrett, 2001).

Table 2.3.1 Physical activity parameters

Intensity	Objective Measures	What Patient Feels *	Typical Examples
Sedentary	<1.6 METs <40% HR_{max} <20% VO_{2max}	At rest with limited added movement	Sitting and reading Watching TV Driving a car
Light	1.6-3.0 METs 40-55% HR_{max} 20-40% VO_{2max}	Active No noticeable change in breathing/sweating Can be sustained for 1 hour or more	Slow walking (e.g. around the house) Light work while standing (e.g. cooking, washing dishes) Playing an instrument
Moderate	3-6 METs 55-70% HR_{max} 40-60% VO_{2max}	Increased breathing and sweating, but still able to maintain a conversation Can sustain activity for 30-60 min	Brisk walk Low movement racquet games (e.g. doubles tennis, recreational badminton) Water aerobics Resistance training Mowing the lawn
Vigorous	6-9 METs 70-80% HR_{max} 60-85% VO_{2max}	Feeling 'out of breath' Increased sweating Can be difficult to maintain a conversation Can sustain activity for up to 30 min	Jogging Hiking Swimming with effort Higher movement racquet games (e.g. singles tennis and squash) Field/ball games (e.g. soccer and basketball) Cross-country skiing Shovelling
High	≥9 METs ≥90% HR_{max} ≥85% VO_{2max}	Feels like giving 100% All-out bursts of between 1 and 2 min Intensity cannot be sustained for > 10 min	Training/competing in most competitive sports Racing or all-out activity (e.g. running, rowing, swimming, skiing and high-intensity intervals)

Key; These descriptions do not generally apply for symptomatic patients with chronic pulmonary disease. MET values for high-intensity activity may not be achievable for many patients with chronic disease, in which case HR_{max} or VO_{2max} values are advised. HR_{max}, theoretical maximal heart rate: usually estimated as (220–age) x0.9; MET, metabolic equivalent of task (1 MET = the energy to lie/sit quietly); VO_{2max}, maximal oxygen uptake.

Adapted from (Norton, Norton and Sadgrove, 2010)

2.3.2 Physical activity recommendations, guidelines and adherence

Physical activity has become a well-established agenda for public health agencies and all types of health-care delivery systems worldwide (Global Advocacy Council for Physical Activity, 2010; International Society for Physical Activity and Health ISPAH, 2017). In 2010, the WHO published the 'Global Recommendations on Physical Activity for Health'. Targeted at policy-makers at a national level, the recommendations focused primarily on the utility of PA in the prevention of NCDs, and were partially developed in response to the limited existence of national guidelines on PA in low- and middle-income countries. The recommendations address the PA requirements for the prevention of NCDs in terms of frequency, duration, intensity, type and total PA needed, and are

targeted at three age groups: 5-17 years; 18-64 years; and 65 years and above. Physical activity guidelines developed for the Irish population (Department of Transport Tourism and Sport, 2016) follow those defined by the WHO, which are universally accepted. Adults (18-64 years) are recommended to take part in at least 30 minutes of moderate intensity activity 5 days per week. Older adults (65 years plus) are recommended to perform the same as adults with the focus being on aerobic activity, muscle strengthening and balance.

Implementation of the PA guidelines poses a number of important questions, not least concerning who is responsible for translating the guidelines into practice. Thornton *et al.* (2016) note the important role health professionals and physicians play in prescribing recommendations for PA, but also highlight what they view as the lack of prescription as part of routine care. Their study sought to provide evidence-based research to help improve exercise prescription from medical professionals. The descriptors of PA (Table 2.3.1), originally identified by Norton, Norton and Sadgrove (2010), were adapted to provide physicians with clearly defined parameters when defining PA intensities. Findings informed a position statement on behalf of the Canadian Academy of Sport and Exercise Medicine addressing the modifiable risk factors for the prevention and management of chronic disease, however the parameters described can potentially be adopted across a range of clinical and practice settings (Thornton *et al.*, 2016). This was of particular relevance to MOM, as the appointed PA co-ordinators needed to have a clear understanding of who they were delivering the exercise programme to inactive men of varying capabilities. Thornton *et al.'s* (2016) findings suggest that the provision of clear guidelines and recommendations from health professionals, particularly physicians, can potentially sway patient commitment to engaging in PA, while also improving the prospect of implementation. Another key consideration with regard to implementation is the issue of sustainability. Foster *et al.*, (2014) point to a dearth of evidence for long-term maintenance of PA or the sustainability of PA programmes.

While the benefits associated with an increase in PA are well established, research indicates that a high proportion of men do not engage in the recommended levels of PA for optimal health benefits. Just under a third (32%) of the population is considered to

be sufficiently active, with those who are classed as obese being less likely to be active (23%), compared to those with a normal weight or overweight (36%; Department of Health, 2015a). Although men in Ireland are reported to be more physically active than women across the life course, significantly more believe they are sufficiently active compared to the proportion who actually achieve the recommended PA guidelines. A possible explanation for this being gender differences in perception of what constitutes 'good' health, i.e. poor health education (Department of Health, 2018a). The Healthy Ireland report also shows that over half (56%) believed that they were adequately physically active (Department of Health, 2015). Reported findings also show a correlation between weight status and PA levels, with figures noting those who are obese to be less active than those of normal weight. In the context of this study, it is worth examining in more detail the differences in perceived versus actual sufficiency of PA for men in Ireland (Table 2.3.2). This highlights a greater gap in older than in younger age groups. Men tend to become less physically active with age, with only 20% of men over the age of 65 reported as sufficiently active (Department of Health, 2016c). These figures underline the need for more targeted approaches to promoting PA to [insufficiently] active middle-aged and older men.

Table 2.3.2 Perceived versus actual sufficiency of physical activity for men in Ireland

	Men	
Age	**Feel that activity levels are sufficient**	**Achieve actual guidelines**
15-24	78	56
25-34	63	52
35-44	53	39
45-54	51	38
55-64	60	33
65-74	65	24
74+	54	14

(Adapted from (Department of Health, 2016c) Healthy Ireland Survey 2016 Summary of Findings, P 24)

2.3.3 Health consequences of physical inactivity

Despite the well-established benefits of PA, the growing prevalence of physical inactivity has emerged as a significant public health concern. Literature has consistently shown a direct relationship between physical inactivity and increased risk of numerous chronic diseases and mortality (Morris and Crawford, 1958; Grontved and Hu, 2011; Chau *et al.*,

2013; Biswas *et al.*, 2015). Morris *et al.'s* (1953) seminal longitudinal study was one of the first to demonstrate an increased health risk associated with physical inactivity, reporting an increased risk of coronary heart disease (CHD) in London bus drivers when compared with conductors. Following this pioneering work, there have been numerous subsequent studies (Paffenbarger *et al.*, 1986; Lee *et al.*, 2012) reporting the lack of PA as a major risk factor for ill-health and premature mortality. Lee *et al.* (2012) estimate that in excess of 5 million deaths annually are as a result of a failure to meet recommended levels of PA at a population level. Lee *et al.'s* study also investigated the potential reduction in the prevalence of the major NCDs, as well as potential deaths, had the recommended PA guidelines been undertaken. Lee *et al.* estimated physical inactivity to be responsible for 10.4% of all deaths in Europe for 2012, and that a 20% increase in PA levels could have averted more than 100,000 deaths. Similarly had inactivity levels been lowered by one-fifth, approximately half a million cases of type 2 diabetes mellitus, and 50,000 cases of breast and colorectal cancer cases may have been avoided (Lee *et al.*, 2012).

Several recent studies (Chau *et al.*, 2013; Biswas *et al.*, 2015; Ekelund *et al.*, 2016) have focused on the detrimental association between daily sitting time and mortality, and whether PA can diminish or even eliminate the effects of sedentary behaviour. Ekelund *et al.* (2016) conducted a systematic review and meta-analysis of 16 studies, which included 1,005,791 individuals who were followed up for 2-18.1 years. The study reported that high levels of moderate intensity PA appears to eliminate the increased risk of death associated with high rates of sitting time, but only reduces the increased risk associated with high television viewing time. This evidence clearly demonstrates the risk of ill-health associated with physical inactivity, and the need for more concerted and targeted strategies to increase PA at a population level.

Rapid unplanned urbanisation, which leads to unhealthy environments, has contributed to a greater prevalence in sedentary behaviours (Samuelson, 2004). While the WHO reports a growing prevalence of NCDs in both low and middle income countries, it should be noted that physical inactivity affects all levels of society. Recent studies (Matthews *et al.*, 2008; Hansen *et al.*, 2012) report that physical inactivity is particularly evident in

high-income countries where adults are reported to spend the majority of their wakeful time being sedentary. Physical inactivity has been identified by the WHO as the fourth leading risk factor for global mortality causing an estimated 3.2 million, or 6%, of deaths globally (Samuelson, 2004). It is noteworthy that Ireland's PA guidelines do not account for gender. Considering Ireland has been to the forefront in raising awareness of issues surrounding men's health, the lack of reference to gender reaffirms findings identifying policies as unyielding and not reflective of the disparity within gender groups.

2.3.4 Physical fitness and population health

Physical fitness is one of the best indicators of a range of health outcomes including all-cause mortality (Kodama *et al.,* 2009), CVD (Kodama *et al.,* 2009), diabetes (Goodrich *et al.*, 2012), cancer (Peel *et al.*, 2010), and dementia (Liu *et al.*, 2012). Studies have attempted to quantify whether a set increase in physical fitness equated to a proportionate reduction in CVD risk. In a meta-analysis study, Kodama *et al.* (2009) demonstrated that an increase in physical fitness by 1 MET (resting metabolic levels are normally categorised as 1 MET/3.5 mlO_2/kg/min) is associated with a 15% reduction in CV events, a 10%-25% reduction in premature mortality, with even greater risk reductions observed in those with lower baseline aerobic capacities (Myers *et al.*, 2015). A reduction in all-cause mortality risk has also been found in response to an increase in physical fitness (Blair *et al.*, 1995). Such findings are particularly relevant as they provide quantifiable measures of health gain that can be tracked to particular improvements in aerobic fitness.

Improving physical fitness at a population level requires a targeted approach to exercise prescription. It is important that all health professionals have a good understanding of exercise prescription, but particularly those prescribing exercise to the general public, or individuals at risk of CVD. There is a general absence of standardised measurement methods or universally recognised classification of fitness levels for general population groups. In 2006, the American College of Sports Medicine (ACSM) produced maximal oxygen uptake (VO_{2max}: ml/kg/min) standards, which were aimed at rating an individual's fitness level based on gender and age (Table 2.4.4).

Table 2.3.3 American College of Sports Medicine standards (ACSM) for VO_{2max} (ml/kg/min)

	Age in years				
Men	**20-29 yrs**	**30-39 yrs**	**40-49 yrs**	**50-59 yrs**	**60+ yrs**
Excellent (top 20%)	>48	>47	>44	>41	>38
Good (next 20%)	44-48	43-47	40-44	37-41	34-38
Average (middle 20%)	41-44	39-43	37-40	34-37	30-34
Fair (next 20%)	37-41	36-39	33-36	30-34	27-30
Poor (lowest 20%)	<37	<35	<33	<30	<27
Women	**20-29 yrs**	**30-39 yrs**	**40-49 yrs**	**50-59 yrs**	**60+ yrs**
Excellent (top 20%)	>41	>39	>36	>32	>31
Good (next 20%)	37-41	35-39	32-36	30-32	27-31
Average (middle 20%)	34-37	32-35	30-32	27-30	25-27
Fair (next 20%)	31-34	29-32	27-30	24-27	23-25
Poor (lowest 20%)	<31	<29	<27	<24	<23

Key: VO_{2max} = maximal oxygen consumption; ml/kg/min = millilitres per kilogram per minute; yrs = years; ACSM = American College of Sports Medicine. (Brubaker, Otto and Whaley, 2006)

The attainment of a high VO_{2max} requires the integration of a number of factors including pulmonary ventilation, haemoglobin concentration in the blood, blood volume, cardiac output and peripheral blood flow (Bassett and Howley, 2000). It is commonly used for measuring athletic performance, as it is an important factor in determining one's ability to sustain high-intensity exercise for longer periods of time. It can, however, also be applied to general population groups. For the purpose of this study, it was used both as a tool for estimating participants' baseline fitness, as well as tracking changes in fitness over time. The ACSM standards rate fitness levels according to age; a non-modifiable risk factor. It is well reported that physical fitness levels (aerobic capacity) decline with age (Fleg *et al.*, 2005), which can hinder an individual's functional independence and quality of life. It is also reported that change in physical fitness in healthy middle-aged men is a strong predictor of mortality (Erikssen *et al.*, 1998). Fleg *et al.*, (2005) report that the rate of decline however is not constant across the age span in healthy individuals, as assumed by cross-sectional studies, but accelerates markedly with each successive age decade, especially in men, and regardless of PA habits. This is of particular importance in the context of this study, as any improvements in physical fitness levels can lead to improved functionality, greater capacity to perform daily activities (Fleg *et al.*, 2005), and significantly lowered risk of death (Erikssen *et al.*, 1998).

2.4 Obesity

2.4.1 Prevalence and trends in obesity

Men on the Move was aimed at recruiting a cohort of 'inactive' men who did not meet PA guidelines and were therefore more likely to be overweight or obese, and to have multiple risk factors for CVD. A growing concern within the field of men's health, both nationally (Richardson, 2004; Department of Health and Children, 2008; Carroll, Kirwan and Lambe, 2014; Lefkowich, Richardson and Robertson, 2015) and internationally (Courtenay, 2000; Wilkins and Savoye, 2009; White, Sousa, Visser, *et al.*, 2011; World Health Organisation, 2018b), has been the increasing prevalence of obesity among males. Indeed, one of the major challenges to public health globally in recent years is the rising levels of obesity, with global obesity levels having more than doubled since 1980 (World Health Organisation, 2016b). Notwithstanding the many complexities in the aetiology of obesity, this increased prevalence of obesity can be partly attributed to an increase in physical inactivity combined with an increased consumption of nutrient-poor foods with high levels of saturated fats and sugar (World Health Organisation, 2004). According to the WHO, obesity is now the most common nutritional disorder in the world (World Health Organisation, 2004).

A number of systematic reviews and international and national reports have been commissioned to examine trends in prevalence and associated consequences of rising levels of obesity. Finucane *et al.*, (2011) conducted a systematic review of data from 199 countries, and reported that in 2008, 1.46 billion adults were classified as overweight, including 502 million being classified as obese. Most recent WHO figures reported that greater than 1.9 billion of the global adult population was overweight, with 600 million being classified as obese (World Health Organisation, 2016b). According to a systematic review by Ng *et al.* (2014), obesity levels in adult populations in 2013 exceeded 50% of the population in many countries from Oceania, North Africa and the Middle East; 33% in North America; and 20% in Western Europe. Figures specific to the Irish adult population reflect international trends.

Since 1990 the prevalence of obesity among men in Ireland has steadily increased. Men tend to accumulate weight at an earlier age, and at a faster rate, than women (White *et al.*, 2011). Eurostat data figures indicate that 22% of men aged between 15-24 years have a body mass index (BMI) >25 kg/m^2 compared to 14% of women, with figures increasing to 46% for men aged 25-34 years, compared to 25% in women (White *et al.*, 2011). Robertson *et al.'s* (2014) systematic review on obesity found that a greater proportion of men to women were overweight or obese in the United Kingdom (UK). Predicted figures for England report that 47% of men and 36% of women will be obese by 2025 (Butland *et al.*, 2007), with similar differences reported for Wales (64% and 53%; Welsh *et al.*, 2013), Scotland (69.2% and 59.6%; Bradshaw *et al.*, 2012) and Northern Ireland (67% and 56%; DHSSPS, 2012). These figures highlight the growing disparity between the sexes, and the need for a gender-sensitised approach to addressing this 'epidemic' (World Health Organisation, 2000).

Within an Irish context, a number of recent reports (Morgan *et al.*, 2008; Irish Universities Nutrition Alliance, 2011; TILDA, 2014; Department of Health, 2016c) highlight a trend in overweight, and obesity levels. As noted, the prevalence of obesity in adults (aged between 18-64 years) has significantly increased since 1990, with men increasing from 8% to 26%, and women from 13% to 21% (Irish Universities Nutrition Alliance, 2011). The greatest increase observed was in men aged 51-64 years. The most recent data (Department of Health, 2016c) report some 37% of adults as having a normal weight, with 37% overweight and a further 23% obese. Men were more likely than women to be overweight (43% men; 31% women), with similar obesity percentages reported between the sexes (25% men; 22% women). For those under the age of 25; 31% of men were reported as overweight or obese, compared to 27% of women of this age. Indeed, the reported figures suggest that Ireland is on course to become the most obese country in Europe. A report by the WHO predicts that, by 2030, obesity rates for Irish men are set to increase from 26% to 48%, with the proportion of overweight and obese men projected to rise to 89%. The forecast would put men in Ireland at the top of the reported 53 countries, matched only by Uzbekistan (World Health Organisation, 2016c).

It is also well reported that obesity is linked with social class, with higher levels of obesity reported in lower social classes; a group whom service providers often find challenging to engage. Based on an adapted version of the UK Standard Occupational Classifications (2010), the Healthy Ireland Survey (Department of Health, 2015) reports on some key differences in obesity across social classes, with higher levels of obesity reported amongst those in lower social classes (28%) than those in higher classes (17%). Robertson *et al.* (2014) also report links between obesity and deprivation, with the incidence of obesity increasing with increasing indices of deprivation and lower levels of education. Additional studies (Gough and Conner, 2006; Monaghan, 2008; Weaver, More and Harris, 2008; McCullagh, 2011; Leishman and Dalziel, 2012) support these findings; linking various indices of social class with obesity. Weaver *et al.* (2008) reported that economic status was a factor for men when making food choices for healthy eating and exercise. In the study, men refer to the high cost of healthy foods, such as fruit and vegetables, compared to food high in sugar, and also make reference to the high costs associated with gym/club memberships. These studies would suggest a distinct correlation between obesity and socio-economic status, and highlights the need for public health interventions to adopt a more targeted approach to engage lower socio-economic status groups.

The data presented underlines the significant public health problem – or 'epidemic' (World Health Organisation, 2000) – that obesity represents with considerable associated social and economic costs that requires urgent attention. These studies highlight a number of important issues in the context of this study; a) that overweight/obesity is a major health issue; b) more men than women are overweight/obese, with the prevalence of overweight/obesity continuing to rise exponentially in recent years, particularly within an Irish context; and c) specifically poorer men and younger men should be targeted for interventions.

2.4.2 Health consequences of obesity

Evidence suggests that men tend to be more susceptible than women to the adverse consequences of obesity, such as CVD, Type 2 Diabetes Mellitus (T2DM) and hypertension (Department of Health and Children, 2005). The excessive fat accumulation caused by obesity is thought to contribute to many diseases associated with an increased risk of ill-health; cardiovascular (CV) and metabolic disease, musculoskeletal problems, decreased physical function, as well as some forms of cancer (Villareal *et al.*, 2005), some of which are explored in more detail in this study. Cardiovascular disease encompasses a range of conditions that include CHD, cerebral vascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. As noted (Section 2.2), CVD is the leading cause of death in Ireland, and it is estimated that CVD mortality increases by 40% for every 5kg/m^2 increase in body mass index (BMI) above 25kg/m^2 (TILDA, 2014). Similarly, De Koning *et al.* (2007a) report an associated 2% increased risk of developing CVD for every 1cm increase in waist circumference (WC). This is particularly important in the context of this study, as men tend to accumulate fat around their waist (Section 2.4.3). There have been numerous studies (Flegal and Kalantar-Zadeh, 2013; Ortega, Lavie and Blair, 2016) which have investigated the link between obesity and CVD, with varying and somewhat controversial findings reported due in large part to the use of BMI as a method of measuring and classifying overweight and obesity. Some of the methods best suited to measuring and classifying overweight and obesity for CBPA interventions will be reviewed in detail in Section 2.4.4.

Metabolic Syndrome (MetS) is a phrase often associated with obesity and increased risk of ill-health, particularly with men. Haller and Hanefeld (1975) first coined the term MetS which refers to a clustering of risk factors that, when combined, result in an increased risk of T2DM and CVD (Sookoian and Pirola, 2011). Metabolic Syndrome is directly related to circulatory disease, many cancers and respiratory disease (Villegas *et al.*, 2003) resulting in an approximate 1.6-fold increase in mortality (Mishra *et al.*, 2013). The clustering of obesity/central obesity, insulin resistance, circulating hypertriglyceridemia (dyslipidaemia) and hypertension are considered the central

components of MetS (Cornier *et al.*, 2008), with central obesity considered to be the most common indicator for the diagnosis of MetS (Villegas *et al.*, 2003). Figure 2.4.1 (O'Neill and O'Driscoll, 2015) indicates the central role that overweight and obesity play in mediating an increase in risk factors associated with MetS. In a study that investigated the prevalence of MetS in middle-aged men and women, the accumulation of fat around the male abdomen was found to be one of the main contributing factors to a higher prevalence of MetS in men than in women (24.6% v 17.8%; Villegas *et al.*, 2003). Men tend to amass fat intra abdominally leading to the 'android' form of obesity often categorised by the 'apple shape' of men, whereas women tend to gather fat in the hip and thigh area, often categorised as 'pear shape', or the 'gynoid' form (World Health Organisation, 2000). This tendency for men to deposit their fat as visceral intra-abdominal fat leads to an increase risk of developing MetS. It is also reported that men accumulate excess weight earlier than women (White, McKee, Richardson, *et al.*, 2011), and an additional factor when considering health consequences i.e. the longer one is overweight/obese, the more likely one is to develop obesity-related conditions.

The adverse effects of obesity can also be seen in many other health conditions. Berger (2015) report that secretions from visceral fat cells lead to the creation of fat toxins which are associated with numerous fat related cancers affecting the prostate, testis, bowel, liver, kidney and oesophagus. Numerous other conditions such as hypertension, hyperlipidaemia, diabetes, erectile dysfunction, dementia and sleep apnoea, are also considered to be as a consequence of excess weight. The literature presented highlights key sex differences in risk factors associated with obesity, with fat distribution of particular importance in the context of this study.

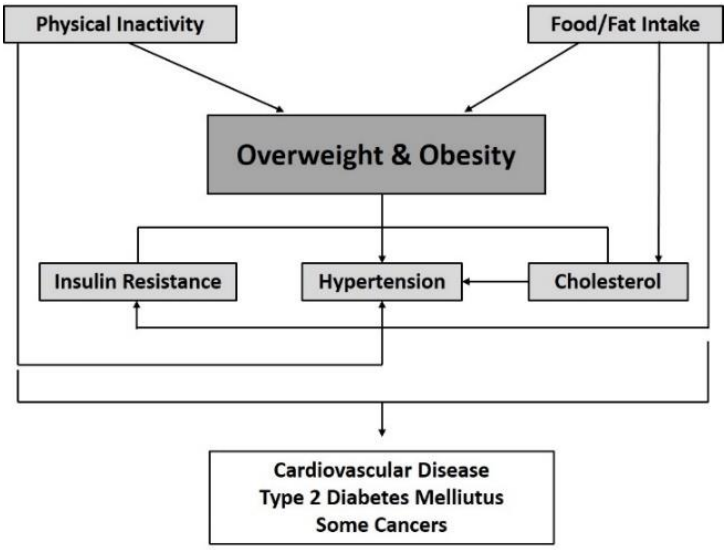


Figure 2.4.1 Metabolic syndrome risk factors (O'Neill and O'Driscoll, 2015)

Kuk *et al.* (2005) investigated the influence of age and sex on the distribution of abdominal adipose tissue for a given WC. The study assessed body composition for a wide ranging demographic of men and women through whole-body magnetic resonance imaging (Kuk *et al.*, 2005). The results from the study suggest that there is a difference between sexes and adipose tissue distribution for a given WC - women were found to have more abdominal subcutaneous adipose tissue than men, while men were shown to have greater visceral adipose tissue (VAT). The study also suggests that VAT accumulation is also influenced by menopausal status and age, and concludes that adipose tissue distribution is altered considerably by age and sex for a given WC. Current WC classifications do not consider the influence of age on the assessment of metabolic risk, however Kuk *et al.'s* study reports that the correlation between WC and VAT is substantially influenced by the age and sex of the individual. Within each sex, older men and women had a significantly greater increase in VAT for a given WC ($P<0.05$). However, the study was unable to clarify whether the prediction of metabolic risk by WC within each sex is improved by establishing defined age categories. One of the main limitations with the study, acknowledged by the authors, and with particular significance to the MOM study, was that it did not account for the possible relationship between physical fitness and visceral adiposity.

The results from the study by Kuk *et al.* (2005) are consistent with findings from a study by Shen *et al.,* which found a significant increase in VAT deposition with age, and which was particularly evident among men and postmenopausal women (Shen *et al.*, 2009). The amount of VAT in men was found to be twice as high as that in premenopausal women. VAT accumulation in men generally leads to an increase in total body fat, whereas in women total body fat is less affected by VAT (Shen *et al.*, 2009). A study by Lemieux *et al.* (1993) found that, even after accounting for total body fat mass, men had a higher ratio of VAT to total body fat mass when compared with women. In summary, the tendency for men to accumulate VAT seems to be a key factor in predicting why obesity is more hazardous in men than in women.

Although WC has been shown to correlate with the amount of total abdominal fat, it can still only be regarded as another aid for health risk classification, as it cannot distinguish between visceral adiposity and the amount of subcutaneous abdominal fat. Also, it may not always be possible to detect favourable changes in an individual's body composition in response to PA, particularly in abdominally obese individuals. Individuals who have altered their lifestyle through PA could be disappointed by trivial changes in their objective measure results, such as change in body weight and WC, as muscle mass may replace some of the visceral fat loss achieved through PA (Després, 2012; Chin, Kahathuduwa and Binks, 2016). Figure 2.4.2 depicts the response of a viscerally obese man who took part in a 1-year lifestyle modification programme at the Quebec Heart Institute (Després *et al.*, 2008). Despite the fact that the man has apparently achieved a modest weight loss of 0.3kg, he reduced his WC by 6cm, which equated to a substantial (17.5%) loss of VAT. These findings emphasise the importance of assessing changes in WC in addition to body weight, and re-emphasise how a reduction in WC may represent a more useful and clinically relevant therapeutic target than weight loss.

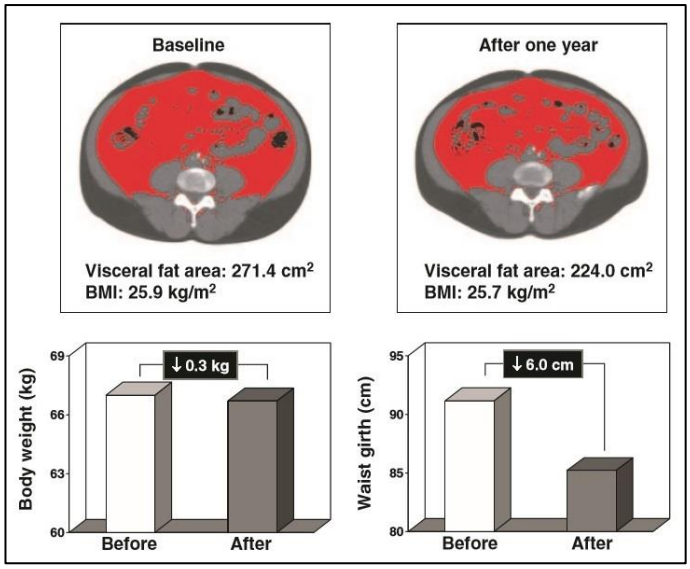


Figure 2.4.2 Body weight (kg) and waist circumference (cm) response to physical activity in obese individual involved in a 1-year lifestyle modification programme.

(Després *et al.*, 2008)

2.4.3 Gender and obesity

Underpinning these worrying obesity statistics are a number of important and previously established gendered aspects to male obesity. For example, in the context of weight and PA (discussed further in Sections 2.4), men are more likely to use exercise to regulate their weight (Kiefer, Rathmanner and Kunze, 2005) and often consider dieting as 'feminine' (Gough and Conner, 2006) and therefore as a less desirable form of weight loss or weight management. It is well reported that men have less healthy diets (i.e. more likely to eat high-caloric foods than women (Morgan *et al.*, 2008; White *et al.*, 2011; Hartmann, Siegrist and Horst, 2012), and are more likely to exceed the recommended weekly alcohol limits, or engage in binge drinking (Morgan, Mcgee and Watson, 2008; White *et al.*, 2011; Wilsnack *et al.*, 2018) with such drinking patterns often used as a means of defining masculinity (Brooks, 2001; Wilsnack *et al.*, 2009, 2018; Iwamoto *et al.*, 2011). Men tend to be less knowledgeable than women regarding healthy foods (Kiefer et al. 2005; Safefood 2014), often regarding them as insubstantial or 'bland' (Gough and Conner, 2006), and tend to conceptualise food as fuel for their bodies (Safefood, 2014).

According to McPherson and Turnbull (2005a), men are often unconcerned with excess weight until it has reached epidemic proportions. Men also associate masculinity with a greater body size (Stibbe, 2004), causing some men to be worried about being too thin and therefore less likely to diet compared with women (Kiefer, Rathmanner and Kunze, 2005; McPherson and Turnbull, 2005). Men's understanding and conceptualisation of "overweight" or "obesity" can also be at odds with how such terms are defined at a public health level (McCarthy *et al.*, 2016). Evidence suggests that most men are unaware that their weight may not be "normal" and are also unaware of the significant health risks associated with being outside the defined "normal" weight parameters (Department of Health, 2016c). This anomaly stems from both a lack of health knowledge and the male drive for muscularity that associates 'bigness' with masculinity, physical attractiveness and good health (Pope *et al.*, 2000; McCreary, Saucier and Courtenay, 2005). The Healthy Ireland Survey (2015) notes that more women than men who were overweight or obese had, in the past, tried to lose weight, with exercise or eating fewer calories, the preferred methods of achieving weight loss. The literature presented emphasises the complexities surrounding obesity, and that a multi-layered approach is needed in order to address the issue.

With reference to obesity in men, Robertson *et al.* (2014) report that a combination of a reducing diet, PA advice or a PA programme, and behaviour change techniques (e.g. self-monitoring, goal setting, prompting self-monitoring, providing feedback, review of goals), were advantageous in achieving, and maintaining, weight reduction in men. The report notes how men prefer more factual information on how to reduce weight, with PA the preferred method. It also suggests that men-only groups may enhance intervention effectiveness, and that flexibility in programme design allowing for individual tailoring/feedback may also be advantageous with increasing programme effectiveness. They suggest that more innovative means of delivering programmes are needed for 'engaging' hard-to-reach groups, such as younger men, unemployed men and those living in remote and rural locations, and suggest programmes provided in social settings, such as sports clubs and workplaces, may be more successful at engaging men than health service settings (Robertson *et al.*, 2014).

2.4.4 Assessing obesity

As highlighted previously, there has been a recent upsurge on literature focusing on sex differences in body shape, specifically the regional distribution of adipose tissue. This is now considered more relevant than total body fat in assessing obesity, and also predicting associated health risks (Després, 2012; Chin, Kahathuduwa and Binks, 2016). Nevertheless, further consideration of the literature in this area is important, particularly in terms of establishing the merits and limitations of both methods as measures of body fatness. Research has continually developed with central adiposity/abdominal obesity now considered more important than overall obesity in the evaluation of CVD and CHD risks (Larsson *et al.*, 1984; Rexrode *et al.*, 1998; Ritchie and Connell, 2007; Luma, 2011).

Body mass index is the most commonly used method of measuring and classifying overweight and obesity across gender, age and ethnicity. Body mass index is calculated by dividing an individual's weight in kilograms (kg) by their height squared in metres (m^2). In the classification of overweight and obesity, individuals with a BMI ≥ 25kg.m^{-2} are considered to be overweight, while those with a BMI ≥ 30kg.m^{-2} are classified as obese (World Health Organisation, 2016b). Body mass index by definition does not differentiate between fat mass (FM) and fat-free mass (FFM). Many would argue that an excess of adiposity, i.e. percentage body fat (BF%), should form part of obesity measurement, and it could therefore be hypothesised that BMI includes an estimation error when assessing adiposity. It could also be assumed that by using BF%, a more accurate measure of adiposity would provide a more accurate predictor of CVD mortality; based on the assumption that it is the excess of adiposity that predicts mortality (Ortega, Lavie and Blair, 2016). However, methods of accurately assessing BF% are time consuming, more complicated, and more expensive when compared to a simple BMI calculation; hence the lack of cohort studies focusing on CVD which directly compare BMI and BF%. Early studies that investigated correlations between BMI and body fatness reported BMI as only having a fair correlation with more direct measures of body fatness (Keys *et al.*, 1972), and suggest that BMI measurements had a limited

ability to reflect adiposity which is more associated with CVD risk (Smalley *et al.*, 1990; Cornier *et al.*, 2011).

Although BMI remains the most commonly used method of measuring and classifying overweight and obesity, waist circumference (WC) is fast becoming the preferred option in a health promotion context for more complex indices of adiposity. Its growing popularity is due to its simplicity of administration and classification of overweight and obesity, and its strong correlation with associated health risks (Lean, Han and Seidell, 1998). Waist circumference comprises the circumferential measurement of the trunk in centimetres (cm) at the midpoint between the hip bone and the lowest rib. In the classification of overweight and obesity, men with a WC ≥ 94cm are considered to be overweight, while those with a WC ≥ 102cm are classified as obese (Samuelson, 2004). It should be noted however, that WC may be difficult to measure and less accurate in obese individuals, particularly in those with a BMI of 35 or higher (Palmer and Apovian, 2017). Studies have shown that a simple waist measurement provides an accurate reflection of total and abdominal fat accumulation (Lean, Han and Morrison, 1995) and, that as an index of adiposity, is not greatly influenced by height (Han *et al.*, 1997). Therefore, WC was of particular importance for the MOM programme, as it allowed for the measurement of abdominal adiposity in men.

Recent studies have focused on WC as a predictor of CV events, and as a means of tracking changes in risk over time. For example, studies have reported that individuals with similar BMI but varying WC measurements have different metabolic risk profiles, and therefore differences in CV health risks (Keys *et al.*, 1972; Larsson *et al.*, 1984; Lean, Han and Morrison, 1995; Rexrode *et al.*, 1998). Typically, the WHO guidelines are used when categorising risk for metabolic complications (Healthy <94cm, Increased risk 94-102cm, and High risk >102cm), while additional studies have investigated further the relationship between the measurement of WC and risk factors associated with abdominal obesity. A study by De Koning *et al.* (2007a) tried to determine the association between WC and waist-to-hip ratio (WHR) with the risk of incident CVD events, and also whether the strength of the association with CVD risk was different between measurements. Using a meta-regression analysis, which included articles that

reported on risk by categorical and continuous measures of WC and WHR (n = 258,114; 4355 CVD events), the study found that for a 1cm increase in WC, the relative risk (RR) of a CVD event increased by 2% (95% CI: 1 – 3%) overall (De Koning *et al.*, 2007). Table 2.4.1 presents further changes in WC for an equivalent increase in CVD risk (De Koning *et al.*, 2007). The results were consistent for both men and women. However, the study acknowledges numerous limitations such as the small number of studies included, the impact of significant heterogeneity as a limiting factor in detecting small differences in risk, and the exclusion of studies that used a WC or WHR cut-off point to denote abdominal obesity. It is also acknowledged that standardised linear associations of WC and WHR with CVD could not be evaluated as standard deviations of measurements were not consistently reported in articles that formed part of the meta-regression analysis. Nevertheless, this study from De Koning *et al.* is significant as it clearly correlates a measurement of WC (and WHR) with an increase in risk of future CVD. This is particularly relevant in the context of MOM as it allows for any post-intervention 'success' to be quantifiable in terms of reduction in CVD risk.

Table 2.4.1 Changes in waist circumference for an equivalent increase in CVD risk

% Increase in risk	**Waist Circumference (cm)**		
	Men	Women	Men and Women
Minimally adjusted			
10	4.71	5.08	5.04
20	9.02	9.72	9.65
30	12.98	13.99	13.88
40	16.64	17.95	17.80
50	20.06	21.63	21.46
Moderately adjusted			
10	5.00	2.13	3.20
20	9.56	4.07	6.12
30	13.76	5.86	8.81
40	17.64	7.52	11.30
50	21.26	9.06	13.62
Maximally adjusted			
10	8.46	2.99	4.26
20	16.18	5.72	8.15
30	23.28	8.23	11.73
40	29.86	10.55	15.05
50	35.98	12.72	18.13

Adapted from (De Koning *et al.*, 2007)

A meta-analysis study (Lee *et al.*, 2008) comparing indices of WC with BMI as discriminators of CVD risk factors found WC to be a marginally better indicator of

predicting increased health risks, and formed the basis of 'The Irish LongituDinal Study on Ageing' (TILDA; a large-scale, nationally representative, longitudinal study on ageing in Ireland) classification with regard to the associations between obesity, CVD and CVD risk factors. The cross-sectional study from Lean *et al.* (1995) investigated a range of health outcomes according to measured bodyweight, BMI and WC which were then used to create bands, or levels, as a means of classifying the participants (men = 5887; women = 7018; age 20-59 years). The results found that a WC of 102cm for men and 88cm for women correspond with symptoms of breathlessness, early development of arthritis from overweight, and the health risks are such that medical consultation and weight loss should be urged. These patterns of risk were found to be similar when compared to the WHO classifications for those 'at risk' for BMI.

Furthermore, Coutinho *et al.* (2013) investigated the mortality risk of patients with coronary artery disease (CAD) based on a combination of BMI and measures of central obesity, such as WC and WHR (Coutinho *et al.*, 2013). Through a systematic review of the literature, the study included over 15,500 (n=15,547) participants with CAD across 3 continents, with data used to assess mortality risk according to different patterns of adiposity. As illustrated in Figure 2.4.3, a BMI of 22 kg/m² represented a normal BMI, 26 kg/m² represented an overweight BMI, and 30 kg/m² represented an obese BMI. Waist circumference measurements of 85cm and 101cm (the 25th and 75th percentiles respectively) were chosen to represent hazard ratios for different profiles of participants (body adiposity patterns that combine BMI with a measure of central obesity). The results revealed a significant interaction between BMI and WC or WHR ($p<0.001$). Interactions between sex and BMI, sex and WC, and sex and WHR were not statistically significant ($p>0.05$ for all). The study showed that patients with CAD and a normal BMI, but who were centrally obese, had the highest long-term mortality compared with other patterns of adiposity. In contrast, those with CAD and an elevated BMI was not found to be detrimental to survival in the absence of central obesity. Coutinho *et al.* concluded that BMI, when used alone, was a misleading anthropometric measurement in patients with CAD, and advocated other methods of assessing central obesity as being more reliable. However, the study recommended that combining measures of central obesity

and BMI ought to become part of best practice when assessing mortality risk of CAD patients.

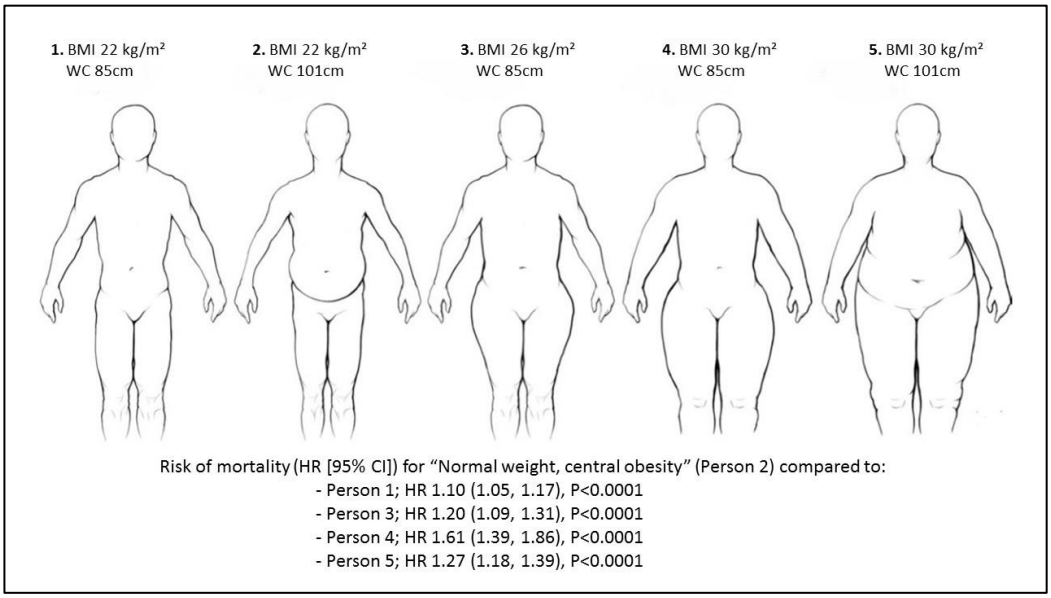


Figure 2.4.3 Mortality risk of subjects with normal weight central obesity compared with subjects with other patterns of adiposity, using waist circumference as a measure of central obesity.
Key: BMI = Body Mass Index; WC = Waist Circumference; CI – confidence interval; HR = hazards ratio.
(Coutinho *et al.*, 2013)

The literature presented shows that an increase in WC and WHR is associated with increased disease risk. In 2008, the WHO correlated WC and WHR with BMI, but found variations in the level of association, suggesting that these measures may provide different information and thus may not be interchangeable. The report notes that for practicality reasons, WC is often preferred method of assessment over BMI and WHR. The report also investigated whether there was a substantial gain in information when using both measures, i.e. waist measures combined with BMI (Table 2.4.2). However, this highlighted some more general issues; 1) the extent to which the range of WC depends on body size, and 2) whether WC measurements would be similarly sensitive to the health risks of populations of varying body sizes. The report notes that although BMI and abdominal adiposity measures may be highly correlated, it is desirable to obtain a BMI, where possible, and consider the utility of joint use of the two indicators (World Health Organisation, 2008).

Table 2.4.2 Combined recommendations of body mass index and waist circumference cut-off points made for overweight or obesity, and association with disease risk

	Body Mass Index	Obesity Class	Disease Risk (Relative to Normal Weight and Waist Circumference)	
			Men <102 cm Women <88 cm	Men >102 cm Women >88 cm
Underweight	<18.5			
Normal	18.5–24.9			
Overweight	25.0–29.9		Increased	High
Obesity	30.0–34.9	I	High	Very High
	35.0–39.9	II	Very High	Very High
Extreme Obesity	>40.0	III	Extremely High	Extremely High

Source; NHLBI Obesity Education Initiative (2000)

In summary, these studies show that, by using WC as a measure of abdominal obesity combined with BMI, these measures provide a simple and practical way to potentially identify groups with increased health risks associated with obesity. While BMI can be used as a predictor of increased metabolic abnormalities, assessing the location of excess body fat further refines the risk associated with being overweight or obese. Therefore, measuring WC is another step in refining health risk assessment and is becoming the preferred assessment tool to more complex indices of adiposity because it relates strongly to associated health risks. One of the primary goals of any weight management health promotion intervention should be the prevention of unwanted weight gain, where even a slight waist reduction (5-10 cm) can result in improvements in several CVD risk factors (De Koning *et al.*, 2007). In the context of this study, a universal, cost-effective, and easy to administer method of measuring and classifying an individual's weight was of utmost importance. Body Mass Index and WC were the chosen methods of assessing overweight and obesity as both are universally accepted methods that can be administered with relative ease and minimum training.

2.5 Economic evaluations associated with inactivity, obesity and community-based interventions

Despite the well-documented increasing prevalence of physical inactivity and obesity (and associated implications for health), the economic burden associated with these

issues remain unquantified at a global level, with largely inconsistent findings reported (Dee *et al.*, 2015). Economic costs associated with inactivity and obesity have been published for several countries (Pratt *et al.*, 2014), however, studies vary on methods, detailed costs and issues of focus, making comparative analysis challenging. The majority of studies have been conducted in high-income countries and have focused on direct healthcare costs. Both of these factors can be considered key limitations considering that low-income and middle-income countries now account for the majority of the global non-communicable disease (NCD) burden (Abegunde and Stanciole, 2006). Men on the Move aims to deliver a sustainable cost-effective PA programme which has the potential to aid in reducing ever growing public health expenditure.

2.5.1 Economic costs of physical inactivity

As noted earlier, physical inactivity represents a significant public health concern with considerable associated social and economic costs. Recent published figures for Ireland show an increase in total public health expenditure of 6.3% from 2017 to 2018 (Department of Health, 2018a); however, it is difficult to gauge the exact costs associated with inactivity either globally or within Ireland, due to the paucity and limitations associated with existing estimates.

Within a global context, for example, the first economic analysis of physical inactivity estimate costs of $67.5 billion (€61.3 billion) a year in health care costs and lost productivity to the world economy (Ding *et al.*, 2016). Data attributable to physical inactivity (i.e. direct health-care costs, productivity losses, and disability-adjusted life-years) representing 93.2% of the world's population (142 countries) were estimated with standardised methods. Direct health-care costs and disability-adjusted life years (DALYs) were estimated for five major NCDs (CHD, stroke, T2DM, breast and colon cancer), while productivity losses were estimated for physical inactivity related mortality with a friction cost approach (used to estimate the indirect cost due to productivity loss). Analyses were based on national physical inactivity prevalence from available countries, and adjusted population attributable fractions (PAFs) associated with physical inactivity

for each disease outcome and all-cause mortality. The study conservatively estimated that physical inactivity cost international health-care systems $53.8 billion for 2013, and noted that physical inactivity related deaths also contributed to $13.7 billion in productivity losses, while also responsible for 13.4 million Disability-adjusted Life Years (DALYs) worldwide. Disability-adjusted life years represent the burden a disorder imposes upon society through its associated disability, ill-health and premature mortality. It is calculated using the sum of potential years of life lost due to premature death, and the equivalent years of 'healthy life' lost due to living with a disease.

The 'International Sport and Culture Association' (ISCA) and the 'Centre of Economic and Business Research' (Cebr) report even higher costs associated with physical inactivity in excess of €80 billion for the European economy in 2012; equivalent to 6.2% of all European health spending, or half of the annual 'gross domestic product' (GDP) of Ireland (Centre for Economics and Business Research UK, 2015). Direct and indirect costs of inactivity across Europe were estimated based on four major NCDs (CHD, T2DM, breast and colorectal cancer), as well as the indirect costs of mood and anxiety disorders. Reported indirect costs associated with physical inactivity, i.e. estimated value of human capital which is lost to morbidity and premature mortality resulting from physical inactivity, were ~€71.1 billion for 2012 (Lee *et al.*, 2012). The costs were based on figures using DALYs lost as a result of considered inactivity-related disorders. National GDP per capita were used to estimate the value of DALYs lost due to physical activity-related disorders. The four noted NCDs were included within the direct costs calculation, as well as inactivity's estimated contribution to the burden of mood and anxiety disorders for each country. These indirect costs are vastly larger than reported direct healthcare costs (~€9 billion per year for Europe), reflecting the substantial burden to society which inactivity contributes through reduced length and quality of life.

Of the four major NCDs considered in Lee *et al.'s* study, inactivity-related CHD was the biggest contributor amounting to ~€23.5 billion. However, it should be noted that just 6.0% of European CHD prevalence is estimated to be attributable to inactivity (Lee *et al.*, 2012). The economic burden associated with physical inactivity and type II diabetes was estimated to be €13.9 million, while breast and colorectal cancers were reported at €8.5 and €11.4 billion respectively. Additionally, an estimated €23.1 billion in indirect costs,

arising from inactivity-related mood and anxiety disorders were reported. The report also conservatively estimates annual costs to continue to rise, with the economic cost burden estimated to be in excess of €125 billion by 2030. The report suggests that if all Europeans were to achieve an average of 20 minutes per day of simple and inexpensive activities (such as walking or running), these costs could be avoided. Even if just one-fifth of Europe's currently inactive population achieved the recommended levels of physical activity, benefits worth up to €16.1 billion would be achieved (Centre for Economics and Business Research UK, 2015). Similarly, estimations reported for Ireland give conflicting figures, which highlight the limitations inherent in the calculation of such figures. In 2010 it was estimated that physical inactivity was costing the Irish economy €1.6 billion per year (Nutrition and Health Foundation, 2010), while figures reported for 2013 estimate inactivity costing the State €150 million (Ding *et al.*, 2016).

Increasing physical activity through population approaches has the potential to produce substantial economic savings, as well as associated health benefits. In 2012, Lee *et al.* estimated costs savings of €16.1 billion based on a 20% reduction in the prevalence of inactivity within Europe's adult population. Additional, more modest estimations report savings of €4.0 and €8.0 billion for 5% and 10% reductions in inactivity levels respectively among European adults (Lee *et al.*, 2012). The estimations accounted for savings gained through a reduction in the prevalence of noted NCDs, which equated to a lowering of the burden placed on healthcare systems and reduced supplementary indirect costs.

Likewise, estimations for Australia reported the potential for substantial cost savings through a reduction in physical inactivity (Cadilhac *et al.*, 2011). Economic benefits were estimated as 'opportunity cost savings', i.e. resources used in the treatment of preventable disease that could potentially be used elsewhere if there was a reduction in the prevalence of disease. The study estimates a 10% reduction in physical inactivity could potentially reduce health-sector costs by AUD96 million, while achieving 6,000 fewer incident cases of disease, 2,000 fewer deaths, 25,000 fewer DALYs, as well as providing gains in working days (114,000) and days of home-based production (180,000). Potential lifetime opportunity cost savings were estimated at AUD162 million. However, opportunity cost savings need to be carefully interpreted, as they are not estimates of immediately realisable financial savings; they are estimates of

resources consumed in current practice that could be made available for other purposes, such as investing in public health programmes (Cadilhac *et al.*, 2011). These savings will only be achieved by the adoption of effective interventions that will invariably have implementation and time costs attached to them.

The societal burden of physical inactivity extends far beyond economic costs. For example, economic cost estimations fail to capture the intrinsic value of associated life and health losses. However, the data presented attempts to give some context to the significant costs attributed to physical inactivity, and reinforce the argument that greater investment in strategies to combat physical inactivity is required and economically justified.

2.5.2 Social and economic costs associated with obesity

In 2002, Ireland's 'National Taskforce on Obesity' estimated annual direct healthcare costs associated with obesity at €70 million, with indirect costs estimated at €0.37 billion, giving a total cost of €0.4 billion (Department of Health and Children, 2005). As with international literature, the majority of studies in Ireland have focused only on direct healthcare costs, with other costs associated with obesity such as reduced productivity being largely ignored. Dee *et al.* (2015) adopted a wider societal perspective in their efforts to approximate the economic cost of overweight and obesity in Ireland, which included both healthcare costs and lost productivity. Their study used a number of data sources which focused primarily on four key categories; healthcare utilisation, drug costs, work absenteeism and premature mortality. They estimated the cost of overweight and obesity in Ireland at €1.16 billion for 2009. This figure was based on a breakdown of healthcare and productivity costs with PAFs used for estimating healthcare costs; national cost data for hospital care and drug prescribing; and social welfare and national mortality data to estimate productivity costs. Whilst there was not an explicit focus on gender differences, the study clearly demonstrates a much higher cost associated with male overweight and obesity with estimating cost of life years totalling €853,070,261, of which €576,573,715 (67.6%) accounted for male deaths.

Dee *et al.'s* study presented figures as income weighted years of potential life lost for all ages based on life expectancy, with the total figure representing 9% of total income-weighted years of life lost from 2007 to 2009. There was a higher percentage (72.2%) of costs attributed to male life years lost due to overweight and obesity up to age 75; with male deaths accounting for €494,204,857 compared to female deaths which accounted for €190,542,208. Based on figures from the Irish Department of Finance, the total annual productivity loss for Ireland based on mortalities for those aged 18-75 years, using BMI for prevalence rates, was estimated at €592,991,594. Dee *et al.'s* study excludes numerous facets of service such as social care, long-term care, and dietary services, which are likely to materialise as a consequence of overweight and obesity. Individual associated costs incurred, such as GP costs, over-the-counter medication, are also omitted in their analyses, as are productivity costs lost by those who are self-employed. While the omission of such facets can be justified due to the absence of adequate reliable data on which to base estimates, it also demonstrates the challenges involved in trying to estimate the costs associated with overweight and obesity. Nevertheless, their study represents an important step in attempting to quantify the preventable costs attributable to overweight and obesity in Ireland, and the urgent need for the development of a coherent policy response to address this epidemic. They argue that failure to act will lead to untenable cost escalation within the health service and unsupportable societal costs (Dee *et al.*, 2015).

International expert groups on obesity (International Obesity Taskforce and European Association for the Study of Obesity, 2002; Wilkins *et al.*, 2017) report that 99% of factors that influence obesity are environmental. These include factors such as; marketing, increasing portion sizes, accessibility and convenience of foods and amenities, increased automation and car use. Therefore, educating the public so that they are more aware of these factors is critical, as it may prompt change in risk factors associated with obesity. Despite comprehensive and wide-ranging Taskforce recommendations, obesity levels in Ireland continue to increase. As a programme that was developed primarily to increase levels of PA, the potential of MOM to also reduce weight amongst a specific target population group presents a potentially important policy response to such Taskforce recommendations.

2.5.3 Estimating the cost-effectiveness of community-based interventions

Although this study did not seek to quantify preventable costs attributable to physical activity and obesity, it did seek to provide cost analysis associated with the implementation of MOM, costs which may be indirectly linked to improvements in activity levels and a reduction in obesity. Measures of health related quality of life (HRQoL), which are widely used by researchers to quantify the effectiveness of interventions, are often not designed to evaluate the cost-effectiveness of health interventions as they fail to account for scoring preferences in their algorithms, i.e. measures were not designed for use in economic evaluation, or sensitive enough to evaluate change. Brazier *et al.* (2002) noted this anomaly and developed a preference-based measure of health based on the SF-36 health survey; a standardised questionnaire widely used to measure generic HRQoL in clinical trials. They noted the potential to produce economic evaluations in health interventions by developing the SF-36 data sets. However, they also note the complexity involved with using the SF-36 and therefore developed a simpler version (SF-6D – Table 2.5.1), which was reduced in size and complexity. The SF-6D has a total of six dimensions (Physical Functioning, Role Limitations, Social Functioning, Pain, Mental Health and Vitality), each one having between four and six levels, allowing for a potential 18,000 varying health states to be defined (Brazier, Roberts and Deverill, 2002).

While the primary purpose of MOM was to increase fitness levels within an 'inactive' cohort, thus potentially reducing body weight, secondary analysis was aimed at evaluating the impact of the programme economically, along with the cost-effectiveness of the intervention in terms of 1) costs incurred over the 52-week intervention programme, and 2) Quality Adjusted Life Years (QALYs) gained over the same 52-week period. These findings will be of particular importance to the MOM partnership network and will aid with informing decisions to up-scale the programme further.

Table 2.5.1; Short form 6D[a]

Level	Physical Functioning	Role Limitations	Social Functioning	Pain	Mental Health	Vitality
1	Your health does not limit you in vigorous activities	You have no problems with work or other regular daily activities as a result of physical health or emotional problems	Your health limits your social activities none of the time	You have no pain	You feel tense or downhearted and low none of the time	You have a lot of energy all of the time
2	Your health limits you a little in vigorous activities	You are limited in the kind of work or other activities as a result of your physical health	Your health limits your social activities a little of the time	You have pain but it does not interfere with your normal work (both outside the home and housework)	You feel tense or downhearted and low a little of the time	You have a lot of energy most of the time
3	Your health limits you a little in moderate activities	You accomplish less as you would like as a result of emotional problems	Your health limits your social activities some of the time	You have pain that interferes with your normal work (both outside the home and housework) a little bit	You feel tense or downhearted and low some of the time	You have a lot of energy some of the time
4	Your health limits a lot in moderate activities	You are limited in the kind of work or other activities as a result of your physical health and accomplish less than you would like as a result of emotional problems	Your health limits your social activities most of the time	You have pain that interferes with your normal work (both outside the home and housework) moderately	You feel tense or downhearted and low most of the time	You have a lot of energy a little of the time
5	Your health limits you a little in bathing and dressing		Your health limits your social activities all of the time	You have pain that interferes with your normal work (both outside the home and housework) quite a bit	You feel tense or downhearted and low all of the time	You have a lot of energy none of the time
6	Your health limits you a lot in bathing and dressing			You have pain that interferes with your normal work (both outside the home and housework) extremely		

Note; [a] The SF-36 items used to construct the SF-6D are as follows: physical functioning items 1, 2 and 10; role limitation due to physical problems item 3; role limitation due to emotional problems item 2; social functioning item 2; both bodily pain items: mental health items 1 (alternate version) and 4; and vitality items.

(Brazier et al., (2002) Page 274; The estimation of a preference-based measure of health from the SF-36)

2.6 Effective practice in engaging men

2.6.1 The need for holistic, community-based and partnership approaches

Research suggests that more holistic and integrated community-based approaches are most effective in terms of PA engagement at a population level (Powell and Paffenbarger, 1985; Marcus *et al.*, 2006; Haskell *et al.*, 2007; Heath *et al.*, 2012). However, these studies have, for the most part, incorporated female populations, making it challenging to interpret or extrapolate how such results might apply to males. There has been a tendency to position men as unwilling to participate in health promotion programmes and to adopt gender-neutral approaches to programme design and delivery (Robertson *et al.*, 2013; Andy Pringle *et al.*, 2014; Carroll, Kirwan and Lambe, 2014; Lefkowich, Richardson and Robertson, 2015). Whilst many studies provide quantitative indices of efficacy (Hillsdon, Foster and Thorogood, 2005), most fail to address issues specific to population subgroups or intervention-delivery modality (Marcus *et al.*, 2006). In the context of this study, it is important to develop an understanding of how social, cultural and environmental factors influence health behaviours in men. Literature refers to the role the environment (location of programme) has, and in particular to the convenience of the workplace as a preferred location for men (White, Conrad and Branney, 2008; Robertson *et al.*, 2014); and it is acknowledged that this may be the case for working women also. The workplace, however, is not a setting that suits all men and does not cater for the needs, for example, of those who are self-employed, unemployed or of other minority groups. In a study focused on the role the environment plays in the development of sustainable PA interventions, Lake and Townshend (2006) demonstrated that individuals interact with their environment (home, school, work and their neighbourhood) on many different levels, and that such interactions are greatly influenced by factors such as government policy, education and health systems. Furthermore, a number of studies (Sallis, Kraft and Linton, 2002; White, Conrad and Branney, 2008; Hunt, Gray, *et al.*, 2014) suggest that the environment plays a key role in the selection of a location for the delivery of health promotion programmes.

Policies in Ireland (Department of Health, 2016a), and the UK (HM Government, 2010), note the importance of 'community' as a means of engaging 'hard to reach' groups with suitable health promotion interventions. Indeed, delivering health interventions through community settings has become increasingly popular within the field of health promotion, with research highlighting the importance of expanding existing community-based approaches to primary prevention (Pringle *et al.*, 2014). These factors were critical in the development of the MOM programme, in particular the role the local community had to play in the success, and future sustainability of the programme.

Modifiable health behaviours such as diet, exercise, substance use, use of social supports and safety practices have been identified as important 'lifestyle contributors' to health (Mahalik, Burns and Syzdek, 2007). However, creating the right interventions in the right environments that can support men to change health practices has proved difficult. It is imperative that interventions be designed that effectively promote the adoption and maintenance of active lifestyle throughout communities (US Department of Health and Human Services, 2000). It has been widely reported that in order to plan, promote, and co-ordinate efforts to increase health behaviours (World Health Organisation, 2007), public health agencies especially need to form partnerships with several community organisations: schools; businesses; policy makers, advocacy groups, nutrition professionals, recreation authorities, planning and transport agencies, and health-care organisations (Heath *et al.*, 2012). This holistic approach which encompasses all levels of organisations, i.e. from those delivering the intervention to the policy makers, are key to establishing any long term sustainable programme, and form a critical component of the MOM programme (see Section 2.7). Public health agencies should ensure that strategies to reduce inequities in the uptake of PA interventions between different population groups are implemented, should monitor the effectiveness and reach of interventions, and need to report routine assessments of the programmes to relevant stakeholders and partners (Kahn *et al.*, 2002).

The establishment of inter-sectoral partnerships from national to local level has a critical role to play in developing successful CBPA programmes that reach their target population groups (Heath *et al.*, 2012). Embedding PA interventions in such a

partnership model not only has the potential to support the target population group to achieve recommended levels of PA, but can also act to provide social support to underserved populations in areas with few recreational services/amenities (Hoehner *et al.*, 2008). It should be noted that programmes such as these are normally free of charge thus contributing to a reduction in social and health disparities, and is something that should be considered, in particular, when trying to engage 'at risk' participants in future health promotion initiatives.

2.6.2 Best practice in engaging men

Health professionals have traditionally encountered difficulties designing interventions that successfully engage men and are frequently unsure about the types of services to which men might respond (Carroll, Kirwan and Lambe, 2014; Hunt, Wyke, *et al.*, 2014). Research is emerging in relation to 'what works' with regards to engaging men with their health (Health Service Executive, 2016). Evidence suggests that gender-sensitised strategies; especially related to community-engagement, programme development & delivery, partnerships and capacity-building; are necessary in creating sustainable PA programmes/health promotion activities that appeal to men (World Health Organisation, 2007; Heath *et al.*, 2012; Lefkowich, Richardson and Robertson, 2015). Lefkowich *et al.* refer to the need to integrate a tiered level (individual, community, and organisational) gender focus when developing strategies for capacity building aimed at creating and delivering programmes for men. By embedding a gender focus within the design process at all levels, this helps to ensure that gender informs each step of programme development and delivery.

Strategies that are community based, use exercise as a hook (Bunn *et al.*, 2016; Nassau *et al.*, 2016; Caperchione *et al.*, 2017; Petrella *et al.*, 2017; van de Glind *et al.*, 2017; Gray *et al.*, 2018; Quested *et al.*, 2018; Maddison *et al.*, 2019; Pietsch *et al.*, 2019; Wyke *et al.*, 2019), focus on creating trust, safety, rapport and meaningful relationships with men, and that are connected to positive masculine identities, have been found to be effective in engaging men (Linnell and James, 2010; McCullagh, 2011; Oliffe *et al.*, 2011; Carroll, Kirwan and Lambe, 2014; Hunt, Gray, *et al.*, 2014; Robertson *et al.*, 2014;

Lefkowich, Richardson and Robertson, 2015). In the design of MOM, careful consideration was also given to a number of other key characteristics required for effective community-based and gender-sensitised health promotion programme targeting 'hard to reach' (Department of Health and Children and Health Service Executive, 2009; Carroll, Kirwan and Lambe, 2014; Lefkowich, Richardson and Robertson, 2015), or 'hard to engage' (Pringle *et al.*, 2011) men. These findings suggest that men have a preference for structured programmes with clear tangible goals; that incorporate an element of flexibility in programme design through consultation with participants, thus catering for their specific needs; that employ a designated PA co-ordinator or facilitator who is responsible for creating a safe, positive and male-friendly group dynamic that prioritises the individual needs of the men; that use incentives to promote engagement; that provide a free programme; that use a suitable accessible venue; and that offer programmes outside of regular work hours (catering not just for the needs of men in work but also enabling unemployed men to engage in the programme without facing the possible stigma associated with being unemployed). Additionally, the adoption of a collaborative and partnership approach; one which recognizes the service providers responsible for engaging and delivering PA programmes (Department of Transport Tourism and Sport, 2016) was identified as a critically important factor in ensuring the success of the programmes.

The recent upsurge in male gender-sensitised health initiatives such as 'Football Fans in Training' (FFIT) in Scotland (Hunt, Wyke, *et al.*, 2014), 'Premier League Health' in England (Pringle *et al.*, 2013), and the Men's Health and Well-being Programme in Ireland (Department of Health, 2013), would suggest an increasing awareness of the need for gender-sensitised approaches to targeting men (Sharp *et al.*, 2018). The use of sport clubs, in particular football stadia, have been shown to increase the potential of engagement by reaching an audience of sports supporters (Hunt, Wyke, *et al.*, 2014; Roncarolo *et al.*, 2015; Wyke *et al.*, 2015; Bunn *et al.*, 2016; Caperchione *et al.*, 2017; Petrella *et al.*, 2017; van de Glind *et al.*, 2017; Quested *et al.*, 2018; Maddison *et al.*, 2019; Pietsch *et al.*, 2019), as well as showing positive results on a range of lifestyle indicators (Zwolinsky *et al.*, 2013; Hunt, Gray, *et al.*, 2014). Such programmes show that utilising elements with which men are familiar and secure, especially around PA, can aid

successful, sustained, engagement (Robertson *et al.*, 2013). Pringle *et al.* also recommend using gender-sensitised promotional and delivery strategies that capture men's interests. For example, the use of football stadiums and associated branding (Pringle *et al.*, 2013; Wyke *et al.*, 2015) have been found to provide an attractive 'hook' to initially attract men to programmes. A review (Bottorff *et al.*, 2015) of interventions that promote PA for adult men found that male-only programmes that focus on masculine ideals and gender influences to engage men in increasing their PA hold potential for informing strategies to promote other areas of men's health. Findings also suggest that programmes with a diverse set of components, such as online and mobile platforms, may impact the PA of men if the approach is simple, clear, and tailored to men's interests and preferences.

A key consideration in the design and delivery of any PA programme is to determine which segments of the community avail of such programmes. A study by Pringle *et al.* (2014) investigated the pre-adoption characteristics and health profiles of men (n=946) who participated in a Premier League Health (PLH) programme. Participants were predominantly younger men (89% were aged 18-44 years), many of whom were not meeting recommended health guidelines, but were found to be open to receive health promotion advice and support with lifestyle changes. Notably, a high percentage (69%) of men did not consider themselves to have any health concerns, yet 67% of those who presented had three or more risk factors for CHD, and over 40% reported never going to see their GP. A study by Zwolinsky *et al.* (2013), which investigated the effect of a 12-week behavioural intervention within the English Premier League (EPL), was similarly successful with reaching 'at risk/hard to reach' men and engaging them in health behaviour change (although no follow up findings were presented). These findings highlight the scale of the unmet health needs amongst participants, but reiterate that community-based health promotion programmes which are gender-sensitised may extend the reach for many men who find it difficult to engage with primary health providers. A key aim of 'Men on the Move' was to address these gaps in the literature by investigating not just the long-term effects of the programme, but also to identify 'how' the programme successfully engaged the men.

2.7 Pragmatic trial design and implementation

2.7.1 Introduction

In order for any 'pragmatic' public health programme to be up-scaled and implemented into a nationwide intervention it is critical that a translational formative evaluation be conducted on the programme. This is particularly important in the evaluation of community-based programmes as they assist with identifying barriers to implementation, thus aiding with the process of moving from efficacy to scaled-up dissemination. Recent studies (Bauman and Nutbeam, 2006; Patsopoulos, 2011; Curran *et al.*, 2012; Heath *et al.*, 2012; O'Hara *et al.*, 2013; Brown *et al.*, 2017) have reported on varying conceptual frameworks and toolkits developed for translational research, making comparisons challenging and highlighting the need for further research on models that have been developed for 'real world' interventions like MOM.

2.7.2 Men on the Move – a 'real world' pragmatic community-based intervention

'Men on the Move' adhered to an action-based research model that evolved organically from practice. Consequently, decisions regarding both the study design and the programme design and implementation were focused on what would work feasibly in practice. One of the broader aims of the programme was to develop a sustainable model that could potentially be scaled-up or adopted/adapted under 'real world' conditions. The rationale for adopting a 'real world' approach was two-fold; a) to inform decision makers about a programme's strengths, weaknesses and impact so that there is a continuous quality improvement process that underpins and justifies public funding; and b) to improve health outcomes at a population level. With a view to developing a more sustainable implementation model, the project design invested heavily in two key pillars of health promotion; capacity building and partnership development. As outlined, it also leaned heavily on international best practice in relation to gender-sensitised and strengths-based approaches to engage more effectively with men. This merging of

theoretical approaches (health promotion, gender and men's health) adds considerably to the unique and innovative project design that has been adopted for this programme.

'Men on the Move' used a conceptual framework model (Figure 2.7.1 and Section 3.1.3) developed by O'Hara *et al.'s*, (2013) and adapted from a framework developed by Bauman & Nutbeam (2006). The model highlights the stages involved from the initial identification of a problem, in this case the under representation of men in CBPA programmes, to addressing that problem at a population level. In brief, following the identification of a 'health problem' (Stage 1), evidence is gathered to define a solution to the 'health problem' (Stage 2). Once a solution has been defined, an intervention (public health intervention) should be tested (Stage 3) to ascertain whether it can address the 'health problem' effectively. The intervention is generally tested on a small group of the population in one area. Thereafter, the intervention is replicated in new settings and with new populations (Stage 4) to ascertain whether its effectiveness is replicated. Following translational formative evaluation, the intervention is finalised for national dissemination to address the 'health problem' at a population wide level.

'Men on the Move' was developed in response to growing obesity levels and declining PA levels among men (Stage 1), and designed in accordance with gender-sensitised and strengths-based approaches to engaging men (Stage 2). It was then tested (Stage 3) and replicated (Stage 4) across multiple sites with a view to achieving a national roll-out. However, in order for any public health intervention to be delivered on a national scale it must be tested under 'real world' conditions and be sustainable. Therefore, following translational formative evaluation, the MOM intervention developed for testing and replication was in keeping with the principles of 'real world' practice. Shediac-Rizkallah and Bone's (1998) framework for sustainable community-based health promotion interventions was also used to inform the development and delivery of MOM. The framework advocates the need to plan for sustainability in the design stage of an intervention given that healthy behaviour change must be sustained in order to realise good health. The framework identifies, a) design and implementation, b) organisational setting, and c) community environment, as key factors to be considered when planning for sustainability. Refer to Section 3.1.3 for further details on the application of this framework to MOM. Findings from this study will support service providers in

establishing community-based health promotion initiatives that are anchored with local communities, which have the potential to maximise the reach and recruitment of an 'at risk' cohort through varied and gender-sensitised recruitment strategies.

Since the conceptual framework for MOM was developed, and the programme delivered, new research has emerged on the effectiveness of different approaches to translational research. This has led to the evolution of 'hybrid designs'. Identified gaps such as; educational/knowledge deficiencies (Freemantle *et al.*, 1999; Cochrane *et al.*, 2007), time constraints for practitioners (Cabana *et al.*, 1999; Fruth *et al.*, 2010), lack of decision support tools and feedback mechanisms (Caban et al., 2010), poorly aligned incentives (Reschovsky, Hadley and Landon, 2006), and other organisational climate and cultural factors (Grol and Grimshaw, 2003; Racine, 2006; Damschroder *et al.*, 2009), often delay the rapid translation of research to implementation. Hybrid designs blend design components of clinical effectiveness and implementation research, thus allowing for more rapid translational gains, more effective implementation strategies, and more useful information for policy makers (Wells, 1999; Glasgow, Lichtenstein and Marcus, 2003; Curran *et al.*, 2012).

Hybrid designs typically take one of three approaches (Curran *et al.*, 2012); 1) testing effects of an intervention on relevant outcomes while observing and gathering information on implementation; 2) dual testing of clinical and implementation interventions/strategies; or 3) testing of an implementation strategy while observing and gathering information on the clinical intervention's impact on relevant outcomes. The first option shared similarities with the approach adopted for the MOM programme; i.e. reporting on the effects of the intervention while developing a model of good practice suitable for up-scaling and adaptation.

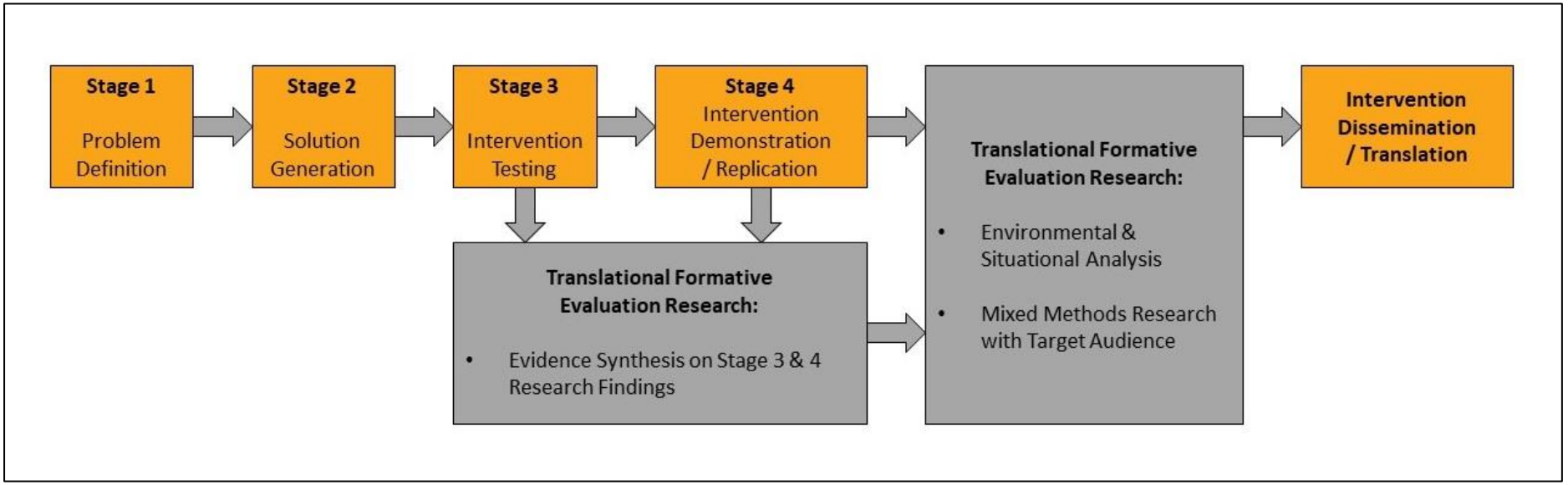


Figure 2.7.1 A conceptual framework highlighting the role of translational formative evaluation research in the translation of evidence into practice (O'Hara *et al.*, 2013)

This dual approach allows for many potential implementation research questions/problems to be investigated, such as: what are the potential barriers to the implementation of a 'real world' intervention?; what problems are associated with delivering the intervention, and how might they translate to the intervention when 'up-scaled'?; and, what modifications are required to maximise implementation? This approach allows for initial findings to be presented to relevant stakeholders, which can be advantageous with aiding rapid translational implementation. Despite the inherent advantages of such an approach, literature is somewhat lacking in addressing the structures needed when incorporating 'hybrid designs'.

Typically, a 'Traditional Translational Pipeline' (TTP) approach is adopted (Curran *et al.*, 2012), which begins with a basic 'efficacy' study investigating the performance of an intervention under ideal and controlled circumstances. This is followed by an 'effectiveness' study to investigate the performance of an intervention under 'real world' conditions, and which forms the basis for the up-scaled implementation of the intervention. Curran *et al.* (2012) note that many published studies fail to recognise the hybrid nature of their designs, hence the lack of peer-reviewed literature outlining where 'hybrid designs' fit into a TTP research pipeline (Figure 2.7.2).

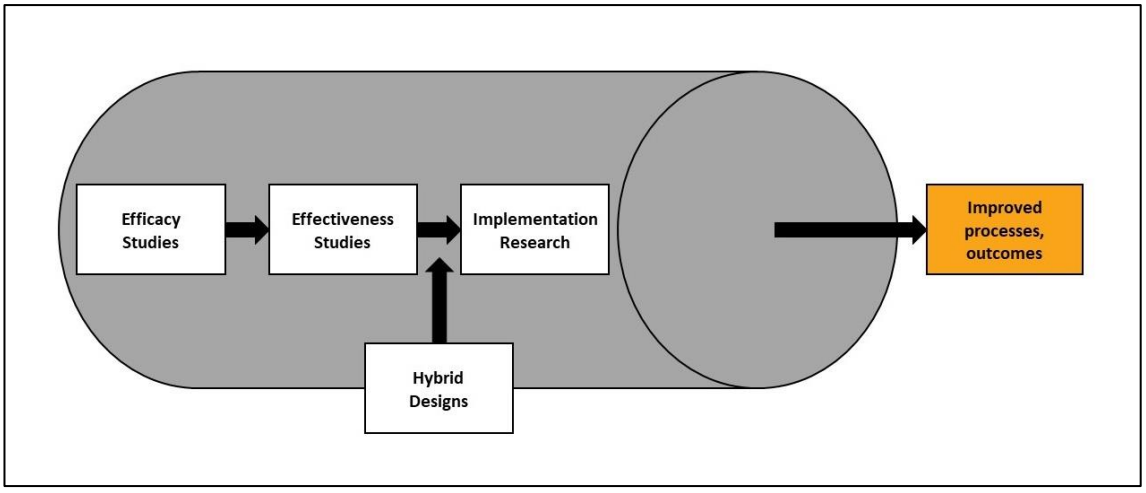


Figure 2.7.2 Traditional translational pipeline incorporating 'Hybrid Designs'

(Curran *et al.,* 2012)

Curran *et al.* (2012) recommend that when adopting such a 'hybrid design', the integrity of the intervention should remain when delivered within new settings/population-groups. They also note that hybrid study designs are still in a developmental stage, are not intended to be rigid or defined by 'boundaries', and should therefore be developed on a case-by-case basis dependent on the conditions and needs of the population-group in question. Additionally, it is reported that 'hybrid designs' might not always be feasible, or affordable, within traditional research budget limits. Traditional cost-effectiveness analysis of interventions fails to account for speed of translation, with exploration of the potential cost benefits associated with 'hybrid designs' being warranted. Although randomised controlled trials (RCTs) are likely to remain the most common approach to moving an intervention through from efficacy research to public health implementation, prudent use of the proposed hybrid designs could speed the translation of research findings into routine practice.

While the literature on translational research draws attention to the need for the development and refinement of pragmatic trials, coupled with the benefits of incorporating 'hybrid designs', further investigation is needed to gain an understanding of the complexities and stages involved with developing an intervention from a 'pragmatic' community-based intervention to an up-scaled programme implemented at a population level. Various toolkits have been developed to aid researchers with design decisions (Loudon *et al.*, 2015), and the evaluation of programmes (NSW Government, 2016). In Australia, the New South Wales (NSW) Government produced evaluation guidelines (NSW Government, 2016) aimed at informing decision-making, improving programmes, and sharing findings. Through incorporating a process evaluation, issues hindering programme delivery can be addressed and modified, thus improving and ensuring programme implementation as intended. Figure 2.7.3 shows the integration of the evaluation process with a programme's lifecycle. Early evaluation can enhance a programme's design by asking fundamental questions about activities, outputs and outcomes, and how these will be measured (including available data sources).

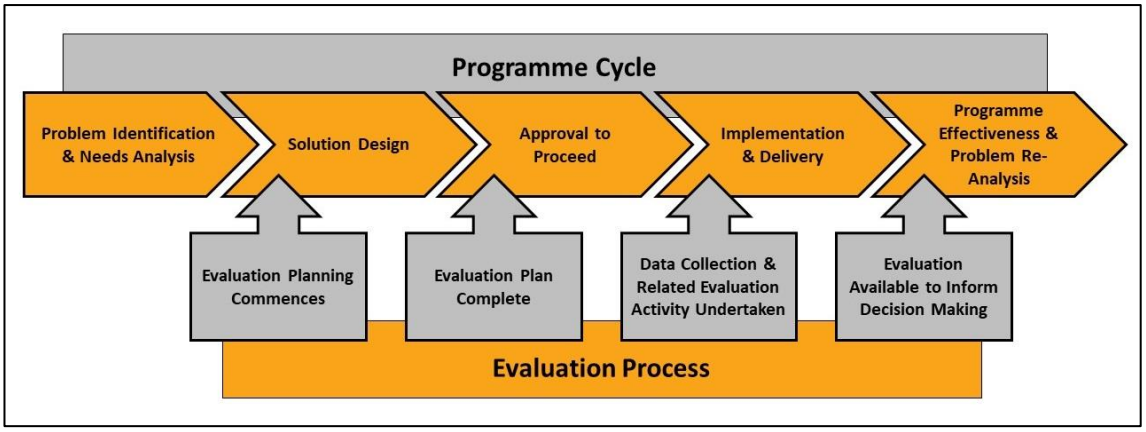


Figure 2.7.3 Integration of evaluation process into lifecycle of programme

(NSW Government, 2016)

Planning early can significantly increase the evaluation methodologies to choose from. It can also ensure that findings are available to support formal decision making processes for the programme's future. The evaluation guidelines developed by the NSW Government also note the importance of incorporating economic evaluations, and the need to promote efficient resource allocation with decision-makers. Economic evaluations assign a value to the programme's inputs and outputs, and generally require planning at an early stage (pre-programme implementation) to ensure economic, social and environment value can be assigned. Economic evaluations can occur pre-programme ('economic appraisal'), post-programme ('economic evaluation'), or both. Post 'economic evaluations' have the advantage of allowing for opportunity to validate any 'economic appraisal' which was undertaken (NSW Government, 2016).

The literature presented highlights the relevance of implementation science, but also the challenges to researchers in navigating their way through the varying theories, frameworks and models (Nilsen and Bernhardsson, 2019). Regardless of the size and structure of a programme, an evaluation that is well designed and managed can yield useful evidence about the effectiveness, or otherwise, of a programme. The literature also outlines the need for further research investigating 'real world' interventions that are capable of being delivered, and sustained in community settings. However, often these small controllable PA interventions are never translated to 'real world' population based intervention programmes. It is important to understand the organisational structures promoting and supporting PA engagement within community settings, and to

evaluate the level of financial investment required to operate them. In doing so, a model of 'good practice' can be developed, which may assist others engaged in translational research to ensure that their research translates into meaningful outcomes in practice, capable of being sustainable in 'real world' conditions.

2.7.3 Making the case for pragmatic 'real world' community-based research

As highlighted in the previous section, a key focus of MOM was to develop a programme, through a 'pragmatic trial', that had the potential to be up-scaled to a national community-based programme, and capable of being sustainable in 'real world' conditions. Up-scaling an intervention improves reach (population and geographical access) and equitable access to the intervention and its benefits (Glasgow, Lichtenstein and Marcus, 2003). Too frequently, however, sound, evidence-based public health interventions fail to move beyond 'efficacy testing'. Notwithstanding the fact that this is a rapidly developing area, to the best of this author's knowledge, there is no published evidence of such large up-scaled 'real world' community-based research on men's health and PA in Ireland. This represents a significant evidence gap as the implementation of population-based intervention programmes in the 'real world' face far greater challenges than the implementation of small efficacy trials that are controllable (Welsby *et al.*, 2014). This has led to a recent upsurge in literature focusing on the relevance of small efficacy trials / RCTs within 'real world' health promotion programmes.

Randomised controlled trials have become a common method in determining the effectiveness of public health interventions, yet often only investigate whether an intervention is effective under rigorous conditions, and typically fail to investigate whether the intervention can be successful in the 'real world' settings where, ultimately, it will be delivered. While RCTs have their advantages in certain environments such as clinical settings, there is increasing scepticism as to whether findings from RCTS reflect the needs of 'real world' interventions, or replicate practices (Zwarenstein and Oxman, 2006; Weiss, 2008; Treweek and Zwarenstein, 2009). Studies have shown that RCT interventions often need considerable adaptation to enable implementation at a larger

scale, which often leads to a reduction in the effects of the intervention (McCrabb *et al.*, 2019). A systematic review from McCrabb *et al.* (2019) assessing the effectiveness of obesity interventions found that the effects in scaled-up interventions were typically 75% or less of the effects reported in pre-scale-up efficacy trials.

Taking into account the challenges involved in translating and/or scaling up RCT results in 'real world' settings, researchers are increasingly favouring more pragmatic strategies, like that adopted for MOM, that allow for the development and implementation of interventions in this 'real world' context (Patsopoulos, 2011). Pragmatic trials are often simple in design and easy to incorporate into 'real world' settings, making them very suitable for local service providers to deliver. When implemented in conjunction with cost-effectiveness analyses, they can also help inform policy makers and health care providers of the costs involved with 'real world' interventions (Patsopoulos, 2011). Therefore, the inclusion of decision makers in the design of pragmatic trials is advantageous (Tunis, Stryer and Clancy, 2003; Maclure, 2009). Additionally, the inclusion of local service providers in the design phase is critical for creating 'community-based' interventions which are sustainable. This was of particular importance in the context of this study as a MOM partnership network, inclusive of local service providers, was developed and oversaw the design and implementation of the programme and actively contributed to the research study.

Despite the growing prevalence of pragmatic trials, they are not without limitations. Pragmatic trials often lack any form of randomisation or blinding, and therefore often yield more erroneous results than RCTs (Pildal *et al.*, 2007; Wood *et al.*, 2008; Odgaard-Jensen *et al.*, 2011). In order to overcome this inherent flaw, which often leads to dilution of the effect, pragmatic trials must have a large sample size in order to detect small effects. Additionally, the effectiveness of a pragmatic trial can differ depending on the setting in which it is provided, i.e. what works in one community might not be as effective in another (Patsopoulos, 2011). Therefore, in order to produce reliable results, it is important to investigate the effects of an intervention in variety of settings, have a large sample size, and allow for long follow-up periods (Masuhr, Busch and Einhäupl, 1998; MacPherson, 2004; Rothwell, 2005; Pildal *et al.*, 2007; Wood *et al.*, 2008; March

et al., 2010; Odgaard-Jensen *et al.*, 2011). Patsopoulos (2011) also notes the importance of new interventions maintaining high internal validity. Even the results of pragmatic trials will include post-hoc exploratory analyses, which will require in turn explanatory trials to verify them. Thus, in terms of absolute numbers there will always be far more explanatory trials than pragmatic ones, with many trials lying in the continuum between them. Pragmatic trials should complement explanatory trials, rather than trying to replace them. Incorporating these components can lead to significant increases in associated costs. 'Men on the Move' was developed on this basis as a cost-effective and adaptable, 'real life' population-based intervention embedded within community settings in Ireland.

2.8 Summary

The literature presented provides an important backdrop and context to the study, by providing a clear rationale for focusing on men's health, emphasising the importance of physical activity and the need for gender-sensitised strategies and supportive environments when engaging men in physical activity, as well as reviewing some key theoretical frameworks that shaped the overall protocol design for MOM. The chapter has presented a critical overview of the statistics on men's health, drawing attention to particular concerns in relation to declining PA levels and increasing rates of obesity in men. It has also explored the relationship between physical [in]activity and health, highlighting the need for gender-sensitised approaches to the promotion of PA that engage men. The literature presented outlines the importance of looking beyond categorical sex differences in terms of LE and mortality rates, and having a greater focus on examining how gender influences health behaviours when seeking to develop appropriate health promotion interventions for men.

Many evidence-based studies have demonstrated the efficacy of increased PA (in terms of LE, healthy ageing, reducing risk of NCD) for people of different ages, and from diverse social groups and countries. Some of these studies suggest potential for replication in other communities. For the general population, particularly adults, it is critically

important to account for the determinants of PA at individual, behavioural, social, environmental and policy levels. One of the key strengths of the MOM programme was that it was delivered by Local Sport Partnerships (LSPs) as part of a unique partnership network under 'real world' conditions. Given the low uptake of PA, particularly among older and lower socio-economic groups, it is imperative that interventions effectively promote the adoption and maintenance of active lifestyles to those population groups within communities who are least active and that these are monitored in terms of effectiveness, cost-effectiveness and reach. It is also of utmost importance that interventions be designed to move beyond a 'one size fits all' approach and be adaptable to suit the needs of the group/community. However, changing lifestyle behaviours remains challenging, and requires a more targeted and gender-sensitised approach in order to achieve improvements amongst those population sub-groups most in need.

The literature highlights that failing to account for gender differences in programme design accounts for the under-representation of men in community-based PA and weight loss programmes. We also know that men are more likely to positively engage with a gender-sensitised or "men-friendly" approach to PA. Using PA as a hook can enable men to take increased responsibility for their own health. Getting men engaged and proactive about their own health is important within a gender equality context, by moving away from more stereotypical constructions of gender that have traditionally attributed health and care-giving roles to women.

The literature presented highlights the need to understand what factors affect the delivery and implementation of 'real world' interventions, particularly within an Irish context. This is a critically important consideration in supporting local service providers endeavouring to engage men, as well as others engaged in translational research, potentially ensuring that their research translates to meaningful action in practice.

Chapter 3 Methodology

Chapter 3 Methodology

This chapter provides a detailed description of the research design, data collection tools and procedures, data management and analysis procedures that were used to evaluate the effectiveness of the Men on the Move (MOM) programme.

3.1 Research Design

3.1.1 Men on the Move: a pragmatic controlled trial

The research design used to evaluate the impact of the MOM programme was a pragmatic controlled trial. This design was chosen over a randomised controlled trial for a number of reasons. Notably, a number of Local Sports Partnerships (LSPs) were involved in the study's conception and funding award and therefore assumed a prominent role in the study from the outset. Thereafter, LSPs were selected for the study on the basis of a) having sufficient staff numbers to meet the commitment of the study, b) being committed and enthusiastic about MOM and c) being committed to conducting research on their practice. Group randomisation did not occur between LSPs; group allocation was determined by the point at which the LSP committed to the project i.e. the first in were assigned the intervention group. In total eight LSPs were included in the study; four in the 'intervention group' (IG) and four in the 'comparison-in-waiting group' (CG) that acted as a control. Each LSP was set a target of recruiting 105 men across three community settings in its county. Randomisation at an individual level was not conducted within community settings because contamination was a major risk, especially in rural Ireland. Whilst acknowledging the limitation of non-randomisation at group level, nevertheless, this is often a natural occurrence and a reality in building successful community-based interventions of this type with multiple 'practitioner partners' (Farahani *et al.*, 2015). The group dynamic within the network of partners was critical to the success of the study. The research team therefore decided to accept the limitation of non-randomisation to safeguard against the potentially more negative impact that randomisation would likely have on the group dynamic within the network of partners and consequently the integrity of programme delivery.

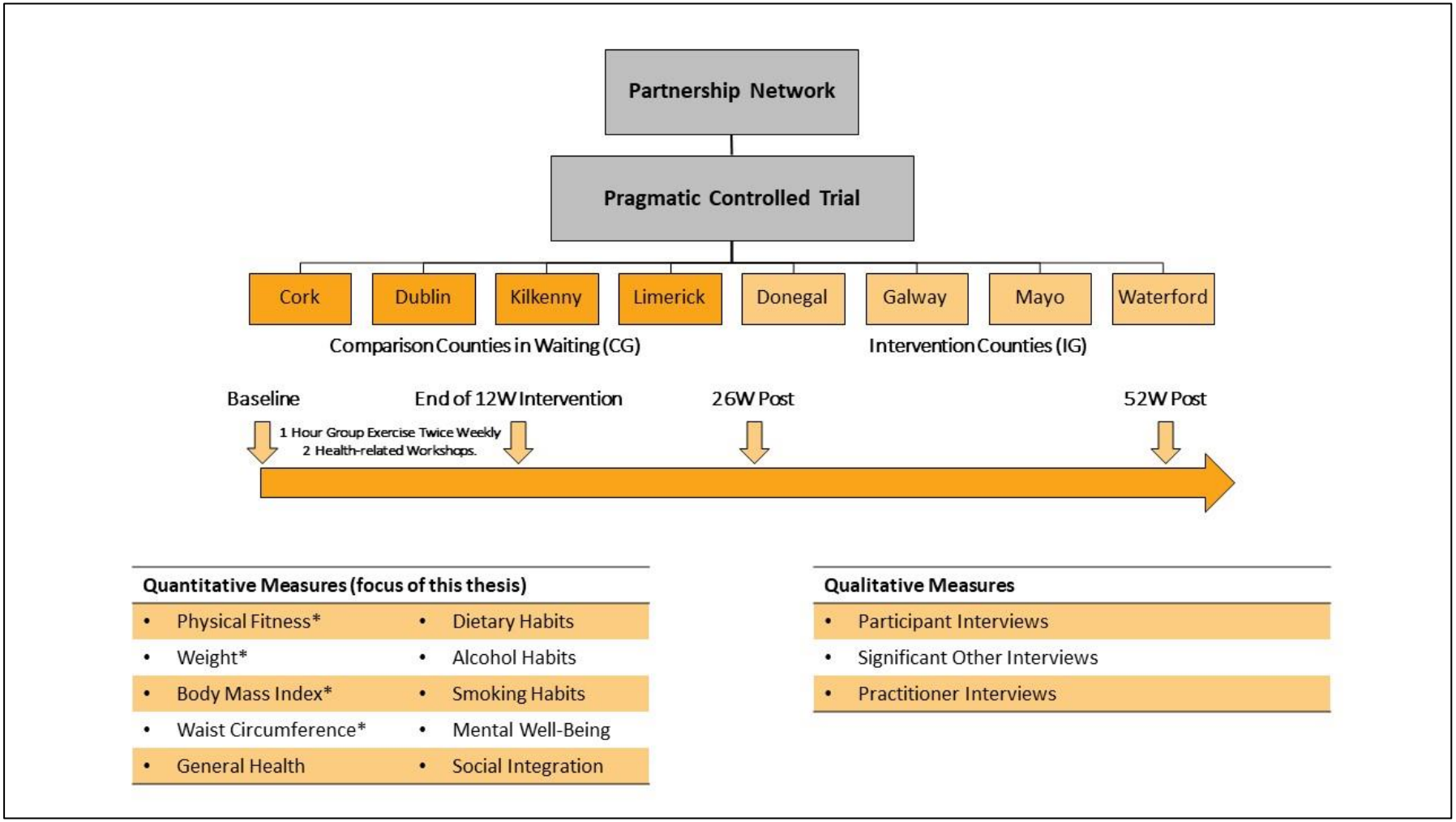


Figure 3.1.1 An overview of the design and data-collection time-points of Men on the Move.

Participants were assessed at baseline, 12, 26 and 52 weeks (Figure 3.1.1). Self-administered questionnaires combined with recorded outcome measures (weight, body mass index (BMI), waist circumference (WC), and time-to-complete one mile) were used to gather data on participants at baseline, 12, 26 and 52 weeks.

3.1.2 Programme design and delivery

The 12W intervention consisted of structured group exercise twice a week, two facilitated experiential workshops [diet and well-being; Appendix C and D respectively], a 24-page health information booklet (Appendix E - Men on the Move Health Information Booklet), a pedometer for independent physical activity (PA) sessions, weekly phone contact, and a customised wallet card to record measures taken. The core components of the structured group exercise were 40 minutes cardiovascular fitness and 20 minutes strength and conditioning training; however, in keeping with good practice, some flexibility was catered for between programmes to ensure that these core components were achieved in a way that best suited the participants' needs.

The two facilitated workshops on diet (weeks six and seven) and well-being (weeks eight and nine) were delivered in all intervention counties over the course of the 12W intervention. Experiential workshops on diet and well-being were developed in partnership with Health Service Executive (HSE) consultants. While for the most part these workshops were standardised across the twelve sites, in keeping with best practice, workshops were tweaked (content and delivery style) in accordance with the needs of the group.

Specifically, the programme aimed to improve the physical fitness, weight status and general health and lives of the men who attend. The participants were also invited to take part in a celebratory 5km event at the end of the 12W PA programme. The event was organised by each LSP. All three MOM groups in each county convened in one location for the event and friends and families were encouraged to come along to support the men in their lives. The event endeavoured to acknowledge the commitment and individual achievements of the men over the course of the programme and gave the

men an opportunity to socialise collectively with their peers from sites within the county who had been on the same journey

Social cognitive theory (SCT) is one of the leading behaviour change theories to explain and predict PA in the general population and underpinned the MOM intervention; specifically, components were incorporated to develop self-efficacy (i.e. confidence to perform PA), to focus on outcome expectancies (i.e. positive outcomes weighed against any negative outcomes), to develop skills (e.g. goal setting and problem solving) and to build social support. The programme was gender-sensitised in relation to context (e.g. men only groups, community based settings that appealed to men), content (e.g. information presented in a scientific manner, use of 'gadgets') and style of delivery (e.g. participative and peer-supported, use of humour and banter).

Men on the Move was delivered by experienced local PA co-ordinators (contracted by the LSP) who were specifically recruited and counselled with respect to the nuances of the programme and of working with male participants. Engaging the right PA co-ordinator was essential to the success of the programme. The key qualities sought in recruiting PA co-ordinators were; having the capacity to relate to and empathise with the participants as well as to create a positive group dynamic; having a wide variety of experience and the capacity to integrate games and fun activities into sessions while also supporting men to progress their PA; being capable of working with whatever ability and environment they might meet in any given session; being knowledgeable of PA and health and capable of signposting participants to relevant services and supports; being community orientated and participation focused; and being empathetic and demonstrating care and respect for the participants.

Physical activity co-ordinators also attended at registration evenings for data collection and to begin the process of forming relationships and building trust with participants. Although not part of this thesis, the experiences of the PA co-ordinators were also investigated as part of the wider evaluation of the programme. The PA co-ordinators worked closely with their LSP to oversee the day-to-day delivery of the MOM programme. They also communicated on a weekly basis with the research team. This highly effective partnership was integral to the success of the national MOM project. Weekly text messages were used by the LSP Co-ordinators as a method to support,

encourage and motivate the men. In the run up to week twelve, phone calls were used to encourage men to attend this follow up test. Participants who missed two consecutive PA session were contacted, by telephone and/or text, and encouraged to return to the programme. To minimise missing data, men were contacted by the LSP co-ordinator in the days before data collection was due to take place and the absence of data for an IG participant does not necessarily indicate dropout. Data were computed in accordance with defined protocols, with descriptive and comparative means analysed. Inferential statistical analysis ($p \leq 0.05$) was undertaken on the between group change scores from baseline at 12, 26 and 52-week time-points.

3.1.3 Framework details used to inform the development and delivery of Men on the Move

Shediack-Rizkallah and Bone's (1998) framework for sustainable community-based health promotion interventions was used to inform the development and delivery of MOM, identifies;

a) Project design and implementation factors

The intervention was designed with extensive consultation and input from the LSP co-ordinators who would be delivering MOM on the ground. The preventative nature of the programme itself dictates a long term approach with flexibility also built into the programme around the style of PA delivery and encompassing scope for broader societal concerns to be addressed through the programme. Outcome measures were also to be shared with participants over the duration of the programme in the hope that information on programme effectiveness would support healthy behaviour change. While the initial 12W programme was funded, LSP co-ordinators consulted with the participants to establish an infrastructure through which the programme could be sustained long term without relying solely on external funding. Prior to engaging with the men, all service providers received ENGAGE training, Ireland's national men's health training programme (Lefkowich et al., 2015; Osborne et al., 2015), which aimed to develop gender competency in the provision of health services for men.

b) Factors within the organisational setting

'Men on the Move' was implemented in a community setting as there is evidence to suggest men may prefer this more informal of settings as opposed to traditional health care settings (Carroll, Kirwan and Lambe, 2014; Hunt, Wyke, *et al.*, 2014). The programme was also gender sensitised in relation to context (e.g. men only groups), content (e.g. information presented in a scientific manner, use of 'gadgets', competitive element) and style of delivery (e.g. participative and peer-supported, use of humour and banter; Hunt, Wyke, Gray, *et al.*, 2014). Local Sports Partnerships were encouraged to draw on local resources and health professionals in order to support the long term viability of the programme and foster capacity building and ultimately become part and parcel of local activities.

c) Factors within the broader community environment

While LSPs by their very nature have been involved in encouraging increasing rates of participation in sport the majority of them had never targeted men specifically before. They have fully embraced this new avenue and it fits well with their priorities. The community sites supporting the delivery MOM have also bought into the MOM philosophy as it helps to direct men towards community services while also addressing men's needs. This type of community ownership is critical to the long term sustainability of the programme.

Table 3.1.1 details how sustainability factors were integrated into the MOM model.

Table 3.1.1 A framework for conceptualising programme sustainability

Sustainability Planning Guide	Elements of the MOM Intervention Designed to Foster Sustainability
PROGRAMME DESIGN AND IMPLEMENTATION FACTORS	
Negotiation process for developing the MOM model	The MOM model of delivery was designed via extensive input from LSPs with practical experience of delivering such programmes to men. Flexibility was also accommodated to meet the specific needs of local communities. Furthermore, the workshops were designed collaboratively between a HSE Senior Dietician (Diet) a Resource Officer for Suicide Prevention (Well-being) and a men's health practitioner researcher.
Evidence of effective practice underpinning the MOM model	The programme model was developed via negotiation with service providers and based upon practical experience as well as lessons from RCTs and practice elsewhere. Therefore, all partners shared ownership of the programme and were invested in its success. The model was underpinned by both a behaviour change strategy as well as a gender sensitive strategy (An overview of intervention components, frequencies, behaviour change and gender sensitivity strategies, and targeted constructs (adapted from Andersen et al., 2012). The development of the MOM brand i.e. the title, strapline, use of imagery and language for all branded and promotional materials, as well as the marketing strategy was also evidence based. The selection of PA co-ordinators was also given a lot of consideration given their central role in facilitating the group dynamic.
MOM model type	The focus of the programme was preventative v curative, which necessitates a long-term approach to foster sustainability. Essentially, the programme has a holistic focus that went beyond the promotion of PA and increasing the level of PA among the participants
Cost of Delivery	The model was designed to require minimal funding by integrating services and using local facilities. Research related study costs were clearly separated from operational costs.
Training	All front line staff were trained in both ENGAGE, the national men's health training programme and in data collection. Data collection by practitioners was a key part of forming relationships with men that supported their engagement in the programme.
FACTORS WITHIN THE ORGANISATIONAL SETTING	
Institutionalization strength	Key local organisations, linked via a national structure were selected based upon their experience of the program or their desire to become involved.
Integration with existing services	The programme was co-ordinated locally via LSPs, an existing service provider with considerable links and networks in their localities. The delivery of the workshops was integrated into business plans of HSE staff which represents joined up service provision.
Programme Champion/Leader	Locally, leadership of the programme came from LSP co-ordinators who had a remit to meet the objectives of the programme and research project.
FACTORS WITHIN THE BROADER COMMUNITY ENVIRONMENT	
Social and political considerations	While LSPs have a remit for increasing PA levels, few had experience of working with men as a priority population. Given their critical role, LSPs are well positioned to engage men via PA and all embraced this role.
Community participation	LSP co-ordinators partnered a variety of existing services in each community that could potentially host the MOM programme and community champions were identified. All programmes were located in existing community organisations / services / facilities. Many local organisations / services had previously struggled to work with men and were looking for something that they could bring to their organization to stimulate engagement. MOM also acted as a mechanism to link men with other services/facilities in their community.

Key: MOM = Men on the Move; LSP = Local Sports Partnership; HSE = Health Service Executive; PA = Physical Activity

3.1.4 Recruitment strategies

The recruitment strategy was comprehensive and involved all service providers. Locally, the delivery of the MOM programme was the responsibility of the LSPs; they oversaw the recruitment strategy, contracted local PA co-ordinators and worked closely with them to oversee the day-to-day delivery of the programme. Local Sports Partnership co-ordinators partnered a variety of existing services that could potentially host the MOM programme. They established steering committees in each community that consisted of a variety of stakeholders including health promotion and primary care staff and members of existing services in each community that could host the MOM programme e.g. men's sheds, sports clubs, community development projects. In some instances, local stakeholders from health promotion and primary care services supported the recruitment strategy and programme delivery. Service providers in each community adopted a variety of recruitment strategies that included in-person invitations, invitation via text and email databases of service users, informing women's groups (as women are often gatekeepers to healthcare for the men in their lives (Ehrhardt *et al.*, 2009)), advertising of branded materials within the service and on the service website, and social media. In some counties, general practitioners (GPs) were informed of the programme in their locality and were encouraged to refer inactive male patients. These strategies were coupled with a local media campaign (print and radio) and advertisement on the local LSP website and social media sites (Appendix F - Examples of LSPs Local Media Campaigns). Men were invited to contact their local service provider or LSP co-ordinator for further details of the programme and all men who expressed an interest in becoming more active were invited to register for the programme at a formal registration evening one week before the commencement of the programme. The LSP co-ordinator and, on average, six service providers, were present at the registration evenings.

The format of the registration evenings was standardised across sites: men were welcomed by the LSP co-ordinator and local service provider. This was followed by an input from a local medical professional who spoke about the benefits of PA after which men were invited to have their baseline assessments done. Teas and coffees were provided and service providers sought out opportunities to speak to all men in person.

3.1.5 The role of key personnel in programme delivery

As envisaged during the programme development, local PA co-ordinators, leaders and champions were vital in ensuring programme success. They were an important part of the recruitment process due to their established networks and relationships within the local communities. While not all local champions were directly involved necessarily with the delivery of the programme, they were influential in promoting the programme because of their stature within their communities. Crucially, those local leaders who were directly involved were key to the success of the programme, in particular with developing a relaxed/trusting environment within their local community for hosting the programme. Therefore, the identification of suitable local champions was critical to local programme success. Local Sport Partnerships played a significant role in the selection of suitable local community groups, champions and PA co-ordinators within each community. The role of PA co-ordinators was particularly important as they were primarily responsible for creating the right atmosphere within their group, while also recognising the capabilities and needs of the group's participants, both of which were critical to the success of sustaining participant involvement. Physical activity co-ordinators had to be capable of adapting the programme to cater for the needs of all participants, and all levels of fitness. Additionally, they needed the skillset to be able to accommodate newcomers to established programmes. It should be noted that, whilst new participants were welcome, they did not form part of the research. Underpinning the important role of local champions and leaders was the added efficiency and cost-effectiveness that their involvement brings in situations where resources are often scarce. It was felt that the integration into existing programmes and services, along with the significant role that local programme leaders and champions play, was a crucial part of establishing and sustaining success within the MOM programme.

3.1.6 Branding

The branding of the MOM national programme was subject to rigorous discussions among the members of the partnership network. The initial concept was first developed

and delivered by the Mayo LSP, with Donegal LSP later adding the strapline 'the best move you'll ever make'. A number of aspects of the programme design were branded that include the logo, the promotional materials, the Health Information Booklet and the programme content. The importance of agreeing appropriate branding was to ensure that the programme was consistent across counties both in terms of its image but also in terms of its message. Consensus was reached on all aspects of the branding. Particular attention was paid to the imagery and language used in the promotional materials and Health Information Booklet. Members of the partnership network felt strongly that the image used should be of a 'real man in Ireland' to whom the target group could relate. Consequently, an image of a man in a MOM group in Mayo was used as the main image on all materials. Likewise, the language used and content of the promotion materials (Appendix G - Sample of a county posters and fliers; H - Sample of Men on the Move Health Check Wallet Cards) and Health Information Booklet (Appendix E - Men on the Move Health Information Booklet) were scrutinised for gender sensitivity and health literacy. Different imagery was used to highlight what was available in comparison and intervention counties; a health check in comparison counties and a 12W PA programme in intervention counties. All men measured at baseline were provided with a MOM health information booklet that included information on PA, diet, stress management, a PA log book and numbers for potential referral options. Wallet cards (Appendix H - Sample of Men on the Move Health Check Wallet Cards) with sufficient space for results at all time-points were also provided to each man. The health information booklet, along with the feedback provided, were simply a way of enabling the men to understand what their WC and BMI measurement meant in health terms. The impact of providing such information, besides educational, could possibly be motivational and may prompt behaviour change (Donnachie *et al.*, 2017; Donnachie, Wyke and Hunt, 2018). While it wasn't the intention at the outset to include feedback on measures as part of the programme, it's evident from the study that the men and service providers want these as an integral part of the programme to both motivate and educate them.

Materials were made available to all counties in both a soft and hard copy to help with recruitment. A5 fliers [n=500], wallet cards [n=200] and A3 posters [n=50] were distributed directly from the printers. Both a hard-copy and PDF version of the poster

were issued to all participating LSPs. The poster was designed to allow for each county to add their own specific information with regards to recruitment. A JPEG image was also issued to the LSPs for use on social media sites.

The literature presented outlines how MOM drew on existing frameworks to develop a model suitable for delivery in diverse communities and among diverse groups of men. The programme was delivered by practitioner partnerships under 'real world' conditions to assess both its efficacy and replicability (Bauman and Nutbeam, 2006, 2014; Glasgow *et al.*, 2012; Rychetnik *et al.*, 2012; O'Hara *et al.*, 2013).

3.2 Ethics, Consent and Inclusion Criteria

Ethical approval (Appendix I) for the study was sought and obtained from the ethics committees at Waterford Institute of Technology [15/Dept-HSES/13], and the Institute of Technology Carlow [Application Reference Number: 125]. This study has been registered with the 'International Standard Clinical Trial Number' registry [ISRCTN55654777].

Informed, written consent was provided by all participants in this study (Appendix J). Participants were eligible for inclusion in the study if they were male, aged at least 18 years, completed the physical activity readiness questionnaire [PAR-Q] (Appendix J), and provided written consent (Appendix J). Whilst consent was sought from all men who attended registration, the partnership network which oversaw the design and delivery of MOM felt it was unethical to exclude any man who attended at registration and who fit the criteria for inclusion but did not provide consent for the study. The approach taken was that their attendance was indicative of a health need and that to prioritise the research i.e. sample size number over the health needs of a man would have been unethical, and these men were therefore allowed to take part in the programme without forming part of the study. As it transpired, just two men did not provide consent and were therefore not included in the analysis.

The age limits reflect globally recommended PA age groups as defined by the World Health Organisation (Samuelson, 2004), and the Healthy Ireland Survey 2015 (Department of Health, 2015): 18–64 years old and 65 years old and above. Other

studies in this field (Hunt, Wyke, *et al.*, 2014) focused more on overweight and obese men in their mid-to-late thirties, it was felt that the age groups selected for MOM took into consideration the nature and availability of the scientific evidence relevant to the selected outcomes, with some flexibility to the PA programme design within groups to ensure that the core components were achieved in a way that best suited the men's needs. This was particularly applicable to the older age limit (65 years and above) where PA programmes may be more effective when modified to the needs of an older age cohort.

The PAR-Q (Appendix J - Physical Activity Readiness Questionnaire) is a self-screening tool used to help identify men who should seek medical advice prior to undertaking exercise. Answering 'yes' to any item on the PAR-Q did not warrant inevitable exclusion from the programme or study; as per the FFIT trial (Hunt, Gray, *et al.*, 2014), men were advised to discuss any issues arising from PAR-Q either with their own GP or with a GP who was present at registration evenings. In keeping with good practice, all PAR-Qs were given to PA co-ordinators to check for any pre-existing medical conditions, and to allow for adaptation of the PA programme to meet the particular needs of some men. It was the responsibility of the participant to consult with their GP and obtain permission. As a way of encouraging participants from the CG counties to attend the health checks, blood pressure (BP) and cholesterol checks were provided in lieu of the PA programme. Blood pressure was measured at all time-points, however cholesterol was only recorded at baseline and 52-weeks as change was not expected in this measure over a shorter time period The results were fed back to participants' verbally. A commitment was also given to the CG participants that they would receive the programme 12 months later.

All the data in this study (once collected) has been made anonymous and contains no identifying information. Written informed consent was provided by all participants; a total of 927 men consented to participate in this study [n=501, IG; n=426, CG]. Ethical consideration was given to i) protect the well-being and safety of research participants, ii) data protection, iii) voluntary participation, iv) informed consent and v) equity. The following measures were and will continue to be taken in response to these issues;

(i) All MOM participants completed a standard screening form prior to undertaking the one-mile walk/run test. Any issue that arose from screening was referred to

a medical practitioner who was present at each venue. The test was overseen by a PA co-ordinator (fully qualified exercise and fitness instructor with professional indemnity insurance). Each PA co-ordinator was also required to be qualified in first aid and was made aware of the location of the nearest automated external defibrillator. These same PA co-ordinators also conducted the MOM intervention. Blood pressure data were also collected from the CG and, in some instances, participants were referred for to their GP for further consultation.

(ii) Participants in this research may have disclosed potentially sensitive information with respect to their demographic profile and/or their health and fitness status. It was imperative that participants felt confident that such information would be held in confidence and that their identity would remain anonymous. Individual codes were assigned to all participants that were used on all data collection paperwork pertaining to that individual. The participant database with identifiable codes was only accessible by the researchers and supervisors and an electronic copy of this database is password protected. All data collection paperwork is stored in a locked filing cabinet to which only the researcher/supervisors have access. All electronic data were stored on a password protected cloud data storage area and backed up using an external hard drive. The external hard drive was stored in a locked filing cabinet in my supervisor's office. No data was stored on portable devices or desk top computers. Data will be stored for 5 years post publishing and will be destroyed thereafter (in accordance with Waterford IT and IT Carlow's data protection policies).

(iii) Participation was entirely on a voluntary basis. Participants have the right to withdraw from the study at any time pre-analysis.

(iv) All participants were provided with Participant Information Sheets and were required to sign Informed Consent forms prior to participation (Appendix J - Consent Form for Intervention Group; Appendix J - Consent Form for Comparison Group). Additional helpers were on hand to provide support and guidance to those participants with literacy issues.

(v) 'Men on the Move' was open to all men, irrespective of social class, race, sexual orientation etc. In the selection of MOM sites, every attempt was made to attract participants from diverse backgrounds (that reached beyond the 'worried well'). In the context of respecting participants' input to the research, results of the research were communicated to participants in two ways; (i) at an individual level, participants received a scorecard outlining results of their individual fitness and body composition tests; and (ii) a report detailing overall results of the research project was furnished to each sports partnership on completion of the project.

3.3 Sample size

The three primary outcome measures for this study were changes in aerobic fitness, percentage bodyweight and waist circumference (WC). Sample size calculations were undertaken to power for a 1 MET (aerobic fitness), 5% bodyweight and 5cm WC between group difference in change scores between groups (IG vs CG). The sample size requirement estimate was greatest for weight loss. Using similar assumptions to the FFIT trial (Hunt, Wyke, *et al.*, 2014), the 5% between group difference in percentage weight loss at 12 months was estimated to require 250 participants in each group (80% power, two-sided test, $p<0.05$). The minimum sample size was increased to 830 (415 men in each group) to allow for 40% attrition; with each LSP having a target of recruiting 105 men across 3 community settings within its county. A greater attrition rate at 12 months was predicted compared to the FFIT study, as all testing was conducted in community settings at specified times.

3.4 Data Collection Procedures

3.4.1 Overview of data collection procedures

Some 927 sedentary males were recruited by LSPs across 25 community sites in eight counties (4 'intervention' [n=501], and 4 'comparison-in-waiting' [n=426]) in the Republic of Ireland. Data collection commenced in September 2015. Prior to

commencement all LSPs and service providers involved with collecting data were issued with a copy of the data collection procedure protocol (Appendix J), along with access to a video demonstrating correct procedures for measuring height, weight and waist circumference (WC). All variables were assessed by trained fieldworkers (LSP Staff, or PA co-ordinator employed by LSP), and were undertaken at designated group meeting times. Rescheduling of assessments was not possible. Each health check host venue had a designated LSP leader to oversee the proceedings, with a public health nurse, or GP, also in attendance. Demographic data were collected from participants at baseline only (Appendix J; Baseline Questionnaire). At each time-point primary and secondary outcome measures were recorded (Figure 3.1.1).

In order to ensure reliable data and to standardise data collection across all sites, representatives from six LSPs (n=10) attended a one-day training event in Dublin on all data collection procedures delivered by members of the research team. The remaining two LSPs (n=14 representatives) were trained locally. All representatives were trained in the use of all equipment and on protocols in taking the measurements. Considerable time was also given to administration of the questionnaire. In turn, these representatives trained other members of their team locally. A data collection video (height, weight, WC) was developed to support this training and was made available to all representatives for further consultation. In addition, a data collection procedures manual was given to all representatives. The research team delivered data collection training. In total, approximately 118 people from a variety of organisations have been involved in the delivery system of MOM across the eight counties involved in this research.

All data collection instrumentation and processes for data collection were the subject of considerable discussion at partnership network meetings. As in other community-based evaluations (Pringle *et al.*, 2013), data collection instruments were reviewed by LSP staff and the research team, with a view to optimising acceptability to clients engaged in the MOM programme and service providers involved in data collection.

3.4.2 Demographic data

Self-reported outcomes were recorded via self-administered questionnaires (Appendix J; Baseline Questionnaire). At baseline only participant demographics (date of birth, ethnic origin, educational attainment, relationship, housing and employment status) and how participants had heard about the programme were recorded. At all time-points, self-reported measures of lifestyle behaviours including PA, consumption of fruit and vegetables, smoking, consumption of alcohol, use of primary care services and prescription medicine, perception of health and workplace capacity.

3.4.3 Primary outcome measures

The primary research outcome measures were physical fitness (METS), weight (kg), BMI (kg/m^2) and waist circumference (cm). Data were obtained at baseline, 12, 26 and 52 weeks (W) by trained fieldworkers and members of the research team. The outcome measures were set with reference to national (Department of Health, 2015, 2016a) and international (Samuelson, 2004) guidelines, as well as similar types of intervention programmes for men (Hunt, Wyke, *et al.*, 2014; van der Linden *et al.*, 2014; Wyke *et al.*, 2015). At each time-point the following objective data were obtained;

- Waist circumference – tape measure [cm]
- Body Mass Index – weight/height^2 [kg/m^2]
- Physical fitness – time-to-complete 1 mile [mins and decimal mins]

The intervention targeted a 1 MET increase in aerobic fitness, a 5% reduction in bodyweight and a 5cm reduction in WC, with changes in fitness and fatness at 12W, 26W and 52W reported.

Waist Circumference

Waist circumference (cm) was measured by placing a tape around the mid-section of the participant, i.e. just below the ribs, and just above the hips. Care was taken to ensure that the tape was parallel to the floor, that the participant was standing upright and continued to breathe normally (i.e. no 'sucking it in').

Body Mass Index

Weight (kg) was recorded using an electronic weighting scales (Seca 813, 40 Barn Street, B5 5QB Birmingham, United Kingdom) with participants wearing light clothing, no shoes and with empty pockets. Height (cm) was measured without shoes using a portable Seca 213 stadiometer (Seca 213 stadiometer, 40 Barn Street, B5 5QB Birmingham, United Kingdom). Participants were instructed to stand on the unit with their back to the wall, stand upright and look straight forward keeping their head level. Their heels, buttocks, shoulders and head should all be touching the ruler. Height was recorded in cm to one decimal place. Body mass index (kg/m^2) was calculated using weight and height measurements. All equipment was calibrated prior to commencing fieldwork.

Physical Fitness

The distance for the time-to-complete 1 mile route was measured using a Trumeter 5500E trundle wheel (Celtic Surveys Ltd., Dunshaughlin Business Park, Dunshaughlin, Meath A85 HC56, Ireland), with times recorded (mins:secs) using a digital timer. The trundle wheel was calibrated at baseline prior to commencing fieldwork.

The time-to-complete 1 mile took place outside. It should be noted that we did not record weather conditions for the multiple locations for each trial. We acknowledge the limitations regarding reliability associated with outdoor testing, such as varying environmental and weather conditions. In order to reduce/eliminate a 'group effect' i.e. men within the group walking at someone else's pace rather than their own, participants had a 10 second staggered start. Before the test began, the men were informed that the objective was to complete the distance in the quickest time possible, but that the primary objective was to complete the mile (with the time being secondary).

In the context of this being a PA study, it was deemed important to quantify aerobic fitness (Chapter 2, Section 2.4.3). Aerobic fitness was computed using the time-to-complete 1 mile [m:dm] as per Daniel and Gilbert estimated VO_{2max} equation (Daniels, 2013). Estimated VO_{2max} values were then converted to METS by dividing by 3.5.

$$VO_{2max} = \frac{0.000104^{v2} + 0.182258^{v} - 4.6}{0.2989558^{e-0.1932605t} + 0.1894393^{e-0.012778t} + 0.8}$$

v = velocity in meters per minute; t = time in minutes

Aerobic fitness has been suggested as a surrogate for habitual PA in inactive populations (Blair *et al.*, 1995) and has been shown to be a risk factor for morbidity and mortality (Kodama *et al.,* 2009). Any improvement in physical fitness therefore equates to a reduction in cardiovascular disease (CVD) risk.

3.4.4 Secondary outcomes

Secondary outcome measures were recorded at all-time points via self-reported questionnaire (see Appendix J) to assess the broader impact of the programme on the men's health and well-being. Fieldworkers were on hand to assist participants who appeared to be having problems when completing the self-administered questionnaires (Appendix J; Baseline Questionnaire) and, whenever possible, the questionnaires were checked before the participant left the health check in order to minimise missing data. The specific measures are listed below:

1. General health history and perception – Questionnaire; adapted from SLÁN (Survey of Lifestyle, Attitudes and Nutrition; Morgan *et al.*, 2008)
2. Dietary habits – Questionnaire
3. Alcohol Habits – Questionnaire; adapted from SLÁN (Morgan *et al.*, 2008)
4. Smoking Habits – Questionnaire; adapted from SLÁN (Morgan *et al.*, 2008)
5. Mental well-being – Questionnaire; The Warwick-Edinburgh Mental Well-being Scale (Stewart-Brown, 2008)
6. Social Integration – Questionnaire; Berkman-Syme social network index (Berkman and Syme, 1979)

For the purpose of this thesis, a 'safe' upper limit for alcohol consumption was based upon reported statistics for Ireland (>17 Units per week; Health Service Executive "Alcohol Programme," 2017; https://www.hse.ie/eng/health/hl/change/alcohol/), and not European guidelines (>14 Units; Piepoli *et al.*, 2016).

Mental well-being was assessed at all time-points via the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). The WEMWBS provides a psychometrically sound tool for measuring mental well-being at a population level and comprises 14 positively worded statements describing thoughts and feelings relating to aspects of mental well-being

that are scored on a 5-point scale. The minimum score possible from the scale is 14 while the maximum is 70. The higher a person's score, the better their mental well-being is deemed to be.

Social well-being scores were assessed via the Berkman-Syme social network index (Berkman and Syme, 1979) and scored according to Loucks *et al.* (2007). The index was scored as follows: Married/co-habiting (no=0; yes=1); close friends and relatives (0–2 friends and 0–2 relatives=0; all other scores=1); group participation (no=0; yes=1); participation in religious meetings or services (less than or equal to every few months=0; greater than or equal to once or twice a month=1). Scores were summed on a 0-5 scale of social isolation/social connectedness: 0 or 1 (socially isolated; SI); 2 (moderately isolated; MI); 3 (moderately integrated; MIn); and 4 or 5 (Socially Integrated; SIn).

3.4.5 Identified modifiable cardiovascular disease risk factors

Based on international guidelines (World Health Organisation, 2013a), six modifiable CVD risk factors were identified; <3 days PA per week, WC >102cm, a smoker, alcohol consumption >17 units/week, on BP medication, on cholesterol medication. Data were analysed to establish incidence and prevalence of CVD risk factors. Age was considered, but not included as it is a non-modifiable risk factor. Waist circumference was the preferred indicator of CVD risk as research suggests (De Koning *et al.*, 2007) a stronger correlation with CVD risk than BMI (Chapter 2, Section 2.4.4).

3.4.6 Economic evaluation of men on the move

While the primary purpose of MOM was to investigate the effects of the programme on physical fitness and other associated outcome measures, secondary analysis was conducted to evaluate both the economic impact of the programme and the cost-effectiveness of the intervention.

The economic evaluation compares the additional cost associated with delivering a new programme with the additional outcomes achieved. The assessment of incremental costs was restricted to the resources associated with providing the intervention in line with Shaw *et al.* (2011). Analysis includes both the direct and indirect costs incurred in

the implementation of the programme for the IG over the initial 12-week intervention period, along with the additional costs relating to the maintenance of the programme post-intervention. The incremental outcomes from the programme were assessed using measures of health related quality of life (HRQoL) which is recognised as a key indicator of treatment outcomes (Whitehead and Ali, 2010). Quality Adjusted Life Years (QALYs) defined as a measure of an individual's length of life that has been adjusted for the health-related quality of that life (HIQA, 2018), were calculated by assigning a value or weight (utility) to identified health states. Utilities were measured on a scale that range in value from 0 (death) to 1 (perfect health). The use of QALYs allows a measure of value for different health states to be computed and also facilitates comparisons between different health programmes as it is universally applicable (Health Information and Quality Authority, 2018). The cost-effectiveness threshold for Ireland is currently €45,000 per QALY. Historically the cost-effectiveness threshold in Ireland has varied between €20,000 and €45,000 per QALY (O'Mahony and Coughlan, 2016). The National Institute of Health and Care Excellence (NICE) in England set the threshold at £20,000 (The National Institute for Health and Care, 2013).

Quality Adjusted Life Years were generated for participants using the short form-6D (SF-6D) utility score which is a preference based measure of health based on the SF-36 health survey (Brazier, Roberts and Deverill, 2002). Collected participant data, both measured and self-reported outcomes, for all time-points were best-matched to correlate with the six dimensions identified in Brazier *et al.'s* (2002) SF-6D (Table 3.4.1). Data were matched as follows:

1. Categories for the 'physical functioning' dimension were defined based on time-to-complete 1-mile, and matched to Brazier *et al.'s* (2002) physical functioning utility weights (Table 3.4.1). In the context of this study it is important to attempt to classify an individual's level of fitness. There is a general absence of standardised measurement methods or universally recognised classification of fitness levels for general population groups. There were no matches with physical functioning Level 6, as men who signed up for a PA programme were deemed capable of some form of physical functioning, i.e. their health 'did not limit them a lot when bathing and dressing'.

2. ‘Role Limitations’ were calculated based on a composite score average achieved for ‘Physical Functioning’ and ‘Mental Health’ categories. The rationale for using a composite score for role limitations was that it spanned across physical and mental health areas which had already been assessed.
3. ‘Social Functioning’ was matched with previously defined social integration categories (Appendix J; Baseline Questionnaire Q22), with social well-being scores assessed via the Berkman-Syme social network index and scored according to criteria defined by Loucks *et al*. (2006). Scores were summed and categorised accordingly.
4. ‘Pain’ was categorised using self-reported data at all time-points. Participants rated their health by selecting one of the following; 1) Excellent, 2) Very Good, 3) Good, 4) Average, 5) Poor.
5. ‘Mental Health’ was assessed via the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), which comprises 14 positively worded statements describing thoughts and feelings relating to aspects of mental well-being that are scored on a 5-point scale (ref). (Appendix J; Baseline Questionnaire Q21).
6. ‘Vitality’ with a specific well-being question related to participants’ energy levels (Appendix J; Baseline Questionnaire Q21(e) – I’ve had energy to spare).

The final values were used to create a six-digit ‘health state’ code that were converted into ‘utility weights’ using the SF-6D algorithm (refer to Table 3.4.2 for examples) at each time-point (baseline, 12, 26 and 52 weeks). The cost utility analysis commenced with a collation of these scores from both groups across the six dimensions. It should be noted that the usable sample sizes for this analysis did decline at each time-point for both groups due to non-completion of certain dimensions by some participants, and thus imputation of missing data did occur. The incremental cost effectiveness ratio (ICER) was then derived to show the additional cost for one additional QALY gained by the IG compared to the CG. This ICER ratio would be a basis for assessing the net benefit of the MOM project and could be compared to other studies in this field to see which represents the best resource allocation.

Table 3.4.1 The short form 6D with 'Men on the Move' data

Level	Physical Functioning – *Time-to-complete 1 mile (mins)*		Role Limitations - *Score to be calculated based on composite score average for 'Physical Functioning' and 'Mental Health' categories.*	Social Functioning - *Q22 – social integration*		Pain - *Q9 – health rating*		Mental Health - *Score to be calculated based on score average for Q21(c) – WEMWBS; I've been feeling relaxed, & Q21(h) – WEMWBS; I've been feeling good about myself*		Vitality - *Q21(e) – WEMWBS; I've had energy to spare*	
1	Your health does not limit you in vigorous activities	*≤8.00 mins*	You have no problems with work or other regular daily activities as a result of physical health or emotional problems	Your health limits your social activities none of the time	*Socially Integrated*	You have no pain	*Excellent*	You feel tense or downhearted and low none of the time	*Q21(c) & (h) - All of the time*	You have a lot of energy all of the time	*Q21(e) - All of the time*
2	Your health limits you a little in vigorous activities	*8.01 – 12.00 mins*	You are limited in the kind of work or other activities as a result of your physical health	Your health limits your social activities a little of the time	*Moderately Integrated – >2 meetings/month with close friends*	You have pain but it does not interfere with your normal work (both outside the home and housework)	*Very Good*	You feel tense or downhearted and low a little of the time	*Q21(c) & (h) - Often*	You have a lot of energy most of the time	*Q21(e) - Often*
3	Your health limits you a little in moderate activities	*12.01 – 15.00 mins*	You accomplish less as you would like as a result of emotional problems	Your health limits your social activities some of the time	*Moderately Integrated – ≤ 2 meetings/month with close friends*	You have pain that interferes with your normal work (both outside the home and housework) a little bit	*Good*	You feel tense or downhearted and low some of the time	*Q21(c) & (h) - Some of the time*	You have a lot of energy some of the time	*Q21(e) - Some of the time*
4	Your health limits a lot in moderate activities	*15.01 – 20.00 mins*	You are limited in the kind of work or other activities as a result of your physical health and accomplish less than you would like as a result of emotional problems	Your health limits your social activities most of the time	*Moderately Isolated*	You have pain that interferes with your normal work (both outside the home and housework) moderately	*Average*	You feel tense or downhearted and low most of the time	*Q21(c) & (h) - Rarely*	You have a lot of energy a little of the time	*Q21(e) - Rarely*
5	Your health limits you a little in bathing and dressing	*>20.01 mins*		Your health limits your social activities all of the time	*Socially Isolated*	You have pain that interferes with your normal work (both outside the home and housework) quite a bit	*Poor*	You feel tense or downhearted and low all of the time	*Q21(c) & (h) - None of the time*	You have a lot of energy none of the time	*Q21(e) - None of the time*
6	Your health limits you a lot in bathing and dressing	*No respondents fell into this category*				You have pain that interferes with your normal work (both outside the home and housework) extremely	*Unable to Work*				

Key; mins = minutes; Q = question; WEMWBS = Warwick-Edinburgh Mental Well-being Scale

Adapted from (Brazier, Roberts and Deverill, 2002)

Table 3.4.2 A sample of health states defined by the SF-6D

Health State			
111111	**223222**	**424334**	**645655**
Your health does not limit you in vigorous activities (e.g. running, lifting heavy objects, participating in strenuous sports)	Your health limits you *a little* in vigorous activities (such as running, lifting heavy objects, participating in strenuous sport)	Your health limits you *a lot* in moderate activities (such as moving a table, pushing a vacuum cleaner, bowling or playing golf)	Your health limits you *a lot* in bathing and dressing yourself
You have *no* problems with your work or other regular daily activities as a result of your physical health or any emotional problems	You are *limited in the kind of work or other activities* as a result of your physical health	You are *limited in the kind of work or other* activities as a result of your physical health	You are *limited in the kind of work* or other activities as a result of your physical health and you *accomplished less than you would like* as a result of emotional problems
Your health limits your social activities (like visiting friends or close relatives) *a little or none of the time*	Your health limits you in your social activities *some of the times*	Your health limits you in your social activities *most of the time*	Your health limits your social activities *all of the time*
You have *no* pain	You have pain but it does *not* interfere with your normal work (both work outside the home and housework)	You have pain that interferes with your normal work (both outside the home and housework) *a little bit*	You have pain that interferes with your normal work (both outside the home and housework) *extremely*
You feel tense or downhearted and low *a little or none of the time*	You feel tense or downhearted and low *a little of the time*	You feel tense or downhearted and low *some of the time*	You feel tense or downhearted and low *all of the time*
You have a lot of energy *all of the time*	You have a lot of energy *most of the time*	You have a lot of energy *a little of the time*	You have a lot of energy *none of the time*

(Brazier, Roberts and Deverill, 2002)

3.5 Statistical analysis

This section comprises of two distinct components outlining the statistical analysis performed to 1) assess the effects of the intervention (Section 3.5.1), and 2) evaluate the cost-effectiveness and economic impact of the programme (Section 3.5.2).

3.5.1 Statistical analysis assessing the effects of the intervention

Questionnaire data were computed in accordance with defined protocols, and analyses conducted to assess the effects of the intervention. All outcome variables were continuous. Descriptive and inferential (95% confidence interval) statistics were also conducted. All data were checked for normality. With respect to aerobic fitness, bodyweight, WC, mental well-being and social integration, the intervention effects were determined by comparing the between group change scores from baseline at 12W (n=428-508), 26W (n=286-378) and 52W (n=269-390) using independent t-tests. A non-parametric Mann-Whitney U analysis was undertaken on social integration. The similarity of the intervention and comparison groups at baseline was assessed using independent t-tests, Mann-Whitney U tests and Chi-Square analysis as appropriate. All statistical analyses were performed using SPSS version 22.0 (Chicago, Illinois, USA). Intervention effect sizes are presented as Cohen's d (Cohen, 1988). Statistical significant changes are presented as mean (95% CI) unless otherwise stated. Significance was set at $p<0.05$.

The primary outcomes are presented as the mean difference in weight loss, WC, BMI and time-to-complete 1 mile at 12W, 26W and 52W, expressed as absolute values and as a percentage. As highlighted previously, the intervention targeted a 1 MET increase in aerobic fitness, a 5% reduction in bodyweight and a 5cm reduction in WC. Numbers achieving those targets at 12W, 26W and 52W are presented as a percentage of (a) those tested at these time-points (best-case scenario) and (b) those (n=628, n=548 for fitness) who participated in the programme to 12W and beyond (worst-case scenario). Percentage success rates were determined with and without imputation. Missing data were not relevant for the best-case scenario analysis as only those present were included in the denominator at each time-point. All those with one post-baseline

assessment were included in the denominator for this worst-case analysis (n=628), with imputation for missing data. For the initial intervention effect worst-case scenario, the numbers who achieved the specified targets at 12W are presented as a percentage of those who were tested at baseline. The ANOVA was undertaken using SPSS Complex Samples, which adjusts confidence intervals for the nesting of participants within 25 community groups. Observed success rates were compared between the intervention and comparison-in-waiting groups using Chi-Square analysis.

For mental well-being, meaningful change was interpreted as per Putz *et al.*, (2012) i.e. ≥+3 above equates to a meaningful improvement and ≥-3 equates to a meaningful dis-improvement in mental well-being respectfully. Data were also analysed as per the 3-fold statistical classification system defined by the National Scottish Survey (2008) whereby those within 1 standard deviation (SD) of the mean were classified as being of 'average mental well-being', those ≥1SD higher than the mean were classified as being of 'above average mental well-being' and those ≥1SD lower than the mean were classified as being of 'below average mental well-being'. Notably, this classification system is not based on any evidence that an average or below average score is problematic.

3.5.1(a) Imputation for missing data assessing the effects of the intervention

In relation to the analysis with missing data imputation assessing the effects of the intervention, the following strategy was applied;

Intervention group (all primary outcome measures)

- For data present at 12W, but not at 26W or 52W, the baseline value was inserted for both 26W and 52W.
- For data present at 26W, but not for 12W, the 26W value was inserted at 12W.
- For data present at 26W, but not for 52W, for one third of the participants the 26W value was inserted (scaled back for fitness in IG to 95% of 26W value), for one third of participants the value half-way between 95% of 26W value and baseline was inserted, and for the final third of participants the baseline value was inserted.

- For data present at 52W and 12W, but not at 26W, a value half-way between 12W and 52W was inserted.
- For data present at 52W, but not at 12W or 26W, the 52W value was inserted at 12W and 26W.

Comparison Group

- Weight – For data missing at 12W the baseline value was inserted; for data missing at 26W, the 52W value was inserted; for data missing at 26W and 52W, the baseline value was inserted; and for data missing at 52W, the 26W value was inserted.
- Waist circumference – For data missing at 12W the baseline value was inserted; for data present at 26W but not at 52W, the baseline value was inserted; for data present at 52W but not at 26W, the 52W value was inserted.
- METS – For data missing at 12W the baseline value was inserted; for data missing at 26W, the 52W value was inserted; for data missing at 26W and 52W, the baseline value was inserted; and for data missing at 52W, the 26W value was inserted.

3.5.1(b) Imputation for missing data assessing the cost effectiveness of the intervention

In relation to the analysis with missing data imputation assessing the cost effectiveness of the intervention, i.e. where there was one missing value from the six dimensions identified in Brazier et al.'s (2002) SF-6D (Table 3.4.1), we adopted the following approach. If a participant scored 3 at both 12W and 52W it may be inferred that this could also be 3 at 26W. Likewise, if a participant scored 4 at baseline and 2 at 26W it may be inferred that this could also be 3 at 26W.

Chapter 4 Results

Chapter 4 Results

The results section will be presented in four distinct sections;

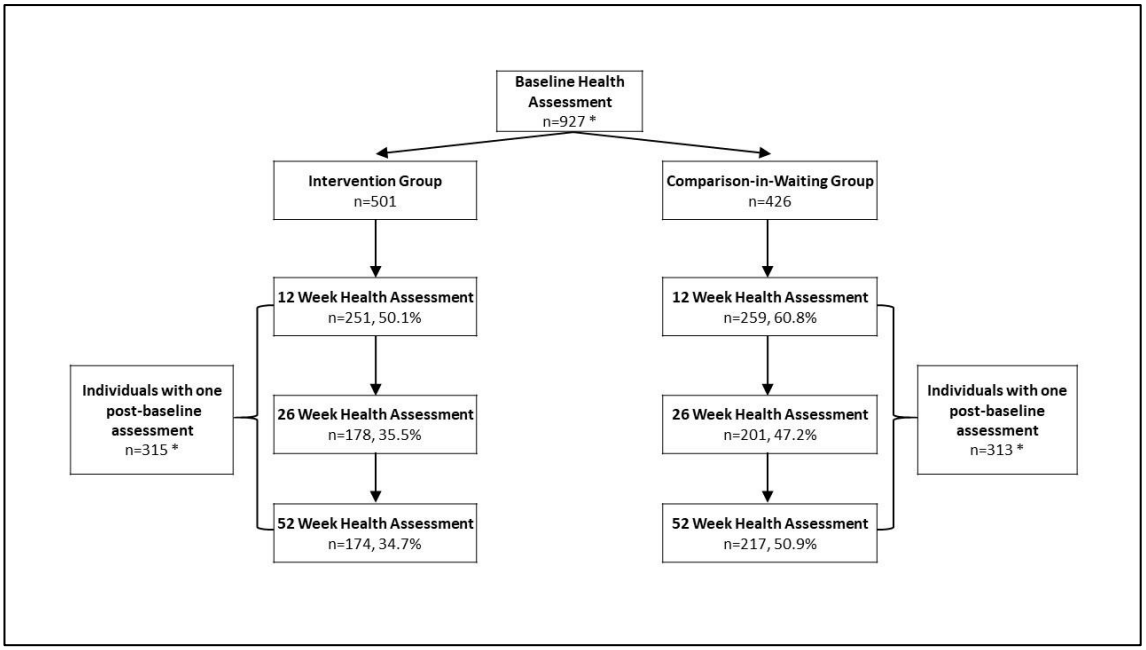
1. Section 4.1; Participant Flow
2. Section 4.2; Baseline participant characteristics
3. Section 4.3; Impact of intervention
4. Section 4.4; Cost effectiveness of Men on the Move

4.1 Participant flow

In total, 927 men (mean ± SD: age = 50.7 ± 10.9 yr; height = 175.2 ± 6.6 cm; weight = 92.7 ± 16.0 kg) completed the Men on the Move (MOM) baseline health check assessments across 25 community sites in eight counties in the Republic of Ireland. As outlined in Section 3.7, these eight counties were divided into two sub-groups based on location; an intervention group (IG; n=501), and a comparison-in-waiting group (CG; n=426). The comparative demographic group means were as follows; IG: age = 52.0 ± 10.7 yr, height = 174.6 ± 6.5 cm, weight = 94.2 ± 16.0 kg; CG: age = 49.3 ± 11.4 yr, height = 176.0 ± 6.6 cm, weight = 91.0 ± 15.9 kg.

4.1.1 Participant flow through the Men on the Move programme

The participation flow throughout the MOM programme is outlined in Figure 4.1.1, with 42.2% (n=391) of baseline participants (IG; 34.7% (n=174), CG; 50.9% (n=217)) attending the final 52 week (W) health check, which took place in September 2016. The values presented are expressed as percentages of the original sub-groups, i.e. IG (n=501), and CG (n=426). Table 4.1.1 presents retention percentages for the main objective measures of those who presented at each time-point, and show a considerably lower number of men (n=797) having completed the time-to-complete 1 mile at baseline. Similarly, at 26W (IG only) and 52W (IG & CG), retention numbers were lower for time-to-complete 1 mile when compared to other variables. Notably, of the 501 men who were recruited to the programme, 68% (n=342) attended over 50% of the programme, i.e. they attended weekly.



* participant numbers were lower for fitness assessments

Figure 4.1.1 Participant flow through the Men on the Move programme

Figure 4.1.1 highlights a high percentage dropout (defined as an IG participant who attended baseline data collection only). Of those presenting at baseline, 63% of the IG and 73% of the CG had at least one follow-up assessment. At 12W, 50% of the IG and 61% of the CG were retested. At 52W 35% of the IG and 51% of the CG were retested. Comparison of IG participants (n=315) vs early dropouts (n=186) are reported on in Section 4.3.7.

Table 4.1.1 Objective measurement overview, and retention percentages, for all time-points

	Weight N (% return)	BMI N (% return)	Waist Circumference N (% return)	Timed mile N (% return)
IG				
BL	501	501	495	435
12W	251 (50.1)	250 (49.9)	251 (50.7)	222 (51.0)
26W	178 (35.5)	177 (35.3)	175 (35.4)	132 (30.3)
52W	174 (34.7)	174 (34.7)	174 (35.2)	127 (29.2)
CG				
BL	426	426	423	362
12W	259 (60.8)	259 (60.8)	258 (61.0)	221 (61.0)
26W	201 (47.2)	200 (46.9)	199 (47.0)	172 (47.5)
52W	217 (50.9)	217 (50.9)	213 (50.4)	160 (44.2)
Total				
BL	927	927	918	797
12W	510 (55.0)	509 (54.9)	509 (55.4)	443 (55.6)
26W	379 (40.9)	377 (40.7)	374 (40.7)	304 (38.1)
52W	391 (42.2)	391 (42.2)	387 (42.2)	287 (36.0)

Note: BMI = Body Mass Index; N = number; IG = Intervention Group; BL = baseline; W = weeks; CG = Comparison-in-waiting Group.

4.2 Baseline participant characteristics

Baseline participant characteristics are presented in Tables 4.2.1 a, b and c. Table 4.1.2(a) reports on a middle aged (50.7±10.9 yr), mostly married/co-habiting (77.6%), predominantly white (97.7%) population. Just over half (52.3%) had no more than secondary education whilst almost two-thirds (64.8%) were in full time employment or self-employed. The vast majority (81.6%) were aged between 40–70 years of age.

Baseline self-reported health status and lifestyle characteristics are outlined in Table 4.2.1(b). A small minority (5.2%) reported their health as poor. Approximately a third reported a health problem (34.9%) and having visited a general practitioner (GP) in the past 12W (32.9%). The most common reported health problems were high blood pressure (BP), overweight/obesity, diabetes, cholesterol and asthma. Almost half (47.4%) reported taking prescription medication in the previous 12W, with 16.5% reporting doing so for chronic conditions (8.9% BP; 7.6% cholesterol). Some 13.5% reported their mental well-being as below average, with the same percentage (13.5%) being classified as socially isolated. Just over half (53.0%) reported being actively involved in groups. Participants reported hearing about the programme through word of mouth (31.2%) or newspaper/media (23.3%) with just 5.8% hearing about the programme through health services.

Baseline health indicators (Table 4.2.1(c)) show that the programme was attended by predominantly overweight/obese men. Mean measurements for body mass index (BMI) and waist circumference (WC) were 30.2±4.9 (n=926) and 105.1±13.0 cm (n=918) respectively. The mean time-to-complete 1 mile was 13.27±3.54 m:dm, range 6:17–30:77 m:dm. Aerobic fitness was estimated (Daniels, 2013) and the mean VO_{2max} (ml/kg/min) was 21.21±7.45 ml/kg/min (range 5.62–46.91), which corresponds to a 6.06±2.13 METS (1.60–13.40). Other health indicators presented include number of days physically active, fruit and vegetable consumption, smoking, and alcohol consumption.

Table 4.2.1(a) Participant baseline demographic characteristics

	Total	IG	CG
Physical Measures		**Mean±SD (N)**	
Age (years)	50.7±10.9 (916)	51.9±10.5 (495)	49.2±11.2 (421)
Height (m)	175.2±6.6 (927)	174.6±6.5 (501)	176.0±6.6 (426)
Weight (kg) **	92.7±16.0 (927)	94.2±16.0 (501)	91.0±15.9 (426)
Age Year Bands (years)		**% (N)**	
18 – 19 Δ	0.4 (4)	0.4 (2)	0.5 (2)
20 – 24	0.6 (5)	0.6 (3)	0.5 (2)
25 – 29	2.3 (21)	1.4 (7)	3.3 (14)
30 – 34	2.0 (18)	1.2 (6)	2.9 (12)
35 – 39	8.7 (80)	6.9 (34)	10.9 (46)
40 – 44	14.8 (136)	13.1 (65)	16.9 (71)
45 – 49	18.2 (167)	19.0 (94)	17.3 (73)
50 – 54	17.8 (163)	16.2 (80)	19.7 (83)
55 – 59	14.7 (135)	18.4 (91)	10.5 (44)
60 – 64	9.7 (89)	10.1 (50)	9.3 (39)
65 – 69	6.4 (59)	7.9 (39)	4.8 (20)
70 – 74	2.2 (20)	3.0 (15)	1.2 (5)
75 – 79	1.4 (13)	1.6 (8)	1.2 (5)
80 – 84	0.5 (5)	0.2 (1)	1.0 (4)
85 – 89	0.1 (1)	0.0 (0)	0.2 (1)
Ethnicity		**% (N)**	
White ■	97.7 (887)	97.6 (479)	97.8 (408)
Other ■	2.3 (21)	2.4 (12)	2.2 (9)
Education Attainment ++		**% (N)**	
Primary education only	9.6 (88)	10.9 (54)	8.1 (34)
Some or completed secondary education	42.7 (392)	46.8 (232)	37.9 (160)
Some or completed Third Level education	47.7 (438)	42.3 (210)	54 (228)
Marital Status		**% (N)**	
Married/Cohabiting	77.6 (712)	78.0 (391)	77.0 (321)
Separated/Divorced	4.7 (43)	4.2 (21)	5.3 (22)
Widowed	2.0 (18)	2.2 (11)	1.7 (7)
Single	10.3 (95)	10.0 (50)	10.8 (45)
In a relationship	5.4 (50)	5.6 (28)	5.3 (22)
Housing Status		**% (N)**	
Live Alone	13.4 (122)	14.6 (72)	12.0 (50)
Live with family/wife/partner	85.2 (776)	83.8 (415)	86.8 (361)
Live with friends	1.4 (13)	1.6 (8)	1.2 (5)
Employment Status		**% (N)**	
Employed (full time)	46.9 (431)	43.0 (215)	51.7 (216)
Self-employed	17.9 (164)	17.8 (89)	17.9 (75)
Looking after home/family	2.1 (19)	2.8 (14)	1.2 (5)
Student	1.6 (15)	1.8 (9)	1.4 (6)
Unable to work due to illness/disability	3.6 (33)	4.2 (21)	2.9 (12)
Employed (part time)	8.2 (75)	8.6 (43)	7.7 (32)
Unemployed and looking for work	7.2 (66)	8.0 (40)	6.2 (26)
Retired from paid work	12.0 (110)	12.8 (64)	11.0 (46)
Volunteer	0.5 (5)	1.0 (5)	0.0 (0)
Paid Employment Only			
Time off work in last 12 weeks	15.0 (140)	12.3 (62)	18.2 (78)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; m = metres; kg = kilograms; Δ = All participants were at least 18 years of age in September 2015 (Chapter 3, Section 3.3); ■ White = Irish, Irish Traveller, Any other white background, Other = Any other African, Asian, black or mixed background. ** denotes significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined using an Independent T-Test. ++ denotes significant difference ($p<0.05$) between the IG vs CG determined by Chi-Square.

Table 4.2.1(b) Participant baseline self-reported health status and lifestyle factors

	Total	IG	CG
Health Status		**% (N)**	
Excellent	4.8 (44)	5.2 (26)	4.3 (18)
Very Good	23.3 (213)	20.5 (102)	26.6 (111)
Good	34.8 (319)	33.9 (169)	36.0 (150)
Average	31.8 (291)	34.5 (172)	28.5 (119)
Poor	5.2 (48)	5.8 (29)	4.6 (19)
Health Problems		**% (N)**	
Yes	34.9 (326)	39.3 (182)	36.6 (144)
No	56.7 (530)	60.7 (281)	63.4 (249)
Health Services (in last 12W)		**% (N)**	
General Practitioner			
Yes	32.9 (286)	34.1 (160)	31.6 (126)
No	67.1 (582)	65.9 (309)	68.4 (273)
Physiotherapist			
Yes	12.1 (91)	12.9 (51)	11.2 (40)
No	87.9 (663)	87.1 (345)	88.8 (318)
Other Health Related Services			
Yes	13.6 (103)	14.3 (59)	12.8 (44)
No	86.4 (656)	85.7 (355)	87.2 (301)
Prescription Medication (in last 12W)		**% (N)**	
Yes	47.4 (427)	50.1 (243)	44.3 (184)
No	52.6 (473)	49.9 (242)	55.7 (231)
WEMWBS Category at Baseline		**% (N)**	
Below Average (≤42)	13.5 (116)	15.8 (74)	10.7 (42)
Average (41 – 59)	71.1 (613)	69.7 (326)	72.8 (287)
Above Average (≥60)	15.4 (133)	14.5 (68)	16.5 (65)
Social Integration		**% (N)**	
Socially Isolated	13.5 (118)	14.3 (69)	14.5 (49)
Moderately Isolated	19.8 (173)	21.3 (103)	20.8 (70)
Moderately Integrated	29.9 (261)	29.2 (141)	35.6 (120)
Socially Integrated	46.8 (222)	35.2 (170)	29.1 (98)
Active Participation in Groups		**% (N)**	
Yes	53.0 (424)	45.6 (208)	62.8 (216)
No	45.4 (363)	52.4 (239)	36.0 (124)
Unknown	1.6 (13)	2.0 (9)	1.2 (4)
How often attend religious services?		**% (N)**	
Never or almost never	25.0 (199)	21.4 (98)	29.7 (101)
Once or twice a year	13.3 (106)	12.3 (56)	14.7 (50)
Every couple of months	13.9 (111)	14.9 (68)	12.6 (43)
Once or twice a month	14.9 (119)	15.8 (72)	13.8 (47)
Once a week	27 (215)	30.6 (140)	22.1 (75)
More than once a week	4.0 (32)	3.7 (17)	4.4 (15)
Unknown	1.9 (15)	1.3 (6)	2.6 (9)
How men found out about MOM		**% (N)**	
Word of mouth	31.2 (286)	32.8 (164)	29.3 (122)
Referred	3.8 (35)	2.6 (13)	5.3 (22)
Health Professional	2.0 (18)	1.0 (5)	3.1 (13)
Local service club	16.2 (148)	7.4 (37)	26.7 (111)
Newspaper/Media/Social Media	23.3 (213)	34.2 (171)	10.1 (42)
Local Sports Partnership	10.3 (94)	7.6 (38)	13.5 (56)
Family	8.4 (77)	8.0 (40)	8.9 (37)
Other	4.9 (45)	6.4 (32)	3.1 (13)

Key: WEMWBS = Warwick-Edinburgh Mental Well-being Scale; IG = Intervention Group; CG = Comparison-in-waiting Group; N = number

Table 4.2.1(c) Participant baseline health indicators

	Total	IG	CG
Physical Measures	**Mean±SD (N) / Median (IQR)**		
Weight (kg) **	92.7±16.0 (927)	94.2±16.0 (501)	91.0±15.9 (426)
BMI (kg/m^2) **	30.2±4.9 (926)	30.8±4.7 (501)	29.4±5.0 (425)
Waist Circumference (cm) **	105.1±13.0 (918)	107.7±12.4 (495)	102.1±13.1 (423)
Time-to-complete 1 mile (min:dec) **	13.3±3.5 (797)	13.9±3.1 (435)	12.6±3.9 (362)
VO_{2max} (ml/kg/min) **	21.2±7.4 (797)	19.6±6.1 (435)	23.1±8.4 (362)
METS **	6.1±2.1 (797)	5.6±1.7 (435)	6.6±2.4 (362)
Number of days Physical Activity per week totalling 30 minutes or more **	3.0 (1.0 – 4.0)	3.0 (1.0 – 4.0)	3.0 (2.0 – 5.0)
Portions of Fruit and/or Vegetables consumed day prior to Health Check	4.0 (3.0 – 5.0)	4.0 (3.0 – 5.0)	4.0 (3.0 – 5.0)
Number of Cigarettes per day	15.0 (5.0 – 20.0)	15.0 (5.0 – 20.0)	11.0 (5.0 – 20.0)
Number of Alcohol Units consumed on average	9.0 (6.0 – 12.0)	9.0 (6.0 – 12.0)	9.0 (6.0 – 12.0)
Number of days per week Alcohol consumed	2.0 (1.0 – 3.0)	2.0 (1.0 – 3.0)	2.0 (1.0 – 3.0)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; kg = kilograms; cm = centimetres; BMI = Body Mass Index; m^2 = metres squared; ++ denote significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined by Chi-Square. yrs = years; ACSM = American College of Sports Medicine; VO_{2max} = maximal oxygen consumption; ml/kg/min = millilitres per kilogram per minute. BMI & WC based on World Health Organisation Classifications (World Health Organisation, 2008)
** denotes significant difference ($p<0.05$) between the IG vs CG determined using an Independent T-Test.

4.2.1 Body mass index (kg/m^2)

Body Mass Index (kg/m^2) scores were categorised in accordance with the WHO cut off points presented in Table 4.2.2 below. At baseline BMI (kg/m^2) was recorded for 926 participants, with the mean BMI being 30.2±4.9 kg/m^2; range 17.40–53.10 kg/m^2. Overall, 45.5% of men were in the obese categories (31.6% class 1, 9.5% class 2, 4.4% class 3), with an additional 44.2% of men classified as overweight. Only 10.2% (n=94) of men were considered to be in the normal category with one participant in the underweight category.

Table 4.2.2 Baseline percentage of participants (n=926) in each BMI (kg/m^2) category

	Total	IG	CG
BMI (kg/m^2)		% (N)	
Underweight (<18.50)	0.1 (1)	0.2 (1)	0.0 (0)
Normal (18.50 – 24.99)	10.2 (94)	6.9 (35)	13.9 (59)
Overweight (25.00 – 29.99)	44.2 (409)	39.9 (200)	49.2 (209)
Obese Class 1 (30.00 – 34.99)	31.6 (293)	36.7 (184)	25.6 (109)
Obese Class 2 (35.00 – 39.99)	9.5 (88)	12.0 (60)	6.6 (28)
Obese Class 3 (≥40.00)	4.4 (41)	4.2 (21)	4.7 (20)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; N = number; BMI = Body Mass Index; kg = kilograms; m^2 = metres squared. BMI based on World Health Organisation Classifications (WHO 2010)

4.2.2 Waist circumference (cm)

Waist circumference (cm) measurements were classified in accordance with the WHO risk categories identified in Table 4.2.3. Waist circumference results placed 54.5% (n=500) and 29.4% (n=270) in the 'high-risk' and 'increased-risk' categories respectively for metabolic complications (World Health Organisation, 2008). Just one in six (16.1%) were within the 'healthy' WC range.

Table 4.2.3 Baseline percentage of participants (n=918) classified by waist circumference (cm) risk category

	Total	IG	CG
Waist Circumference (cm) (WHO, 2010)		**% (N)**	
Healthy (<94cm)	16.1 (148)	9.9 (49)	23.4 (99)
Increased Risk (94 – 102cm)	29.4 (270)	26.5 (131)	32.9 (139)
High Risk (>102cm)	54.5 (500)	63.6 (315)	43.7 (185)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; cm = centimetres. WC based on World Health Organisation Classifications (World Health Organisation, 2008)

4.2.3 Physical fitness

Baseline fitness levels were categorised according to American College of Sports Medicine (ACSM) age-standardised fitness levels (Brubaker, Otto and Whaley, 2006), Table 4.2.4(b). Results placed the majority (89.0%, n=709) in the 'poor' physical fitness category (expressed in VO_{2max}; ml/kg/min), 60.7% (n=474) of which were aged between 40-59 years.

Table 4.2.4(a) Baseline overview of participants (n=797) time-to-complete 1 mile (m:dm)

Outcome Measure	Mean ± SD	Range
Time-to-complete 1 Mile (m:dm)	13:27 ± 3.54	06:17 – 30:77
VO_{2max} Estimation (ml/kg/min)	21.21 ± 7.45	5.62 – 46.91
METS Estimation	6.06 ± 2.13	1.60 – 13.40

Key: SD = Standard Deviation; m:dm = minutes:decimal minutes; VO_{2max} = maximal oxygen consumption; ml/kg/min = millilitres per kilogram per minute; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min (Kodama *et al.,* 2009)

Table 4.2.4(b) Baseline participants (n=797) level of fitness

Age (yrs)	ACSM Standards for VO_{2max} (ml/kg/min) % (N)					Total % (N)
20-29	Poor	Fair	Average	Good	Excellent	
	<37	37-41	41-44	44-48	>48	
	2.4 (19)	0.4 (3)	0.0 (0)	0.0 (0)	0.0 (0)	2.8 (22)
30-39	Poor	Fair	Average	Good	Excellent	
	<35	36-39	39-43	43-47	>47	
	8.5 (68)	1.5 (12)	0.4 (3)	0.9 (7)	0.0 (0)	11.3 (90)
40-49	Poor	Fair	Average	Good	Excellent	
	<33	33-36	36-40	40-44	>44	
	29.9 (238)	0.9 (7)	1.6 (13)	0.3 (2)	0.0 (0)	32.6 (260)
50-59	Poor	Fair	Average	Good	Excellent	
	<30	30-34	34-37	37-41	>41	
	30.9 (246)	1.3 (10)	0.6 (5)	0.3 (2)	0.0 (0)	33.0 (263)
60+	Poor	Fair	Average	Good	Excellent	
	<27	27-30	30-34	34-38	>38	
	17.3 (138)	1.0 (8)	0.3 (2)	0.1 (1)	0.0 (0)	18.7 (149)
Other			N/A			1.6 (13)
Total	**89.0 (709)**	**5.0 (40)**	**2.9 (23)**	**1.5 (12)**	**0.0 (0)**	**100.0 (797)**

Key: yrs = years; ACSM = American College of Sports Medicine; VO_{2max} = maximal oxygen consumption; ml/kg/min = millilitres per kilogram per minute; N = number

4.2.4 Cardiovascular disease risk factors

As noted in Section 3.4.3, six modifiable cardiovascular disease (CVD) risk factors were identified based on international guidelines (World Health Organisation, 2013; <3 days physical activity (PA), WC >102cm, a smoker, alcohol consumption >17 units, on BP medication and cholesterol medication). Table 4.2.5 presents the number of CVD risk factors attributed to men who presented at baseline. The majority (85.5%) presented with at least one risk factor, whilst over half (53.1%) had two or more risk factors. Over half of participants were found to be 'at risk' by being 'inactive' (59.2%) and/or having a WC in excess of 102cm (57.3%). It should be noted that only 9.1% of participants were in excess of the 17-unit threshold for alcohol consumption recommended in current Irish guidelines (HSE "Alcohol Programme," 2017), however this percentage significantly increases to 19.5% when the European threshold (14 Units) for 'excess alcohol consumption' is applied (Piepoli *et al.*, 2016). Approximately one in ten were 'at risk' by being current smokers (13.3%), on blood pressure (8.9%) or on cholesterol (7.6%) medication.

Table 4.2.5 Prevalence of identifiable modifiable cardiovascular disease risk factors presented at baseline

	Total	IG	CG
Number of days Physical Activity per week totalling 30 minutes or more		**% (N)**	
Never	**25.7 (231)**	28.7 (140)	22.1 (91)
1 Day	**17.5 (157)**	19.9 (97)	14.6 (60)
2 Days	**15.9 (143)**	15.8 (77)	16.1 (66)
3 Days	**17.2 (155)**	16.6 (81)	17.9 (74)
4 Days	**7.7 (69)**	6.6 (32)	9.0 (37)
5 Days	**5.9 (53)**	4.5 (22)	7.5 (31)
6 Days	**2.8 (25)**	2.9 (14)	2.7 (14)
7 Days	**7.2 (65)**	4.9 (24)	10.0 (41)
Portions of Fruit and/or Vegetables consumed day prior to Health Check		**% (N)**	
None	**5.9 (54)**	4.6 (23)	7.5 (31)
1	**12.2 (111)**	11.4 (57)	13.1 (54)
2	**22.4 (204)**	25.3 (126)	19.0 (78)
3	**25.2 (229)**	25.9 (129)	24.3 (100)
4	**18.4 (167)**	17.9 (89)	19.0 (78)
5	**9.6 (87)**	9.8 (49)	9.2 (38)
6	**3.5 (32)**	2.8 (14)	4.4 (18)
7+	**2.8 (25)**	2.2 (11)	3.4 (14)
Weekly Alcohol Consumption		**% (N)**	
Yes	**80.5 (737)**	77.7 (387)	83.7 (350)
No	**19.5 (179)**	22.3 (111)	16.3 (68)
Alcohol Consumption ≥17 Units (Ireland)	**9.1 (66)**	9.3 (36)	8.9 (30)
Smoking Status		**% (N)**	
Never Smoked	**49.5 (454)**	49.9 (249)	49.0 (205)
Former Smoker	**37.2 (341)**	39.3 (196)	34.7 (145)
Current Smoker	**13.3 (122)**	10.8 (54)	16.3 (68)
If current smoker, how many per day?			
1-10 cigarettes per day	**11.9 (54)**	4.0 (20)	7.9 (34)
11-20 cigarettes per day	**12.1 (56)**	6.0 (30)	6.1 (26)
20+ cigarettes per day	**2.7 (12)**	0.8 (4)	1.9 (8)
Prevalence of Risk Factors		**% (N)**	
Zero Risk Factors	**14.5 (135)**	10.3 (52)	19.3 (83)
1 Risk Factor	**32.4 (303)**	29.3 (148)	36.1 (155)
2 Risk Factors	**35.7 (333)**	40.4 (204)	30.1 (129)
3 Risk Factors	**13.2 (123)**	14.3 (72)	11.9 (51)
4 Risk Factors	**3.7 (35)**	4.9 (25)	2.3 (10)
5 Risk Factors	**0.5 (5)**	0.8 (4)	0.2 (1)
Risk Factor		**% (N)**	
<3 Days Physical Activity	**59.2 (532)**	64.5 (314)	53.0 (218)
Waist Circumference >102cm	**57.3 (526)**	67.3 (333)	45.6 (193)
Alcohol Consumption ≥17 Units (Ireland)	**9.1 (66)**	9.3 (36)	8.9 (30)
Current Smoker	**13.3 (122)**	10.8 (54)	16.3 (68)
Blood Pressure Medication	**8.9 (83)**	10.7 (54)	6.8 (29)
Cholesterol Medication	**7.6 (71)**	9.7 (49)	5.2 (22)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; cm = centimetre. BMI & WC based on World Health Organisation Classifications (World Health Organisation, 2008)

[1] Note, the WHO (2016) criteria for 'inactive (<3 days per week) and therefore 'at risk' of CVD is different to National PA Guidelines (30mins or more at least 5 days per week; DoH, 2009)

The dataset was examined to explore possible associations between socio-demographic variables (educational attainment, marital status, home status, employment status) and the prevalence of these risk factors. Men with no more than second level education had

a lower level of fitness (METs; Primary or Secondary Education = 5.7, Third Level Education = 6.4, $p<0.001$), and men who lived alone also had a lower level of fitness (METs; Living Alone = 5.4, Living with others = 6.2, $p=0.002$). No association was found between these socio-demographic factors and any other risk factor.

4.2.5 Similarity of intervention and comparison groups at baseline

Additional analysis was undertaken to assess the similarity of the intervention and comparison groups at baseline. Table 4.2.1(c) presents significant ($p<0.05$) group differences for primary outcome measures; weight, BMI, WC, time-to-complete one mile / METS, and significant percentage group difference for the 'Number of days physical activity per week totalling 30 minutes or more' ($p=0.005$). Table 4.2.1(a) presents significant ($p<0.05$) percentage group differences for 'Ethnicity' ($p=0.005$) and 'Level of Education' ($p=0.002$).

4.3 Impact of Intervention

4.3.1 Change scores for primary outcome measures

The change scores from baseline at 12W, 26W and 52W are presented in Table 4.3.1 for bodyweight (kg), BMI (kg/m^2), WC (cm) and aerobic fitness (METS). To be included, the participant needed to be present at baseline and at the subsequent time-point in question. Significant changes were observed in the IG for all outcome measures at each time-point.

Table 4.3.1 Change scores of the IG and CG between baseline and 12, 26 and 52 weeks

	Baseline	Baseline to 12W	Baseline to 26W	Baseline to 52W
		Mean Difference±SE (N)		
Weight (kg)				
IG	94.12±16.04 (501)	-1.67±0.29* (250)	-1.92±0.32* (178)	-2.07±0.27* (174)
CG	91.01±15.87# (426)	0.05±0.19 (258)	0.03±0.19 (200)	-0.18±0.19 (216)
BMI (kg/m^2)				
IG	30.83±4.67 (501)	-0.55±0.09* (250)	-0.64±0.11* (177)	-0.68±0.09* (174)
CG	29.40±4.96# (425)	0.02±0.06 (258)	0.01±0.806 (200)	-0.06±0.06 (216)
Waist Circumference (cm)				
IG	107.71±12.44 (495)	-4.67±0.62* (246)	-4.51±0.87* (171)	-3.88±0.64* (170)
CG	102.12±13.08# (423)	-0.13±0.43 (255)	-1.82±0.47 (197)	-0.72±0.42 (211)
Fitness (METS)				
IG	5.61±1.75 (435)	2.27±0.28* (216)	2.34±0.29* (124)	1.32±0.13* (119)
CG	6.60±2.41# (362)	0.07±0.14 (212)	0.45±0.17 (162)	0.40±0.14 (150)

Key: W = week; SD = Standard Deviation; N = number; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; IG = Intervention Group; CG = Comparison-in-waiting Group; cm = centimetre; kg = kilogram; BMI = Body Mass Index; m^2 = metre squared. # = statistical significance ($p<0.05$) compared to group baseline score. * = statistical significance ($p<0.05$) compared to change score in CG. The analysis takes into account the change between groups from baseline.

4.3.2 Weight (kg)

The changes in bodyweight and percentage body weight difference between groups are presented in Table 4.3.1 and Table 4.3.2. There was a decrease ($p<0.05$) in bodyweight in the IG at 12W, 26W and 52W (~1.7 – 2.1 kg) representing a significant percentage

decrease ($p<0.05$) in body weight (~1.8% - 2.2%). There was no change from baseline in the CG at any time-point. The initial intervention effect on bodyweight of -1.67 kg at 12W represents a medium effect size (δ 0.64) which was maintained at 26W (δ 0.62) and 52W (δ 0.50).

4.3.3 Body mass index (kg/m^2)

The changes in BMI (kg/m^2) between groups are presented in Table 4.3.1 and Table 4.3.2. There was a decrease ($p<0.05$) in bodyweight in the IG at 12W, 26W and 52W (~0.6 – 0.7 kg/m^2) representing a significant percentage decrease ($p<0.05$) in BMI (~1.8% - 2.2%). There was no change from baseline in the CG at any time-point. The initial intervention effect on BMI of -0.55 at 12W represents a medium effect size (δ 0.64) which was maintained at 26W (δ 0.63) and 52W (δ 0.49).

4.3.4 Waist circumference (cm)

The changes in WC between groups are presented in Table 4.3.1 and Table 4.3.2. There was a significant reduction ($p<0.05$) in WC in the IG at 12, 26 and 52W (~4.7 – 3.9cm) representing a significant percentage decrease ($p<0.05$) in WC (~4.3% - 3.6%). There was no change from baseline in the CG at any time-point. The initial intervention effect on WC of -4.67cm at 12W represents a large effect size (δ 0.98) with a medium effect size of 0.55 and 0.60 at 26W and 52W respectively.

4.3.5 Time-to-complete one mile (m:dm) / Aerobic fitness (METS)

The changes in aerobic fitness (METS), based on the time-to-complete 1 mile results, are presented in Table 4.3.1 and Table 4.3.2. There was a significant improvement ($p<0.05$) in aerobic fitness for the IG at 12W, 26W and 52W (~2.3 – 1.3 METS) representing a significant percentage improvement ($p<0.05$) in aerobic fitness (~2.2% - 0.9%). There were small increases in aerobic fitness of less than 0.5 METS in the CG at 26W and 52W. The initial intervention effect on aerobic fitness of ~2.3 METS at 12W represents a large effect size (δ 1.18) which was maintained to 26W (δ 1.05), with a medium effect size (δ 0.60) at 52W.

Table 4.3.2 Mean difference of IG and CG change scores at 12, 26 and 52 weeks for fitness and fatness variables

	N	IG	CG	Difference between groups (95% CI)	Effect Size *	p-value for difference between groups
Body weight (kg)						
12W	508	-1.67 (0.18)	+0.05 (0.14)	-1.72 (95% CI -2.16 – -1.27) [a]	0.64	<0.001
26W	378	-1.92 (0.24)	+0.03 (0.20)	-1.94 (95% CI -2.55 – -1.33)	0.62	<0.001
52W	390	-2.07 (0.31)	-0.18 (0.22)	-1.89 (95% CI -2.62 – -1.16)	0.50	<0.001
Percentage body weight (%)						
12W	508	-1.76 (0.18)	+0.13 (0.16)	-1.89 (95% CI -2.36 – -1.42) [a]	0.66	<0.001
26W	378	-2.06 (0.26)	+0.10 (0.21)	-2.16 (95% CI -2.82 – -1.51)	0.64	<0.001
52W	390	-2.22 (0.32)	-0.19 (0.24)	-2.03 (95% CI -2.81 – -1.27)	0.51	<0.001
Body Mass Index						
12W	508	-0.55 (0.06)	+0.02 (0.47)	-0.57 (95% CI -0.71 – -0.42) [a]	0.64	<0.001
26W	377	-0.64 (0.08)	+0.01 (0.06)	-0.66 (95% CI -0.46 – -0.86)	0.63	0.18
52W	306	-0.68 (0.09)	-0.06 (0.06)	-0.61 (95% CI -0.37 – -0.86)	0.49	0.13
Waist Circumference (cm)						
12W	501	-4.67 (0.28)	-0.13 (0.23)	-4.54 (95% CI -5.25 – -3.83) [a]	0.98	<0.001
26W	368	-4.51 (0.40)	-1.82 (0.30)	-2.70 (95% CI -3.66 – -1.73) [a]	0.55	<0.001
52W	381	-3.88 (0.40)	-0.72 (0.33)	-3.16 (95% CI -4.18 – -2.14)	0.60	<0.001
Fitness (METS)						
12W	428	+2.27 (0.12)	+0.07 (0.08)	+2.20 (95% CI 1.91 – 2.48) [a]	1.18	<0.001
26W	286	+2.34 (0.16)	+0.45 (0.10)	+1.89 (95% CI 1.52 – 2.27)	1.05	<0.001
52W	269	+1.31 (0.17)	+0.40 (0.09)	+0.93 (95% CI 0.57 – 1.28)[a]	0.60	<0.001

Note: N = Number; IG = Intervention Group; CG = Comparison-in-waiting Group; CI = Confidence Interval; kg = kilogram; W = weeks; cm = centimetre; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min

* = Effect Size calculated using Cohen's d (0.2 is a small effect, 0.5 is a medium effect and 0.8 is a large effect).

[a] = significantly different to mean difference in IG and CG change scores at previous time-point.

4.3.6 Secondary outcome measures

Table 4.3.3 presents frequencies for mental well-being and social integration for all men who presented at baseline, 12, 26 and 52 weeks. The results suggest a positive intervention effect ($p<0.05$) on mental well-being with a significant increase in those categorised 'above average' at 12, 26 and 52 weeks, with no intervention effect on social integration.

Table 4.3.3 Frequencies and mean values for secondary outcomes for all men who presented at baseline, 12, 26 and 52 weeks

		Baseline	12W	26W	52W
		Mean±SD (N) / % (N)			
Mental Well-being (WEMWBS)					
IG	Below Average (≤42)	15.7 (73)	9.9 (21)	5.6 (9)	8.2 (13)
	Average (41 – 59)	69.7 (325)	67.9 (144)	72.8 (118)	70.3 (111)
	Above Average (≥60)	14.6 (68)	22.2 (47) #	21.6 (35) #	21.5 (34) #
	Total N	**(466)**	**(212)**	**(162)**	**(158)**
CG	Below Average (≤42)	10.7 (42)	10.0 (25)	11.1 (21)	9.7 (19)
	Average (41 – 59)	72.8 (286)	70.7 (169)	70.9 (134)	71.9 (141)
	Above Average (≥60)	16.5 (65)	19.2 (46)	18.0 (34)	18.4 (36)
	Total N	**(393)**	**(240)**	**(189)**	**(196)**
Social Integration					
IG	Socially Isolated	14.3 (69)	12.7 (28)	9.3 (15)	10.9 (17)
	Moderately Isolated	21.4 (103)	15.0 (35)	19.1 (31)	20.5 (32)
	Moderately Integrated	29.3 (141)	32.3 (71)	29.6 (48)	27.6 (43)
	Socially Integrated	35.0 (169)	39.1 (86)	41.9 (68)	41.0 (64)
	Total N	**(482)**	**(220)**	**(162)**	**(156)**
CG	Socially Isolated	12.6 (49)	13.4 (32)	12.7 (24)	9.3 (19)
	Moderately Isolated	17.9 (70)	21.3 (51)	19.6 (37)	25.5 (52)
	Moderately Integrated	30.5 (119)	26.4 (63)	30.7 (58)	30.4 (62)
	Socially Integrated	38.9 (152)	38.9 (93)	37.1 (70)	34.8 (71)
	Total N	**(390)**	**(239)**	**(189)**	**(204)**

Key: W = week; N = number; IG = Intervention Group; CG = Comparison-in-waiting Group; WEMWBS = Warwick-Edinburgh Mental Well-being Scale. # = statistical significance ($p<0.05$) compared to group baseline score.

4.3.7 Intervention targets

The MOM intervention targeted a 5% reduction in body weight, a 5 cm reduction in WC and a 1 MET increase in physical fitness following the initial 12-week intervention, as well as the 26 and 52-week follow-up data collection time-points. Table 4.3.4 presents the best- and worst-case scenario for the percentage of men who achieved targeted changes in fitness and fatness at 12W, 26W and 52W, as well as the likelihood of achieving the target if allocated to the IG. Two separate analyses are presented. The first calculates the success rate by dividing the numbers achieving the target by the numbers who were retested at at each time-point. The second analysis (in parenthesis) is more

conservative and in line with the intention to treat principle, assuming that all those who did not re-present at 12W did not meet the target. The numbers meeting the target are divided by the total numbers who were tested at baseline. When all IG programme participants (i.e. those who had some participation beyond baseline) are included in the denominator with imputation for missing data, the percentage success rates are reduced, particularly at the 52W time-point (Table 4.3.4).

The 1 MET increase in aerobic fitness targeted in the intervention was achieved by 73%, 71% and 51% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 4.3.4). Of the 548 men who were aerobically fitness tested at any time-point post-baseline, the estimated aerobic fitness success rates, with imputation for missing data, were 69%, 44% and 31% at 12W, 26W and 52W respectively (Table 4.3.4). The probability of achieving the 1 MET increase in aerobic fitness target for example was between 2 and 4 times higher, depending on time-point if allocated to the IG. A small percentage of the CG also achieved the 1 MET increase in fitness at specific time-points though the probability of achieving the 1 MET increase was up to 4 times higher in the IG (Table 4.3.4).

The 5% reduction in bodyweight targeted in the intervention was achieved by 13%, 16% and 22% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 4.3.4). Of the 628 men whose weight was assessed at any time-point post-baseline, the estimated reduction in body weight success rates, with imputation for missing data, were 13%, 12% and 14% at 12W, 26W and 52W respectively (Table 4.3.4). The probability of achieving the 5% weight reduction target for example was between 3 and 10 times higher, depending on time-point if allocated to the IG. A small percentage of the CG also achieved the 5% reduction in bodyweight at specific time-points, though the probability of achieving the 5% reduction in bodyweight was significantly higher in the IG (Table 4.3.4).

The targeted 5cm reduction in WC in the intervention was achieved by 48%, 45% and 42% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 4.3.4). The probability of achieving the 5cm reduction in WC target for example was between 2 and 5 times higher, depending on time-point if allocated to the IG. Of the 624 men whose WC was assessed at any time-point post-baseline, the

estimated reduction in WC success rates, with imputation for missing data, were 44%, 31% and 26% at 12W, 26W and 52W respectively (Table 4.3.4). A small percentage of the CG also achieved the targeted changes at specific time-points, though the probability of achieving the 5 cm reduction in WC was significantly higher in the IG (Table 4.3.4).

Table 4.3.4 Best- and worst-case scenario for the percentage of men who achieved targeted changes in fitness and fatness at 12, 26 and 52 weeks

	N = without imputation (N = with imputation)	IG	CG	Relative Risk of achieving target in IG
FITNESS (METS)				
1 MET increase in fitness @ 12W	428	73.1%	18.4%	3.98 (95% CI 2.96 – 5.34)
	(548)	(68.5%)	(18.3%)	3.74 (95% CI 2.85 – 4.91)
1 MET increase in fitness @ 26W	286	71.0%	24.7%	2.87 (95% CI 2.15 – 3.85)
	(548)	(43.5%)	(19.5%)	2.23 (95% CI 1.68 – 2.97)
1 MET increase in fitness @ 52W	269	51.3%	20.0%	2.56 (95% CI 1.78 – 3.69)
	(548)	(31.4%)	(13.9%)	2.00 (95% CI 1.61 – 3.19)
WAIST CIRCUMFERENCE				
5cm reduction in waist circumference @12W	501	48.4%	10.4%	4.66 (95% CI 3.19 – 6.81)
	(624)	(44.3%)	(10.6%)	4.19 (95% CI 2.94 – 5.88)
5cm reduction in waist circumference @26W	375	45.4%	20.4%	2.23 (95% CI 1.62 – 3.06)
	(624)	(30.6%)	(15.2%)	2.02 (95% CI 1.48 – 2.75)
5cm reduction in waist circumference @52W	389	42.0%	15.8%	2.65 (95% CI 1.86 – 3.78)
	(624)	(26.1%)	(12.6%)	2.08 (95% CI 1.47 – 2.94)
WEIGHT				
5% reduction in bodyweight @12W	511	13.5%	1.5%	8.81 (95% CI 3.17 – 24.45)
	(628)	(13.0%)	(1.3%)	10.19 (95% CI 3.69 – 28.10)
5% reduction in bodyweight @26W	378	16.3%	4.5%	3.62 (95% CI 1.76 – 7.44)
	(628)	(12.1%)	(3.8%)	3.15 (95% CI 1.68 – 5.91)
5% reduction in bodyweight @52W	391	21.8%	5.5%	3.95 (95% CI 2.13 – 7.32)
	(628)	(13.7%)	(4.8%)	2.85 (95% CI 1.62 – 5.02)

Note: N = number; IG = Intervention Group; CG = Comparison-in-waiting Group; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; W = week; CI = Confidence Interval; cm = centimetre; % = percentage.

Percentages have as the denominator those who presented for retesting at each time-point and also (in parenthesis) all those who engaged with the programme beyond the baseline assessments with imputation for missing data

4.3.8 Comparison of programme intervention group participants (n=315) vs early dropouts (n=186)

At baseline, those allocated to the IG who went on to participate in the programme were slightly older, had higher levels of aerobic fitness, were more physically active, and had a lower bodyweight and WC, compared to those who were classified as early dropouts (all $p<0.05$; Table 4.3.5). Compared to early dropouts, fewer programme participants self-reported health problems and more were in full-time employment or self-employment ($p<0.05$; Table 4.3.5).

Table 4.3.5 Baseline characteristics of intervention group participants (n=315) and early dropouts (n=186)

	Participants (PT)	**Dropouts (DO)**	
	Mean±SD (N) / Mean (IQR) / % (N)		p-value
Age, Fitness and Fatness			
Age (years)	52.7±10.2 (311)	50.7±10.9 (182)	p=0.040
Weight (kg)	92.2±14.1 (315)	97.3±18.5 (186)	p<0.001
Waist Circumference (cm)	105.9±10.8 (310)	110.7±14.3 (185)	p=0.003
BMI (kg/m^2)	30.1±4.1 (315)	32.1±5.3 (186)	p=0.010
METS	5.7±1.8 (294)	5.3±1.7 (139)	p=0.022
Mental well-being and social integration			
Mental Well-Being (WEMWBS)	51.61±7.8 (297)	49.64±8.6 (169)	p=0.140
Social Integration (BSSNI)	16.43±6.1 (272)	16.38±6.1 (146)	p=0.623
Perceived health status and self-reported health behaviours			
% self-reporting health problems	32.9 (96)	50.6 (86)	p<0.001
Physical activity >30minutes (days/week)	3.0 (1.0 – 4.0)	2.0 (1.0 – 4.0)	p=0.033
Previous day fruit and veg intake (portions)	4.0 (3.0 – 5.0)	4.0 (3.0 – 5.0)	p=0.359
% who are current drinkers	79.2 (248)	75.4 (138)	p=0.323
Weekly Alcohol Consumption [a]	8.0 (6.0 – 12.0)	10.0 (7.5 – 14.0)	p=0.086
% who currently smoke	9.3 (29)	13.5 (25)	p=0.144
Education, martial and employment status			
% reporting some third level education	43.7 (136)	39.9 (73)	p=0.404
% married/co-habiting [b]	79.9 (250)	74.7 (139)	p=0.180
% in full time employment or self-employed [c]	65.0 (204)	53.3 (98)	p=0.010

Key: PT = Participants (participant in intervention group who attended baseline and at least one other data collection); DO = Dropouts (participant in intervention group who attended baseline data collection only); SD = Standard Deviation; IQR = Inter-Quartile Range; % = percentage; N = number; kg = kilograms; cm = centimetres; BMI = Body Mass Index; m^2 = metres squared; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; WEMWBS = Warwick-Edinburgh Mental Well-being Scale; BSSNI = Berkman-Syme Social Network Index; Statistical Significance $p<0.05$.

a Alcohol Units; Pint = 2 units, ½ Pint = 1 unit, Glass of wine (large) = 2 units, Spirit measure = 1 unit.

b Other categories; separated/divorced, widowed, single, in a relationship

c Other categories; looking after family home, student, employed (part-time), unemployed, retired, volunteer, unable to work due to long-term illness

Note: It should be acknowledged that we did not follow-up with participants to ascertain reasons for drop-out.

4.4 Cost effectiveness of Men on the Move

4.4.1 Outcome measures relevant to cost effectiveness

Table 4.4.1 gives an overview of the descriptive statistics for the outcome measures relevant to the six dimensions identified in Brazier *et al.* (2002). The results indicate a significant ($p<0.05$) reduction of greater than 20% in time-to-complete one mile for the IG at 12-weeks, compared to an insignificant reduction for the CG. There were no significant changes at subsequent time-points for either group. These trends continue across all other outcome measures, i.e. significant improvements were observed for the IG following the 12W intervention which were maintained at 26 and 52 weeks.

Table 4.4.1 Descriptive data for the SF-6D for participants who attended baseline and at least one other data collection time-point

OUTCOME MEASURES		Baseline	12W	26W	52W
		Mean±SD (N) / % (N)			
Physical Measure – Time to complete 1 Mile (m:dm)					
IG		13.58±3.1 (294)	10.29±2.8 (219)	10.99±8.2 (132)	11.43±3.0 (126)
CG		12.48±3.9 (271)	12.04±3.5 (221)	11.76±3.8 (172)	11.78±3.9 (160)
Physical Measure – 1 Mile Categories					
IG	<8 minutes	3.1 (9)	23.4 (29)	24.1 (20)	7.7 (8)
	8:00 – 12:00 minutes	29.3 (86)	44.4 (55)	45.8 (38)	51.0 (53)
	12:01 – 15:00 minutes	34.7 (102)	25.8 (32)	18.1 (15)	39.4 (41)
	15:01 – 20:00 minutes	30.6 (90)	5.6 (7)	9.6 (8)	1.9 (2)
	>20 minutes	2.4 (7)	0.8 (1)	2.4 (2)	0.0 (0)
CG	<8 minutes	11.1 (30)	13.7 (37)	16.3 (33)	2.8 (6)
	8:00 – 12:00 minutes	39.1 (106)	40.6 (110)	42.9 (87)	37.3 (79)
	12:01 – 15:00 minutes	22.5 (61)	26.2 (71)	22.7 (46)	50.0 (106)
	15:01 – 20:00 minutes	24.4 (66)	17.3 (47)	13.8 (28)	9.9 (0)
	>20 minutes	3.0 (8)	2.2 (6)	4.4 (9)	0.0 (0)
Mental Well-being (WEMWBS)					
IG	Below Average	13.5 (40)	9.9 (21)	5.6 (9)	8.2 (13)
	Average	71.0 (211)	67.9 (144)	72.9 (118)	70.3 (111)
	Above Average	15.5 (46)	22.2 (47)	21.6 (35)	21.5 (34)
CG	Below Average	9.7 (28)	10.0 (24)	11.1 (21)	9.7 (19)
	Average	75.2 (218)	70.7 (169)	70.9 (134)	71.9 (141)
	Above Average	15.2 (44)	19.2 (46)	18.0 (34)	18.4 (36)
Social Functioning Measure					
IG	Socially Isolated	12.9 (39)	12.7 (28)	9.4 (15)	10.3 (16)
	Moderately Isolated	18.2 (55)	15.9 (35)	18.8 (30)	20.6 (32)
	Moderately Integrated	30.1 (91)	32.3 (71)	29.4 (47)	27.7 (43)
	Socially Integrated	38.8 (117)	39.1 (86)	42.5 (68)	41.3 (64)
CG	Socially Isolated	13.1 (38)	13.4 (32)	12.8 (24)	9.3 (19)
	Moderately Isolated	15.2 (44)	21.3 (51)	19.1 (36)	25.5 (52)
	Moderately Integrated	30.8 (89)	26.4 (63)	30.9 (58)	30.4 (62)
	Socially Integrated	40.8 (118)	38.9 (93)	37.3 (70)	34.8 (71)
Pain Measure – Self Reported Health					
IG	Excellent	6.1 (19)	10.1 (25)	9.9 (17)	11.1 (19)
	Very Good	24.0 (75)	36.0 (89)	37.2 (64)	36.3 (62)
	Good	36.2 (113)	34.8 (86)	34.3 (59)	30.4 (52)
	Average	38.8 (90)	17.0 (42)	18.0 (31)	20.5 (35)
	Poor	4.8 (15)	2.0 (5)	0.6 (1)	1.8 (3)
CG	Excellent	4.2 (13)	6.7 (17)	6.5 (13)	8.0 (17)
	Very Good	28.3 (87)	32.0 (81)	40.7 (81)	33.5 (71)
	Good	36.2 (111)	34.0 (86)	33.7 (67)	34.3 (73)
	Average	27.7 (85)	22.9 (58)	18.1 (36)	21.1 (45)
	Poor	3.6 (11)	4.3 (11)	1.0 (2)	2.8 (6)
Vitality – I've had energy to spare					
IG	All of the time	3.9 (12)	14.1 (19)	2.0 (2)	5.9 (6)
	Often	21.5 (66)	36.3 (49)	39.4 (39)	36.3 (37)
	Some of the time	45.9 (141)	38.5 (52)	49.5 (49)	48.0 (49)
	Rarely	24.1 (74)	11.1 (15)	8.1 (8)	7.8 (8)
	None of the time	4.6 (14)	0.0 (0)	1.0 (1)	2.0 (2)
CG	All of the time	4.6 (14)	6.7 (18)	3.5 (7)	6.8 (14)
	Often	28.4 (86)	35.9 (97)	36.3 (73)	33.3 (69)
	Some of the time	45.4 (138)	44.8 (121)	46.3 (93)	42.0 (87)
	Rarely	17.5 (53)	8.9 (24)	10.9 (22)	16.9 (35)
	None of the time	4.0 (12)	3.7 (10)	3.0 (6)	1.0 (2)

Key: W = week; SD = Standard Deviation; N = number; IG = Intervention Group; CG = Comparison-in-waiting Group; m:dm = minutes:decimal minutes; WEMWBS = Warwick-Edinburgh Mental Well-being Scale.

4.4.2 Cost calculations

The estimated costs of delivering and running the MOM programme across four counties are set out in Table 4.4.2. The estimated total cost of the programme was €63,035, which works out at €125.82 for each of the 501 participants in the IG. The majority of the costs were incurred during the implementation of the 12-week intervention, with minimal costs thereafter for the maintenance of the programme.

Table 4.4.2 Costs per Men on the Move programme

	Item	Cost		
		Baseline - 12W	**12W-26W**	**26W-52W**
Direct Costs	LSP Co-ordinator	€3,264		
	Branding (posters, flyers, wallet cards, health information booklet)	€610		
	PA Programme (PA Coordinator)	€4,800		
	In-door venue hire	€1,280		
	Workshop Delivery	€800		
	Hosting Celebration Event	€1,600		
	Group Maintenance (Supporting existing groups of vulnerable men* who cannot contribute to sustaining the programme)		€800	€915
	Equipment		€2,000	€2,285
Indirect Costs (For both groups)	Estimation of hours associated with planning, co-ordination, training, implementation, data collection, reflection and learning.	€32,245.76	€4,245.12	€8,190.08
Total Costs		**€44,600**	**€7,045**	**€11,390**

Key: W= week; LSP = Local Sport Partnership; PA = Physical Activity.
Note: Indirect Costs (Appendix K) were based on Post-Doc Mid-Scale Salary for Ireland (approximately €41,800 (Jan 2019) = €21.44 per hour; i.e. 52 weeks / 37.5 hours per week)
* = vulnerable men refers to participants who were unable to contribute to costs (typically €2 - €3 per session) associated with programme continuation following the initial 12-week LSP funded intervention. Participants were encouraged to take ownership of groups and contribute to costs associated with PA co-ordinator. LSPs provided funding (Group Maintenance) where needed.

Both direct and indirect costs (for both groups) are included; the direct costs include the co-ordination and management of the programme, as well as the delivery and participation in the training programme. In addition, resources required for data collection such as equipment to measure the physical performance of the participants and branding materials are included. All resources required to deliver the intervention were costed according to the price paid at the start of the MOM programme (September 2015). Indirect costs are those that occurred despite not being directly assigned to the

MOM programme. Time data was quantified based on the diary method, where the specific time spent on different tasks relating to the programme was registered in a diary (Landfeldt, Zethraeus and Lindgren, 2019). These included staff who, although not directly employed to work on the programme, contributed in the form of meetings, training, support and material development. This time data has been costed based on the proxy good method, also known as the replacement cost approach which values the time for different activities and tasks at a shadow price of a market substitute (Landfeldt, Zethraeus and Lindgren, 2019). In the case of the MOM programme, the market substitute price is taken as the hourly rate of €21.44. The salary grade of €41,800 is chosen based on mid-salary entry grade for Post-Doc in Ireland (Irish Universities Association, 2019).

4.4.3 Quality adjusted life years analysis

Details of the incremental benefits of the programme which are captured by the changes in Quality Adjusted Life Years (QALYs) from the programme are presented in Table 4.4.3.

Table 4.4.3 Utility analysis by group and across all time-points

Group	Time-point	N	Utility Scores			
			Baseline	12W	26W	52W
IG	**Baseline**	403	0.630	-	-	-
	12W	226	0.648	0.701	-	-
	26W	120	0.649	0.702	0.704	-
	52W	81	0.656	0.700	0.707	0.700
	Utility Change			0.053	0.002	-0.003
	(denotes change from BL)				(0.055)	(0.044)
	QALYs Gained			11.98	0.24	-0.57
CG	**Baseline**	322	0.664	-	-	-
	12W	211	0.666	0.662	-	-
	26W	140	0.670	0.668	0.675	-
	52W	107	0.670	0.668	0.668	0.674
	Utility Change			-0.004	0.007	0.006
	(denotes change from BL)				(0.005)	(0.004)
	QALYs Gained			-0.84	0.98	0.64

	Programme Costs	€44,600
	Costs per QALY for IG	€3,723

Key: N = number; BL = baseline; W = week; IG = Intervention Group; CG = Comparison-in-waiting Group; QALYs = Quality Adjusted Life Years; QALYs gained = N x Utility Change.

The results show higher utility scores for the IG at baseline when compared with the CG. However, those in the IG are shown to experience a utility increase greater than 0.7 (i.e. more than a 5% increase) which contrasts with a largely negligible increase in utility for the CG. The changes in utility scores post 12-weeks for both groups was insignificant; i.e. the benefits in utility values of over 5% rise were maintained by the IG while the average utility of those in the CG remains largely unaltered. This reinforces the findings in Table 4.4.1 which suggest that the MOM programme delivers an immediate benefit following the 12-week intervention, which is maintained when the programme ceases at this point.

The average utility improvement of 5.3% for the IG translates to 11.98 additional QALYs gained (226 participants x average of 5.3% improvement in utility per person). The QALYs gained or lost at subsequent time-points is insignificant in comparison to initial benefit achieved at 12-weeks. The results show insignificant changes in QALYs for the CG. Quality Adjusted Life Years ratio costs, calculated using incremental costs (Table 4.4.2) with QALYs (Table 4.4.3) which leads to the calculation of a cost per QALY ratio, were €3,723 (€44,600 ÷ 11.98) for the IG at 12-weeks.

Chapter 5 Discussion

Chapter 5 Discussion

This chapter will be presented in the following distinct sections;

1. Section 5.1; Baseline characteristics
2. Section 5.2; Impact of and participant flow through Men on the Move
3. Section 5.3; Cost effectiveness
4. Section 5.4; Limitations
5. Section 5.5; Conclusion / Contribution to existing knowledge

5.1 Baseline characteristics

5.1.1 Reach of Men on the Move

The first research question sought to establish whether the programme was effective in recruiting 'at-risk' men who did not meet national physical activity (PA) guidelines (Department of Health and Children, 2009) and were therefore likely to have multiple risk factors for cardiovascular disease (CVD). As noted in Chapter 2, it is well documented that unhealthy lifestyles behaviours are a major contributing factor to CVD, the leading cause of death globally (World Health Organisation, 2013a). Behavioural risk factors such as physical inactivity, unhealthy diet, tobacco use and harmful use of alcohol are closely linked to chronic health issues such as obesity, diabetes, hypertension, and high cholesterol, and collectively represent the most critical risk factors for CVD (World Health Organisation, 2016b).

The programme succeeded in reaching its main target population group, with 84.0% of participants at baseline not achieving 30 mins or more of PA on at least 5 days per week – a figure far greater than the 66% reported among the adult male population in Ireland (Department of Transport Tourism and Sport, 2016). This is an important finding, as any increase in PA, regardless of age, can help reduce the risk of CVD; particularly amongst those previously inactive. Not surprisingly in the context of an inactive and older cohort, the vast majority of men in this study (89.0%) were classified as 'poor' in terms of physical fitness. As noted (Section 2.3), physical fitness levels (aerobic capacity) decline with age (Fleg *et al.*, 2005), and are a strong predictor of mortality in middle-aged men

(Erikssen *et al.*, 1998). Any improvements in physical fitness levels therefore, particularly among an older age cohort, are likely to significantly reduce the risk of CVD. The absence of the prophylactic effect of PA (Shook *et al.*, 2015; Soares-Miranda *et al.*, 2016) coupled with poor fitness levels, exposes these men to increased risk of adverse health outcomes including all-cause mortality (Kodama *et al.*, 2009), CVD (Kodama *et al.*, 2009), diabetes (Goodrich *et al.*, 2012), cancer (Peel *et al.*, 2010), and dementia (Liu *et al.*, 2012).

The proportion of 'normal' weight men (10.2%) was considerably less than the national average for adult males (31%; Department of Health, 2015a). Likewise, the proportion in the 'at-risk' categories for body mass index (BMI; 45.5% 'obese') and waist circumference (WC; 54.5% 'high risk') is also a cause for considerable concern. As noted in Section 2.3, men are more likely to accumulate adipose tissue in the trunk/abdomen (Krotkiewski *et al.*, 1983), with central adiposity/abdominal obesity now considered more important than overall obesity in the evaluation of CVD and coronary heart disease risk (Larsson *et al.*, 1984; Rexrode *et al.*, 1998; Després, 2012; Chin, Kahathuduwa and Binks, 2016). A waist-reduction of 5-10cm can result in a reduction in several CVD risk factors (De Koning *et al.*, 2007), and reaffirms the relevance of recruiting this 'at-risk' cohort in a PA programme.

Baseline characteristics were also compiled for other health behaviours. Results show that 80.5% consumed alcohol which is in-line with national figures for adult males (79%; Department of Health, 2017). Some 9.1% reported that they drank 17 or more units per week, which is considerably lower than the national average of 33% reported for adult males (Long and Mongan, 2013). Once again, this could be indicative of the older age profile recruited in this study with rates of excess alcohol consumption typically declining with age (Brennan, Schutte and Moos, 2010). Notably, the comparatively low proportion of current smokers (13.3% v 21.6% national average for males; Gravely *et al.*, 2017), suggests that smokers may be less likely than non-smokers to self-select for a PA programme and that other strategies might be necessary to reach those men. Additionally, 47.4% of men who presented were on prescription medication (19.6% for chronic conditions). It is well established that an increase in PA can reduce the prevalence of chronic diseases, such as hypertension and diabetes; thus reducing the

reliance on prescription medication (Keith M. Diaz, and Daichi Shimbo, 2013; Pedersen and Saltin, 2015; Fernandez-Navarro, Aragones and Ley, 2018).

Data from this study is in keeping with that reported elsewhere (Pringle *et al.*, 2011) in terms of attracting men with high CVD risk, including key areas of risk such as not meeting recommended PA levels, low consumption of fruit and vegetable, smoking, excess weight, and excess alcohol consumption. Indeed, the majority of men recruited were 'at-risk' of CVD as evidenced by high BMI and WC results and low fitness and PA levels. Despite this, almost two-thirds (62.9%) reporting a positive self-rating of their health. This paradox is not unique to this study (Richardson, 2004; Pringle *et al.*, 2011) and is possibly due to men's poor knowledge and symptom recognition, the normalisation of ill-health, and also reflective perhaps of Irish optimism with recently published figures showing Ireland having the highest self-perceived health status in the EU (Section 2.2, Figure 2.2.5; Department of Health, 2018b). These findings indicate the need for an increased focus on health literacy being integrated into future public health interventions for men. Whilst it was noteworthy that two-thirds (67.1%) had not visited their GP in the 12 weeks prior to baseline, a distinction needs to be made between being 'at-risk' of ill-health versus suffering from ill-health - with a community-based physical activity (CBPA) programme perhaps being a more appropriate place to address the former.

The recruitment strategy succeeded in reaching 'older' men (81.6% aged between 40–70 years), possibly due to the non-competitive nature of the programme. Although not modifiable, age is one of the most critical CVD risk factors. These findings are particularly encouraging in light of recent published statistics (Section 2.2) highlighting significant growth in older age groups in Ireland, and predicting that one in five people will be aged 65 years or older by 2038 (Department of Health, 2018a). The success of word-of mouth and newspaper/media/social media recruitment strategies is consistent with previous work (Robertson *et al.*, 2013). This highlights the importance of partnering with and anchoring recruitment strategies with local community groups to maximise the reach of community-based health promotion initiatives. Notably, just 5.8% (n=53) reported hearing about the programme through health services.

A secondary consideration was to establish whether the community-based outreach nature of the programme could succeed in engaging 'hard-to-reach' men, i.e. a diverse sample in terms of ethnicity, social class, relationship status etc. Disappointingly, this proved not to be the case, with the vast majority who presented being 'White Irish (97.7%)', in shared living accommodation (86.4%) and in a relationship (83.0%); characteristics which are indicative of the general population in Ireland (Central Statistics Office, 2015). The programme was not successful therefore in reaching more marginalised groups, such as migrants, ethnic minority groups, or Travellers (Nolan and Maitre, 2008). Recruitment for future programmes should incorporate more specific and targeted strategies directed at these 'hard-to-reach' groups. 'Men on the Move' targeted males from the Irish population at large, and used an image of a man in a MOM group in Mayo as the main image on all materials; individuals from ethnic minority groups may not identify with this imagery. Tailored imagery could be used in future recruitment to target these specific groups, as well as testimonials from existing participants. Additionally, recruitment strategies could target environments which are typically 'male dominated', i.e. farming marts (van Doorn, Richardson and Osborne, 2017), bookies, barbers, construction sites etc. (Richardson and Carroll, 2018).

With the exception of certain characteristics (fitness levels), comparative analysis shows the intervention and comparison groups to be predominately similar. A cross sectional analysis of the data is generally in line with that published in the literature (Pringle *et al.*, 2011) in terms of health and well-being markers across categories; such as physical activity, consumption of fruit and vegetables, smoking, weight, and alcohol consumption.

5.1.2 Key conclusions on reach of Men on the Move

Declining PA levels with age, coupled with increasing rates of overweight/obesity are key causal factors in what has been described as 'the burden of ill-health' experienced by men in Ireland (Department of Health and Children, 2013; p15). Targeting such 'at risk' groups emerged as a key priority in this study. The community-based and partnership driven nature of this study, allied to the gender-sensitive approaches that

were used, appear to have been successful in reaching those for whom it was intended, with the majority of men presenting as inactive, overweight/obese and having multiple CVD risk factors. In doing so, the recruitment strategy succeeded in overcoming previously identified difficulties in this regard (Carroll, Kirwan and Lambe, 2014; Robertson *et al.*, 2014; Lefkowich, Richardson and Robertson, 2015). Findings suggest that service providers can maximise the reach and recruitment of an 'at-risk' cohort for community-based health promotion initiatives through partnership-based and gender-sensitised recruitment strategies anchored within community groups (Sharp *et al.*, 2018). Results also highlight, however, that a 'one size fits all' recruitment strategy is not enough to reach more marginalised cohorts and that more targeted approaches are needed to engage 'hard-to-reach' groups of men (e.g. Traveller men, non-Irish nationals).

5.2 Impact of and participant flow through Men on the Move

5.2.1 Impact of Men on the Move programme

The second research question sought to investigate the impact of participation in a 12-week CBPA programme up to 52 weeks post-baseline. Results demonstrated a large effect in aerobic fitness, evident at 12W, maintained through 26W with values still elevated at 52W. The results also demonstrated a large intervention effect on WC at 12W, while there was a medium effect on BMI evident at 12W which was maintained through 26W and 52W. Findings provide strong evidence of programme efficacy but do need to be considered in the context of the dropout that occurred in this 'real-world' intervention.

Intervention efficacy was evaluated with reference to the change scores from baseline in the 'intervention group' (IG) and 'comparison-in-waiting group' (CG) but also in terms of the percentages that achieved the 1 MET fitness, 5% bodyweight and 5cm WC targets. The percentages achieving these targets were determined without and with imputation for missing data. The former approach reflects intervention efficacy in those who were part of the intervention at that time-point and available for testing, a likely best-case

scenario, but indicative of results that can be achieved with ongoing participation in our 'Men on the Move' (MOM) community groups. The latter approach, with imputation for missing data, reflects the successes that are likely to be achieved in a group of 'at-risk' men who were part of the MOM intervention at some post-baseline time-point. This was considered to be the most appropriate denominator when estimating the original participating group success rates as the economic costs of delivering the programme relate to the size of this group who continued beyond baseline. These best-case and worst-case scenarios were similar at 12W but differences widened at 26W and at 52W, particularly for those variables for which the intervention had the greatest effect.

The aerobic fitness data at 12W and 26W represent the most notable intervention effect. The greater than 2 METS achieved post 12W in aerobic fitness equates to a potential 30% CVD risk reduction (Kodama *et al.*, 2009) and this was maintained to 26W. The 1 MET aerobic fitness target was achieved by over 70% of the 12W and 26W participants. There was a loss in fitness gains at 52W, potentially due to lag in programme momentum associated with a summer break. Nevertheless, the average improvement of 1.3 METS at 52W equates to a potential 20% CVD risk reduction (Kodama *et al.*, 2009), and is particularly important in the context of a previously inactive and overweight cohort. Even with the worst-case analysis and allowing for the summer break, nearly one-third of the IG achieved the 1 MET target at 52W. In line with the fitness changes, there were increases in weekly frequency of PA participation in the IG through 52W (BL = 3.0±2.0; 52W = 3.6±1.9 days per week doing at least 30 minutes moderate PA). The intervention also achieved a positive mental well-being effect at 12W and 26W in ongoing participants, with a reduction in this effect at 52W. The mean change at 26W approximates the clinical meaningful score for the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) tool (Stewart-Brown, 2008).

The programme effects on bodyweight and WC were more modest; not surprising perhaps for a PA-focused intervention. If anything, the modest weight loss of ~2kg and targeted weight loss success rates were continuing to improve at 52W. On reflection, it was perhaps overly-optimistic to have targeted a 5% reduction in body weight, given that the primary focus of MOM was PA and not weight loss. Perhaps a 2% reduction in body weight, similar to that achieved in the 'EuroFIT' study, would have been a more

realistic target (Wyke *et al.*, 2019). Nevertheless, the significant reduction in WC at 52W (~4cm) equates to a CVD risk reduction of ~8% (De Koning *et al.*, 2007). This is particularly relevant to men who tend to accumulate adipose tissue in the trunk/abdomen (Krotkiewski *et al.*, 1983). Waist circumference provides an accurate reflection of total and abdominal fat accumulation and associated health risks (Lean, Han and Morrison, 1995). At 52W, the 5cm waist reduction target was achieved by 42% of ongoing participants and 26% of the MOM participant group, which is likely to have a meaningful impact on population health if replicated in a national rollout.

There were small unexpected positive changes in the CG, particularly in WC and fitness at 26W and 52W. These changes might be attributed to a CG who were gearing up for the commencement of the intervention promised to them after their 52W assessments.

'Men on the Move' drew on successful programmes such as 'Football Fans in Training' (FFIT; Wyke *et al.*, 2015). It is interesting, therefore, to compare results between studies. For example, the mean between-group difference at 12 months were as follows; METS = 0.92 (MOM), 1.49 (FFIT); weight loss = 1.89 kg (MOM), 4.94 kg (FFIT); WC = 3.16cm (MOM), 5.12cm (FFIT); and BMI = 0.62 kg/m^2 (MOM), 1.56 kg/m^2 (FFIT) - all in favour of the intervention in both studies. Results for mental well-being suggest a positive intervention effect ($p<0.05$) in both studies. Whilst the results show FFIT to have achieved more positive outcomes, these need to be considered with due regard to some notable differences between the two. In the first instance, the primary focus of the interventions differed (i.e. FFIT focused on PA and dietary change for weight loss, whereas MOM primarily focused on improvements in aerobic fitness through increased PA). With FFIT, participants were rewarded for undertaking assessments (Hunt, Wyke, Gray, Anderson, *et al.*, 2014) and FFIT participants were sometimes assessed in their own homes (Wyke *et al.*, 2015). Men on the Move was limited to conducting group-based assessments in community settings at designated times and not all missed assessments were lost to the programme. Significant differences are also evident when the demographic information of men who presented at baseline are compared. The men who presented for FFIT (n=747) were at greater risk of CVD (weight = 109.5 kg; BMI = 35.3 kg/m^2; WC 118.4 cm) when compared to the men who presented for MOM (weight = 92.7±16.0 kg; BMI = 30.2±4.9 kg/m^2; WC 105.1±13.0 cm). A possible reason for the

greater improvements observed in FFIT, may be that recruitment for FFIT was capped at baseline BMI ≥ 28 kg/m^2, whereas no such cap was placed for MOM. Baseline BMI for MOM ranged from 17.40 – 53.10 kg/m^2, therefore there was greater potential for improvement with FFIT participants as they were starting from a lower base.

5.2.2 Participant flow through the 'Men on the Move' programme

The numbers presenting for re-testing at 52W (Section 4.1.1) was the disappointing element of this programme. The sustained engagement of the large numbers who presented at baseline proved to be an unrealistic expectation. Notwithstanding dropouts there still remained a large cohort of 'at risk' men, for whom there was much potential for improvements in health and well-being. More concerning is the reduction in numbers between 12W and 52W which impacted on a widening of best and worst-case analysis differences between these time-points. Possible explanations for poorer numbers presenting are; 1) the programme itself was only starting for the CG at 52W while it was ending for the IG possibly encouraging attendance at 52W; and 2) there may have been some selective attendance at 52W favouring those who felt they had improvements to be recorded. Strategies will be needed in a national rollout to retain men beyond 12W, such as avoiding a long summer break or providing a variety of PA options (i.e. walking football, cycling etc.). Additionally, MOM would possibly require restructuring to give more emphasis to healthy eating and weight management if targeting a 5% reduction in weight.

Although not the primary purpose of this study, the comparison of ongoing participants to early dropouts reveals some noteworthy differences. Dropouts were more overweight, more inactive and less fit with greater health problems. The identification of 'dropout' characteristics, as noted, may enable service providers to refine the programme design to cater to the specific needs of this cohort, i.e. alternative ways of assessing fitness levels which have less of an impact on joint-loading. A national MOM roll-out will need to be sensitive to these factors. The impact of self-reported health problems on early dropout was considerable and, clearly, alternative approaches will be necessary for this cohort. Further work relating to barriers and self-efficacy is needed

(Dishman, Sallis and Orenstein, 1984). Findings also draw attention to the wider question of what constitutes programme effectiveness or 'success' in terms of adherence by 'at-risk' groups to health promotion interventions in real-world settings (HSE UK; Social Inclusion Branch, 2004).

5.2.3 Key conclusions on impact and participant flow

In summary, the findings show that a gender-sensitised CBPA programme can enable previously inactive men to achieve, and sustain, significant increases in aerobic fitness as well as significant reductions in weight, waist measurements, and CVD risk. Results demonstrated a large effect in aerobic fitness, evident at 12W, maintained through 26W with values still elevated at 52W. The results also demonstrated a large intervention effect on WC at 12W, while there was a medium effect on BMI evident at 12W which was maintained through 26W and 52W. However, results highlight the challenges with maintaining adherence to CBPA interventions, particularly for 'at-risk' men. Perhaps incorporating peer-to-peer mentoring into future programmes could assist with progamme adherence, i.e. develop a 'buddy system' using men already established within MOM groups to support new participants'. Against a backdrop of WHO's recent call for more 'gender-transformative' health promotion approaches to engaging men (World Health Organisation, 2018a), findings address an important gap in public health practice by informing the translational scale-up of a small controllable gender-sensitised PA intervention, MOM, to a national population-based PA intervention targeting inactive men.

This evaluation of a community-based, multiple site, group PA intervention (MOM), used a partnership model to target at 'at-risk' men (Carroll *et al.*, 2018), with a view to scaling up the programme for national roll-out. Findings provide strong evidence of programme efficacy but do need to be considered in the context of the dropout that occurred in this 'real-world' intervention.

5.3 Cost effectiveness

The third research question sought to investigate the cost-effectiveness of a gender-sensitised CBPA for men in Ireland. 'Men on the Move' was shown to be cost-effective in supporting an 'at risk' cohort of men achieve significant improvements in aerobic fitness, weight loss, and waist reduction, with improvements maintained 52 weeks post-baseline. The estimated total costs of delivering MOM was a modest €63,035 (€125.82 for each of the 501 participants in the IG), when compared to other studies in this field (FFIT – £254,579/£680 per participant; EuroFIT – between £180 and £268 per participant). Inter-study differences should be acknowledged, and like for like comparisons are not always feasible. Additionally, this study aimed to establish Quality Adjusted Life Years (QALYs) gained over the 52-week progamme. Quality Adjusted Life Years ratio costs were estimated at €3,723 for the IG at 12-weeks which represents a very cost-effective improvement when compared to known guidelines of €20,000 per QALY gained (O'Mahony and Coughlan, 2016).

The cost-effectiveness analyses have a number of strengths and limitations. While indirect cost analysis did not account for healthcare utilisation, medication use, and absenteeism from work, it did account for hours attributed by the partnership network to the design, delivery and implementation of the programme. Brazier *et al.'s* short form-6D (SF-6D) was used as the method for generating health utilities over the often preferred European Quality of Life-5 Dimensions (EQ-5D) questionnaire (EuroFit), as it was best-matched with the questionnaire developed for data collection and allowed for indirect comparsion with similar type interventions. Additionally, the SF-6D provided both physical and mental summary component scores as well as health utility scores for the economic analysis. In hindsight, further consideration at the design stage of the programme, in particular to the choice of questions included in the questionnaire used, would allow for a more thorough economic evaluation to be performed by; 1) including questions that directly match the identified health dimensions; and 2) incorporating healthcare utilisation, medication use, and absenteeism from work into the indirect cost analysis.

5.4 Limitations

Notably, one of the key strengths of the MOM programme was that it was delivered by Local Sport Partnerships (LSPs) as part of a unique partnership network under 'real world' conditions. However, due to the 'real world' nature and application of a CBPA programme of this scale there are a number of limitations to be considered in the context of programme implementation.

5.4.1 Limitations with data collection

Firstly, much of the data recorded was self-reported, and while every effort was taken to ensure that a trained practitioner/research team member assisted with data collection, this was not always feasible due to the large sample size. The self-administered questionnaire was comprehensive (Appendix J), and therefore time consuming to complete, and a possible explanation for some instances of incomplete questionnaires. Evidence suggests that lengthy measurement tools lead to greater amounts of missing data on individual questions, decreased variability in answers to grid-based questions and shorter responses to open-ended questions (Galesic and Bosnjak, 2009).

The rigidity of data collection time-points could also be considered a limitation as data collection took place on a specified evening in each location which might not have suited all men interested in the programme.

Another limitation to consider was that a high percentage (~50%) of the baseline data collection took place in sports clubs which may not have appealed to men who might not identify with 'sport'. However, many of the communities who recruited large numbers at baseline took place in local Gaelic Athletic Association (GAA) clubs. Therefore, one could hypothesise that there is a real opportunity to further develop MOM through collaborating with the GAA, thus potentially delivering a MOM programme nationally through local GAA clubs; i.e. clubs already embedded within every local community/parish throughout the country.

Another factor to consider with data collection, was that all objective data were gathered by trained practitioners, but reliability was not assessed. To overcome this 'limitation', the complexity of the objective measures gathered were considered at the design stage to allow for ease of replication, which as noted are not without their own limitations; i.e. WC may be difficult to measure and less accurate in obese individuals, particularly in those with a BMI ≥35 (Palmer and Apovian, 2017). Additionally, all LSPs attended a data collection training day, and were provided with data collection procedures, a tools manual, and access to an accompanying training video. As noted, we also acknowledge the limitations regarding reliability associated with outdoor testing for the time-to-complete 1 mile, such as varying environmental and weather conditions.

5.4.2 Limitations with pragmatic trial

While careful attention was given to the self-reported data gathered at each time-point, more consideration could have been given to a number of the questions included in the questionnaire before data collection commenced. This limitation is particularly relevant to some computed variables i.e. using time-to-complete 1 mile to estimate VO_{2max} and using other variables to compute utility scores. The inherent limitations with these estimates means that data should be viewed with caution. The calculation for participants' level of fitness (Section 3.4) could be looked at as arduous to say the least, as the time-to-complete 1 mile data were used to estimate participant VO_{2max} levels which in turn were used to estimate participant MET scores. Other alternatives such as a 'bleep test' were considered as a method to calculate participants' fitness levels, however it is difficult to have a fitness test that accommodates a variety of fitness levels which is not a progressive maximal test. The research team felt that the time-to-complete 1 mile test was safer to administer than a maximal test as participants were in control of their exercise intensity, i.e. they had the option to stop and walk during the test if needed. This was of particular importance given the cohort of men targeted. It was also important that the test administered was solely based on performance, and did not factor variables such as heart rate or age into the fitness calculations. The key was to detect changes in fitness accurately, and hence the protocol used. Likewise, data to calculate utility scores used in the cost-effectiveness analysis presented were

retrospectively best-matched to the six-dimensions identified in Brazier *et al.'s* SF-6D form. These examples highlight some of the challenges involved with 'pragmatic' interventions, and the need to identify clear research outcomes from the outset (i.e. before data collection begins), thus ensuring that questionnaires are designed accordingly.

As noted, the absence of randomisation was another limitation of this study, and unsurprisingly comparative analysis between groups (Section 4.2.5) revealed significant group differences for primary outcome measures. In order to avoid contamination between groups and preserve the group dynamic within the communities, it was decided to accept the limitation of non-randomisation to safeguard the integrity of programme delivery. Although differences in fitness and fatness variables at baseline between the IG and CG were small, they were, nevertheless, statistically significant in the context of the large sample size. Similar to the baseline differences reported between FFIT and MOM (Section 5.2.1), there was greater potential for improvement with IG participants as they were starting from a lower base.

As noted earlier in this chapter, a limitation with the MOM programme was that it did not appeal to all men. Despite the gender-sensitive, partnership and community outreach recruitment strategies that were adopted, these were not enough to recruit 'hard to reach' groups of men. Careful attention would need to be given to this limitation with any potential national scale-up of the programme. As noted in Section 2.2.2, health inequalities experienced by marginalised groups differ in severity and complexity, and therefore require greater and more targeted healthcare support (Health Service Executive, 2018). In addition, no data was collected on the sexual orientation of the men engaged so it is not currently known how effective MOM was in reaching men who identified as other than heterosexual.

Another limitation to consider was the comparatively modest effect of the programme on weight and WC outcome measures; not surprising perhaps for a PA-focused intervention. In order to make more significant inroads on weight and WC measures, any potential scale-up of MOM should look at incorporating additional nutritional components as PA and nutrition are inextricably linked in approaches to weight

reduction and weight management (Hills *et al.*, 2013). As noted in Section 2.3, obesity plays a central role in mediating an increase in risk factors associated with CVD (O'Neill and O'Driscoll, 2015), thus incorporating an additional focus on weight reduction in the MOM programme would likely increase weight reduction further. Comparable studies, such as FFIT, show that significant improvements can be achieved if multiple outcome measures are factored into the intervention design. For example, FFIT was delivered by community coaches trained in diet, nutrition, physical activity and behaviour change techniques (Wyke *et al.*, 2015). An additional emphasis on such measures could potentially aid with the number of participants who dropped out, i.e. those who were most 'at risk' due to increased weight, and poor levels of physical fitness. However, it should also be noted that the inclusion of additional elements increase associated costs to such programmes. As noted, dropouts were more overweight, more inactive, less fit and had greater health problems when compared to ongoing participants. The impact of self-reported health problems on early dropout was considerable and, clearly, alternative approaches will be necessary to improve adherence in this cohort. Further work relating to barriers and self-efficacy is needed (Dishman, Sallis and Orenstein, 1984).

One of the challenges with up-scaling any 'real world' intervention is the maintenance of momentum/vibrancy generated from the initial programme delivery. In the context of this study, a seasonal break in the programme appeared to have a negative effect on the maintenance of improvements from 26 to 52 weeks. This is a practical limitation in a pragmatic 'real world' design study.

Many of the limitations presented highlight the challenges with the delivery of 'real world' community-based programmes; limitations which would not have arisen through a randomised controlled trial (RCT). These findings reaffirm the importance of reporting findings from 'pragmatic' interventions as outlined in Section 2.7, and highlight the challenges of any potential up-scaling of the programme. Key considerations for the national scale-up of MOM are discussed in Section 5.5 and provide further suggestions to overcome a number of the limitations identified.

5.5 Contribution to existing knowledge / Conclusion

The success of the MOM programme has been recognised in Ireland's recent National Men's Health Action Plan (Health Service Executive, 2016) with plans underway to scale up delivery nationally. However, it is imperative that the wider dissemination of the MOM programme builds upon the key lessons learned from the implementation model outlined in this study. Findings which have been informed by translational formative evaluation, offer a unique contribution to existing knowledge in the design and delivery of 'real world' CBPA programmes. Shediac-Rizkallah and Bone's framework for sustainable community-based health promotion interventions outlined in Section 2.7 was used to inform the development and delivery of MOM (Shediac-Rizkallah and Bone, 1998). Specifically, translational formative evaluation is the key first step when up-scaling any public health intervention from 'efficacy testing' and 'replication' to national 'dissemination'. Therefore, following translational formative evaluation, the intervention developed for testing and replication was in keeping with the principles of 'real world' practice.

The focus of MOM was primarily preventative; all key stakeholders were aware of the wider preventative remit and how well-being and social integration were core values of the programme and were explicit in highlighting the impact a simple group PA programme could have on mental well-being and social connection. The purposeful linking of PA and social aspects created a low pressure, fun, environment which appealed to the men, sustained their engagement and ultimately generated effective programme outcomes. The implementation of the programme was underpinned by the specific skills, attributes and capacity of those responsible for programme delivery. As noted in Chapter 3 and identified as a key factor in programme design and subsequent implementation, all front-line staff involved in the delivery of MOM were provided with ENGAGE training – a one-day comprehensive training aimed at developing gender competency in the provision of health services for men (Lefkowich *et al.*, 2016; Osborne *et al.*, 2016). The training not only benefited the programme participants but also contributed to capacity building among those working with men, thus creating a pool of skills and knowledge for future work in the area of men's health.

Research question four sought to identify key lessons learned from the study with a view to informing a national scale-up of MOM. The first key lesson was the value of adopting a multi-layered approach from national level to local level, which emerged as one of the main drivers of MOM's success. The development of a partnership network involving the statutory, academic and community sectors was key to the development of the MOM model and its subsequent delivery. Notably, this ensured national consistency (of content, approach and tone etc.), but with the necessary flexibility to make it relevant at a local level. The establishment of this partnership was crucial in providing a national structure that a) created a network for the LSPs to connect for support, b) ensured consistent direction/guidance to all local LSPs and c) provided links with partners beyond the LSP structure that also supported local delivery.

Findings show that service providers can maximise the reach and recruitment of an 'at-risk' cohort for community-based health promotion initiatives through partnership-based and gender-sensitised recruitment strategies anchored within community groups. Anchoring the programme within the LSP network ensured it would benefit from the vast local networks within each LSP while also enabling it to translate nationally beyond the eight counties in this study. Local Sport Partnerships were well positioned to establish local structures to ensure the programme was embedded within a community organisation and supported by community champions with the requisite skills and local knowledge to underpin its sustainability. The buy-in, and integration, of local services was essential to the recruitment and delivery of MOM as it was an effective use of existing networks, promoted social engagement and was less threatening for many men who engaged. However, the results also highlight that a one-size-fits-all recruitment strategy is not enough to reach more marginalised cohorts, especially those in lower socio-economic groups, and that more targeted approaches are needed to engage 'hard-to-reach' groups of men. Post-intervention results show that a 'real world' gender-sensitised CBPA programme can enable previously inactive men to achieve, and sustain, significant increases in aerobic fitness as well as significant reductions in weight, waist measurements, and CVD risk. However, findings presented highlight the challenges with maintaining adherence to CBPA intervention for men, particularly amongst those most 'at-risk'.

'Men on the Move' was shown to be cost-effective, and while the model was designed to require minimal funding through integrating services and using local facilities there are still considerable resources required on the part of LSPs when establishing new programmes. Local Sport Partnerships have to build relationships with community partners, source local champions, recruit and support tutors and, in some instances, support/drive recruitment. It is therefore recommended that a variety of resources are made available to support the establishment and continuation of MOM programmes. These should include; a) providing programmes/resources to cover the costs of new entrants (i.e. those who commence after the initial 12-week programme) and offer support to participants for whom funding might be an issue; b) provide additional resources/support in order to try and establish MOM groups in disadvantaged communities, and; c) develop PA resources (inclusive of equipment) and standardised evaluation tools, thus ensuring continuity in programme delivery and evaluations across all counties.

This study is orientated towards delivering impact-focused research activity that forges strong links between research and practice. Notwithstanding dropout issues, findings address an important gap in public health practice by informing the translational scale-up of a small controllable gender-sensitised PA intervention, MOM, to a national population based PA intervention targeting inactive men. The findings presented advance public health knowledge through original research and inform policy and practice in men's health, obesity prevention, PA and health promotion. The findings have helped to build capacity and to inform a broad range of service providers (i.e. the MOM partnership network) on how to effectively work with men. Presently there are over 40 MOM groups in operation across the 8 counties, engaging approximately 820 men. Findings have prompted the national roll out of 'Men on the Move' in Ireland from 2019.

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Appendices

Appendices

Appendix A Background and overview of Men on the Move

Men on the Move was originally conceived by Mayo Local Sport Partnership (LSP) in September 2012 and was adapted for delivery by Donegal LSP in 2013. The evaluation findings from both programmes (Canavan, 2013), coupled with those from published literature of similar programmes elsewhere (Andersen, Burton and Anderssen, 2012; Gray, Hunt, Mutrie, Anderson, Leishman, *et al.*, 2013; Gray, Hunt, Mutrie, Anderson, Treweek, *et al.*, 2013; Hunt, Wyke, *et al.*, 2014), as well as considerable reflective practice by practitioners, formed the evidence base for the current MOM programme design (Table A.1). The National 'Men on the Move' [MOM] programme was initiated in February 2014. Throughout 2014 and 2015, a partnership network consisting of organisations representing LSPs, men's health promotion specialists, a national health charity, the National Health Service and academics oversaw the design and implementation of the programme and research study. The research team is a collaboration of staff from Waterford Institute of Technology (WIT), Institute of Technology Carlow (ITC) and the Centre for Men's Health, Leeds [Prof Steve Robertson, mentor]. The network of partners met quarterly throughout the lifetime of the project to oversee the implementation of MOM. The group collectively worked to achieve a common MOM brand, delivery model and local recruitment and implementation strategy with a view to sustainability. The group also provided oversight on the data collection tools while many assumed a hands on role in collecting data from participants in venues across the country.

Table A.1 Overview of intervention components and frequencies, behaviour change and gender sensitivity strategies

Intervention Component	Frequency	Description	Behaviour Change Strategy	Gender Sensitivity Strategy	Targeted Construct
Structured Group Exercise	60 min twice a week	Participants were invited to participate in their local community. Exercise sessions were led by a qualified PA co-ordinator and the programme was designed as an 'entrant programme' for those wishing to become physically active. Each session had the following structure: to be confirmed re: what happens in each session and key messages at the end of session. Men encouraged to participate in 2 sessions outside of scheduled classes.	Provide opportunities for PA Increase social support for PA Promote mastery learning through skill training Improve knowledge and skill to perform PA Promote positive outcomes for PA	Training in gender competency for PA co-ordinator All male groups Participative Peer-supported [encourage male banter] Venue Timing Meaningfulness of information given Language [science of PA and weight management]	Environment Expectancies Self-efficacy
Experiential Workshops	2*1 hour	Two experiential workshops on 'diet' and 'mental fitness' to be delivered	Improve knowledge of a 'heathy diet' for health and well-being and capacity to do PA and weight management Improve knowledge of healthy alcohol consumption and relation to capacity to do PA and weight management Improve knowledge of how to improve mental fitness and relationship of same with PA Increase social support	Training in gender competency for workshop facilitators Use of experiential methodologies whereby men are supported to access their own knowledge first and developed from there Use of tangible examples for demonstrations	Social support Self-efficacy Expectancies
Information Booklet	Given to all participants week 1	Provides PA related information as well as a log book to record PA sessions	Improve knowledge and skill to perform PA Provide tracking mechanism for PA behaviour	Imagery and language of booklet Log book provides tangible feedback - competition re trying to better their score	Expectancies Self-efficacy
Celebration Event	Once off	A 5Km fun walk/run event in each county for participants and their families. The three MOM groups in each county come together for this event.	Provide opportunities for PA Increase social support for P Promote positive outcomes for PA	Motivation of something to strive towards [goal setting and feedback on behaviour] Competition between MOM groups Self-monitoring	Expectancies Self-efficacy

Pedometer	Given to all participants week 1	Pedometers given to all men to support them to do PA in the two independent sessions per week. These 'gadgets' can be used to set weekly targets and also give feedback to men.	Improve knowledge and skill to perform PA Promote positive outcomes for PA	Men like gadgets and seeing how things work and evidence shows they can motivate men to engage in PA [goal setting and feedback on behaviour] Competition re trying to better their score [self-monitoring]	Expectancies Self-efficacy
Phone Call	5-15 min	Week 12 - Call to encourage men to attend for the follow up test at week 16 and PA plan for the next 4 week	Provide feedback on PA behaviour Reinforce problem solving for PA Provide encouragement and help		Social support Self-efficacy

Adapted from (Andersen, Burton and Anderssen, 2012; Hunt, Wyke, *et al.*, 2014)

Table A.2 outlines the methodological flow diagram developed for the overall MOM programme. This study follows an action based research model which evolved organically from practice [i.e. the delivery of MOM in two pilot counties] and consequently a number of LSP partners have been involved in the conception and securing of funding for this project. Other LSPs were identified on the basis of a) having sufficient staff numbers to commit to the requirements of the project and b) were enthusiastic about being involved in MOM and conducting research on their practice. The research team undertook a pragmatic controlled trial to assess delivery of the MOM programme. Eight LSPs were selected for inclusion in the study; 4 in the 'intervention' group (IG) and 4 in the 'comparison-in-waiting' group (CG). Each LSP was asked to recruit a target of 105 men across 3 community settings in their county.

Table A.2 Flow Diagram of the Methodological Approach to the MOM Investigation

Partnership Recruitment and Development	
• County enumeration and invitation via LSP	• Formation of local steering committees
• Staff training and orientation	• Workshop development
• Source funding	• Allocation of groups
	• Recruit PA co-ordinators and facilitators

Baseline Data Collection
Community Facility: Fitness assessment, body mass index, waist circumference, demographic, psychosocial, lifestyle behaviours, health history questionnaires [+ blood pressure and cholesterol for comparison-in-waiting group]

Intervention Group	**Process Measures**	**Comparison Group in Waiting**
Delivery of MOM Intervention	Participant tracking Resource tracking of staff Monitoring partnership meetings	Provision of Information Booklet Regular Phone Calls

Follow Up Data Collection
Process Data: Interview with national and community partners and PA co-ordinators

Assess Institutionalization	Delayed MOM Intervention

The programme is funded by the Health Service Executive (HSE) in Ireland and delivered through the Local Sports Partnerships (LSPs). It can be considered innovative in its gender specific approach to a critical public health issue and has the potential to inform evidence-based and sustainable practice in targeting increased PA among an 'at risk'

population group (Carroll, Kirwan and Lambe, 2014). The study will inform gender-specific approaches which long-term may lead to changes in policy and practice in the area of PA and obesity.

Appendix B Published Papers

Paper 1 Reaching beyond the 'worried well': Pre-adoption characteristics of participants in 'Men on the Move', a community-based physical activity programme.

Liam Kelly, Michael Harrison, Noel Richardson**,** Paula Carroll, Steve Robertson, Aisling Keohane, Alex Donohoe
Journal of Public Health. 2018, fdy134, https://doi.org/10.1093/pubmed/fdy134

Abstract

Background; Issues surrounding gender and men's health have become an increasing focus of public health globally. Unhealthy lifestyles and lower engagement in health promotion initiatives have contributed to lower life expectancy and higher mortality rates among certain 'hard-to-reach' groups of men. This study presents the pre-adoption characteristics of men who registered for 'Men on the Move' - a community-based physical activity (PA) programme - to ascertain whether the programme reached those for whom it was intended, i.e. adult men who did not meet PA guidelines and were likely to be 'at-risk' of CVD. Methods; Multiple recruitment strategies were adopted to engage the target group and baseline data collection included a range of demographic, self-report and outcome measures. Results; Participants (n=927) were predominantly middle-aged, white, married/cohabiting, in full-time work, with almost half having completed third level education. Results demonstrate that the recruitment strategy was highly effective in reaching the target group, with the majority presenting being previously inactive, overweight/obese and having multiple CVD risk factors. Conclusions; Findings suggest that a collaborative partnership between multiple service providers can maximise the reach and recruitment of an 'at-risk' cohort for community-based health promotion initiatives through varied and gender-sensitised recruitment strategies anchored within community groups.

Key Words: Men's Health, Gender Sensitised, Community, Physical Activity

Introduction:

Within Ireland, and indeed globally, issues surrounding gender and men's health have become an increasing focus of public health (Department of Health and Children, 2008; White, Sousa, Visser, *et al.*, 2011; World Health Organisation, 2013b). Whilst advancements in medical care and the treatment of chronic diseases are contributing to overall increases in life expectancy (Lunenfeld and Stratton, 2013), significant disparities in health outcomes between the sexes remain. Contributing to lower life expectancy and higher rates of mortality among certain groups of men are unhealthy lifestyles and lower engagement in preventative health or health promotion initiatives (Courtenay, 2003; White, Sousa, Visser, *et al.*, 2011; Department of Health, 2016b). Whilst males may be more vulnerable to certain diseases and illnesses than females (Kraemer, 2000), such differences fail to account for more than a small proportion of overall sex differences in health outcomes and for any of the differences in health outcomes between different male population groups (Courtenay, 2003). The intersection of gender with other aspects of identity draws into focus those sub-populations of men for whom health outcomes are significantly worse than the general male population. There is a well-established social gradient in mortality (Marmot, 2005) that has, within an Irish context, widened between the 1980s and 2000s, with a greater widening of the gap being evident among men (Layte and McCrory, 2011). This has drawn attention in Ireland on disparities in health outcomes among 'at-risk' or 'unreached' (Baker *et al.*, 2015) population groups of men, such as farmers (Smyth *et al.*, 2013), unemployed men (Institute of Public Health in Ireland, 2008) and Traveller men (All Ireland Traveller Health Study Team, 2010) and has important implications in terms of the targeting of health interventions to those most in need.

Modifiable health behaviours such as diet, exercise, substance use, use of social supports and safety practices have been identified as important 'lifestyle contributors' to health (Mahalik, Burns and Syzdek, 2007). However, creating the right interventions in the right environments that can support men to change health practices has proved difficult (White, Sousa, Visser, *et al.*, 2011). Men's 'unwillingness' to engage in health promotion programmes also reflects a failure to account for gender as a key driver of health behaviours, including the need for gender-specific approaches to effectively

engage men (Carroll, Kirwan and Lambe, 2014; Robertson *et al.*, 2014; Lefkowich, Richardson and Robertson, 2015). Gender-specific strategies related to community-engagement, programme development and delivery, partnerships and capacity-building, are necessary in creating sustainable health promotion activities that appeal to men (World Health Organisation, 2007; Heath *et al.*, 2012; Lefkowich, Richardson and Robertson, 2015).

Physical activity (PA) is a prophylactic to many chronic conditions associated with obesity and sedentary behaviour (Kodama *et al.*, 2009; Soares-Miranda *et al.*, 2016). Given the low prevalence rates of PA, particularly among older and lower socio-economic groups (Hanson, Cross and Jones, 2016; O'Donoghue *et al.*, 2016), it is imperative that interventions effectively promote the adoption and maintenance of active lifestyles to those population groups within communities who are least active (US Department of Health and Human Services, 2000) and are monitored in terms of effectiveness and reach (Kahn *et al.*, 2002).

'Men on the Move' (MOM) is a gender-specific and community-based PA programme for adult, inactive men in Ireland – a cohort who are likely to be more 'at risk' of cardiovascular disease (CVD). The purpose of this paper is to present the pre-adoption characteristics of men who registered for the MOM programme; to ascertain whether the programme reached those for whom it was intended, i.e. adult men who did not meet PA guidelines and were likely to be 'at risk' of CVD.

Methods

Ethical approval was obtained from Waterford Institute of Technology ethics committee [15/Dept-HSES/13]. This study has been registered with the 'International Standard Randomised-Controlled Trial Number' registry [ISRCTN55654777]. For details of full study protocol, refer to Carroll *et al.* (2018). Written informed consent was provided by all study participants.

The Men on the Move Programme

In brief, MOM is a free 12-week community based 'beginners' PA programme for inactive adult men. The programme design was informed by evaluating a pilot programme, reflective practice and reviewing effective practice elsewhere (Pringle *et al.*, 2014; Hunt, Wyke, Gray, *et al.*, 2014; Bottorff *et al.*, 2015; Wyke *et al.*, 2015). Men were recruited across 8 counties in Ireland (4 'intervention' and 4 'comparison-in-waiting') by Local Sports Partnerships (LSPs – recreational sport providers) who co-ordinated and delivered the programme locally. The comparison-in-waiting group acted as a control group and received the intervention 52 weeks post-baseline. The programme comprised 1-hour structured group exercise (cardiovascular and strength training) twice weekly, two workshops (diet & mental well-being), a 24-page health information booklet, a pedometer for independent PA sessions, weekly phone contact, a customised wallet card to record measurements and an end of programme 5km celebration event.

The Recruitment Strategy

The recruitment strategy was designed to reach beyond the 'worried well' (Smith, 2002) and involved the input of multiple service providers. LSP co-ordinators partnered a variety of community organisations that hosted the MOM programme. In total, 13 sports clubs (9 Gaelic, 3 soccer, 1 rugby), 8 community sports facilities, 8 family resource/community centres, and 1 local men's shed were used as host venues. In some instances, local health promotion and primary care services providers supported the recruitment strategy and programme delivery. Recruitment strategies included in-person text and email invitations via existing databases (including women's groups as 'gatekeepers' to healthcare for men), advertising using branded materials on service websites and social media, a local media campaign (print/radio) and GP referral. In keeping with best practice (Canavan, 2013; Gray, Hunt, Mutrie, Anderson, Leishman, *et al.*, 2013; Gray, Hunt, Mutrie, Anderson, Treweek, *et al.*, 2013; Hunt, Gray, *et al.*, 2014) particular attention was paid to the imagery, branding and language used in the promotional materials (including a MOM Information Booklet). The images used were

of 'real men', and the language was gender sensitised and health literacy proofed for the target group. Men who expressed an interest were invited to a formal registration evening one week before the programme began.

The programme itself was also gender-sensitised in relation to approach (using PA as 'a hook'), context (e.g. men only groups, community based settings that appealed to men), content (e.g. use of 'gadgets'), style of delivery (e.g. participative/non-competitive, peer-supported, use of humour/banter), and adopted strengths-based approaches based on creating safety, trust, rapport, and meaningful relationships with men (Robertson *et al.*, 2013; Carroll, Kirwan and Lambe, 2014; Hunt, Wyke, Gray, *et al.*, 2014; Lefkowich, Richardson and Robertson, 2015). All staff involved in MOM attended men's health training (ENGAGE) focused on developing gender competency in the provision of health services for men (Lefkowich, Richardson and Robertson, 2015).

The Participants

Sample size calculations, based on similar assumptions to the FFIT trial (Hunt, Gray, *et al.*, 2014), estimated that a minimum of 830 men (415 men in each group) needed to be recruited. Men were eligible for inclusion in the study if they were aged at least 18 years, did not meet the recommended PA guidelines, completed the PA readiness questionnaire (PAR-Q) and provided written consent.

Data Collection

Participants were assessed at baseline and outcome measures included height, weight, body mass index (BMI), waist circumference (WC) and time-to-complete one mile. Self-administered questionnaires were used to gather data on participant demographics (date of birth, ethnic origin, educational attainment, relationship status, housing and employment status), self-reported outcomes (PA, consumption of fruit and vegetables, smoking, consumption of alcohol, use of primary care services and prescription medicine, perception of health, mental well-being and social integration), and how participants had heard about the programme.

Data Analysis

Questionnaire data were computed in accordance with defined protocols (White, de Sousa, de Visser, *et al.*, 2011). All data were checked for normality and presented as mean±SD or median (IQR) accordingly. Frequency data is also presented. Inferential statistical analysis was undertaken using SSPS version 22.0 (Chicago, Illinois, USA). Between group comparisons were undertaken using independent t-tests or Mann-Whitney U tests and the significance of between group frequencies was determined by Chi-Square. Significance was set at $p<0.05$.

Results:

In total, 927 men (IG n=501; CG n=426) completed the MOM baseline assessments across 25 community sites. Comparative analysis found insignificant differences between groups which demonstrates that they were well matched; data for the whole group will be reported here. The profile of participants (Table I) was that of a middle aged (50.7±10.9 yr), predominantly white (97.7%), married/cohabiting (77.6%), in full-time work (64.8%) population, with almost half (47.7%) having completed third level education. These characteristics are indicative of the general population in Ireland (Central Statistics Office, 2015). The vast majority (81.6%) were aged between 40–70 years of age.

Table II reports baseline self-reported health status and lifestyle characteristics. A small minority (5.2%) reported their health as poor. Approximately a third reported a health problem (34.9%) and having visited a GP in the past 12 weeks (32.9%). The most common reported health problems were high blood pressure (BP), overweight/obesity, diabetes, cholesterol and asthma. Almost half (47.4%) reported taking prescription medication in the previous 12 weeks, with 16.5% reporting doing so for chronic conditions (8.9% BP; 7.6% cholesterol). Some 13.5% (n=116) reported their mental well-being as below average, while 13.5% (n=118) were classified as being socially isolated. Over half (54.5%) reported hearing about the programme through word of mouth (31.2%) or newspaper/media/social media (23.3%) with just 5.8% (n=53) hearing about the programme through health services.

Baseline health indicators show that the programme was attended by predominantly overweight/obese men (Table III). Mean measurements for BMI and WC were 30.2±4.9 (n=926) and 105.1±13.0 (n=918) respectively. Overall, 45.5% of men were in the 'obese' BMI categories (31.6% class 1, 9.5% class 2, 4.4% class 3), with an additional 44.2% classified as 'overweight'. Only 10.2% of men were in the normal BMI category. Waist circumference results placed 54.5% (n=500) and 29.4% (n=270) in the 'high-risk' and 'increased-risk' categories respectively for metabolic complications (Samuelson, 2004; World Health Organisation, 2008). Just one in six (16.1%) were within the 'healthy' WC range. The mean time-to-complete 1 mile was 13.27±3.54 min:dec-min, range 6:17–30:77 min:dec-min. Aerobic fitness was estimated (Daniels, 2013) and the mean VO_{2max} (ml/kg/min) was 21.21±7.45 ml/kg/min (range 5.62–46.91), which corresponds to a 6.06±2.13 METS (1.60–13.40) approximation. Baseline ACSM age-standardised fitness levels (Brubaker, Otto and Whaley, 2006) placed the majority (89.0%, n=709) in the 'poor' category (expressed in VO_{2max}; ml/kg/min). The vast majority (84.0%, n=755) did not meet National PA Guidelines criteria; at least 30 mins on 5 or more days per week (Department of Health and Children, 2009). Similarly, 84.1% (n=765) did not meet recommended daily consumption of 5 or more portions of fruit and vegetables, whilst 13.3% (n=122) were current smokers (with 37.2% reporting as former smokers).

Based on international guidelines (World Health Organisation, 2013a), six self-reported modifiable cardiovascular disease (CVD) risk factors were identified; 'inactive (<3 days PA per week), 'obese' (WC >102cm), 'current smoker', 'excess alcohol consumption' (>14 units per week), 'on BP medication', 'on cholesterol medication'. Data were analysed to establish incidence and prevalence of CVD risk factors (Table IV). Age was considered, but as a non-modifiable risk factor was not included. Over half were found to be 'at risk' by being 'inactive' (59.2%) and/or 'obese' (57.3%). Some 19.5% were 'at risk' based on 'excess alcohol consumption'. Approximately one in ten were 'at risk' by being current smokers (13.3%), on blood pressure (8.9%) or on cholesterol (7.6%) medication. The vast majority (85.5%) presented with at least one risk factor, whilst over half (53.1%) had two or more risk factors (Table IV).

The dataset was examined to determine if level of educational attainment, marital status, home status or employment influenced any CVD risk factor. Men with a third

level education had a higher level of fitness compared to those who did not (METs; Primary or Secondary Education = 5.7, Third Level Education = 6.4, $p<0.001$), men who lived alone had a lower level of fitness (METs; Living Alone = 5.4, Living with others = 6.2, $p=0.002$). These socio-demographic factors did not influence any other risk factor.

Discussion

Main findings of this study

The aim of this paper was to outline the pre-adoption characteristics of men who registered for a community-based PA programme ('Men on the Move') in Ireland. A key priority was to recruit men who did not meet national PA guidelines (Department of Health and Children, 2009) and, as a consequence, were more likely to be 'at risk' of CVD. The programme succeeded in reaching its target population, with 84.0% not achieving 30 mins or more of PA on at least 5 days per week – a figure far greater than the 66% reported among the adult male population in Ireland (Department of Transport Tourism and Sport, 2016). Not surprisingly, the physical fitness level of the vast majority of men in this study (89.0%) was classified as 'poor'. The absence of the prophylactic effect that being sufficiently active offers (Shook *et al.*, 2015; Soares-Miranda *et al.*, 2016) coupled with their poor fitness levels, exposes these men to increased risk of adverse health outcomes including all-cause mortality (Kodama *et al.*, 2009), CVD (Kodama *et al.*, 2009), diabetes (Goodrich *et al.*, 2012), cancer (Peel *et al.*, 2010), and dementia (Liu *et al.*, 2012).

The proportion of 'normal' weight men (10.2%) was considerably less than the national average for adult males (31%; Department of Health, 2015a), while the proportion in the 'at risk' categories for BMI (45.5% 'obese') and WC (54.5% 'high risk') is a cause for considerable concern. Men are more likely to accumulate adipose tissue in the trunk/abdomen (Krotkiewski *et al.*, 1983), with central adiposity/abdominal obesity now considered more important than overall obesity in the evaluation of CVD and coronary heart disease risk (Larsson *et al.*, 1984; Rexrode *et al.*, 1998). Indeed, a waist-reduction

of 5-10cm can result in improvements in several CVD risk factors (De Koning *et al.*, 2007), and reaffirms the relevance of recruiting this 'at-risk' cohort in a PA programme.

Results show that 80.5% consumed alcohol which is in-line with national figures for adult males, (79%; Department of Health, 2017), while 9.1% reported that they drank 17 or more units per occasion, which is considerably lower than the national average of 33% reported for adult males (Long and Mongan, 2013). Notably, the comparatively low proportion of current smokers (13.3% v 21.6% national average for males (Gravely *et al.*, 2017)), might imply that smokers are less likely than non-smokers to self-select for a PA programme and that other strategies might be necessary to reach those men. Additionally, 47.4% of men who presented were on prescription medication (19.6% for chronic conditions). It is well established that an increase in PA can reduce the prevalence of chronic diseases, such as hypertension and diabetes; thus reducing the reliance on prescription medication (Mughal *et al.*, 2001; Colberg *et al.*, 2010; Viña *et al.*, 2012; Pedersen and Saltin, 2015; Fernandez-Navarro, Aragones and Ley, 2018).

Data from this study is in keeping with that reported elsewhere (Pringle *et al.*, 2011) in terms of attracting men with high CVD risk, including key areas of risk such as PA, consumption of fruit and veg, smoking, weight, and alcohol consumption. Indeed, the majority of men recruited were 'at risk' of CVD as evidenced by high BMI and WC results and low fitness and PA levels. In fact, some 53.1% of men who presented at baseline had two or more CVD risk factors, highlighting a paradox between how men rated their health and the baseline health-indicators. Despite their largely unhealthy profile, almost two-thirds of participants (62.9%) rated their health as 'good'/'excellent' with only 5.2% reporting their health as 'poor'. This paradox is not unique to this study (Richardson, 2004; Pringle *et al.*, 2011) and may be indicative of the need for an increased focus on health literacy being integrated into future public health interventions for men. Whilst it was noteworthy that two-thirds (67.1%) had not visited their GP in the 12 weeks prior to baseline, a distinction needs to be made between being 'at-risk' of ill-health versus suffering from ill-health - with a community-based PA programme perhaps being a more appropriate place to address the former.

What this study adds

Findings clearly show that the gender sensitised recruitment strategy (as described earlier) was effective in reaching an 'at risk' group of men for whom this public health intervention was intended. The strategy also succeeded in reaching 'older' men (81.6% aged between 40–70 years), possibly due to the non-competitive nature of the programme. Although not modifiable, age is one of the most critical CVD risk factors. Indeed, any increase in PA, regardless of age, can help reduce the risk of CVD; particularly amongst those previously inactive.

The community-based partnership driven nature of this study, allied to the gender-sensitive approaches that were used, appear to have been successful in overcoming previously identified difficulties (Carroll, Kirwan and Lambe, 2014; Robertson *et al.*, 2014; Lefkowich, Richardson and Robertson, 2015) in engaging 'at risk' men. The success of word-of mouth and newspaper/media/social media recruitment strategies is consistent with previous work by Robertson et al. (Robertson *et al.*, 2013). This highlights the importance of partnering with and anchoring recruitment strategies with local community groups to maximise the reach of community-based health promotion initiatives. However, MOM did not appeal to all men. The vast majority (97.7%) who presented were 'White Irish', in shared living accommodation (86.4%) and in a relationship (83.0%). The programme was less successful in reaching more marginalised groups, such as migrants, ethnic minority groups, or Travellers (Nolan and Maitre, 2008). Recruitment for future programmes should incorporate strategies to include these groups.

Limitations of this study

One of the key strengths of the MOM programme was that it was delivered by LSPs as part of a unique partnership network under 'real world' conditions. However, this approach brings some limitations. Firstly, much of the data was self-reported, and while every effort was taken to ensure that a trained practitioner/research team member assisted with data collection, this was not always possible due to the large sample size. Secondly, all objective data were gathered by trained practitioners, but reliability was

not assessed. To overcome this 'limitation', the complexity of the objective measures gathered were considered at the design stage to allow for ease of replication. Thirdly, baseline data collection took place on a specified evening (up until the end of the second week) in each location which might not have suited all men interested in the programme. Fourthly, a high percentage of the baseline data collection took place in sports clubs which may not have appealed to men who do not identify with 'sport'.

Conclusion

Findings demonstrate that the recruitment strategy was highly effective in reaching the 'at-risk' group of men for whom it was intended, with the majority of men presenting as inactive, overweight/obese and having multiple CVD risk factors. Results also highlight the need for more targeted and gender-specific programmes, such as MOM, that support service providers to effectively engage inactive men in public health interventions. Findings suggest that service providers can maximise the reach and recruitment of an 'at-risk' cohort for community-based health promotion initiatives through varied and gender-sensitised recruitment strategies anchored within community groups.

Table I; Participant Baseline Demographic Characteristics

	Total	IG	CG
Physical Measures		**Mean±SD (N)**	
Age (years)	**50.7±10.9 (916)**	51.9±10.5 (495)	49.2±11.2 (421)
Height (m)	**175.2±6.6 (927)**	174.6±6.5 (501)	176.0±6.6 (426)
Weight (kg) **	**92.7±16.0 (927)**	94.2±16.0 (501)	91.0±15.9 (426)
Age Year Bands (years)		**% (N)**	
15 – 19	**0.4 (4)**	0.4 (2)	0.5 (2)
20 – 24	**0.6 (5)**	0.6 (3)	0.5 (2)
25 – 29	**2.3 (21)**	1.4 (7)	3.3 (14)
30 – 34	**2.0 (18)**	1.2 (6)	2.9 (12)
35 – 39	**8.7 (80)**	6.9 (34)	10.9 (46)
40 – 44	**14.8 (136)**	13.1 (65)	16.9 (71)
45 – 49	**18.2 (167)**	19.0 (94)	17.3 (73)
50 – 54	**17.8 (163)**	16.2 (80)	19.7 (83)
55 – 59	**14.7 (135)**	18.4 (91)	10.5 (44)
60 – 64	**9.7 (89)**	10.1 (50)	9.3 (39)
65 – 69	**6.4 (59)**	7.9 (39)	4.8 (20)
70 – 74	**2.2 (20)**	3.0 (15)	1.2 (5)
75 – 79	**1.4 (13)**	1.6 (8)	1.2 (5)
80 – 84	**0.5 (5)**	0.2 (1)	1.0 (4)
85 – 89	**0.1 (1)**	0.0 (0)	0.2 (1)
Ethnicity		**% (N)**	
White ■	**97.7 (887)**	97.6 (479)	97.8 (408)
Other ■	**2.3 (21)**	2.4 (12)	2.2 (9)
Education Attainment ++		**% (No)**	
Primary education only	**9.6 (88)**	10.9 (54)	8.1 (34)
Some or completed secondary education	**42.7 (392)**	46.8 (232)	37.9 (160)
Some or completed Third Level education	**47.7 (438)**	42.3 (210)	54 (228)
Marital Status		**% (N)**	
Married/Cohabiting	**77.6 (712)**	78.0 (391)	77.0 (321)
Separated/Divorced	**4.7 (43)**	4.2 (21)	5.3 (22)
Widowed	**2.0 (18)**	2.2 (11)	1.7 (7)
Single	**10.3 (95)**	10.0 (50)	10.8 (45)
In a relationship	**5.4 (50)**	5.6 (28)	5.3 (22)
Housing Status		**% (N)**	
Live Alone	**13.4 (122)**	14.6 (72)	12.0 (50)
Live with family/wife/partner	**85.2 (776)**	83.8 (415)	86.8 (361)
Live with friends	**1.4 (13)**	1.6 (8)	1.2 (5)
Employment Status		**% (N)**	
Employed (full time)	**46.9 (431)**	43.0 (215)	51.7 (216)
Self-employed	**17.9 (164)**	17.8 (89)	17.9 (75)
Looking after home/family	**2.1 (19)**	2.8 (14)	1.2 (5)
Student	**1.6 (15)**	1.8 (9)	1.4 (6)
Unable to work due to long term illness/disability	**3.6 (33)**	4.2 (21)	2.9 (12)
Employed (part time)	**8.2 (75)**	8.6 (43)	7.7 (32)
Unemployed and looking for work	**7.2 (66)**	8.0 (40)	6.2 (26)
Retired from paid work	**12.0 (110)**	12.8 (64)	11.0 (46)
Volunteer	**0.5 (5)**	1.0 (5)	0.0 (0)
Paid Employment Only			
Time off work in last 12 weeks	**15.0 (140)**	12.3 (62)	18.2 (78)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; m = metres; kg = kilograms; ■ White = Irish, Irish Traveller, Any other white background, Other = Any other African, Asian, black or mixed background.

** denotes significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined using an Independent T-Test. ++ denotes significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined by Chi-Square.

Table II; Participant Baseline Self-reported Health Status and Lifestyle Factors

	Total	IG	CG
Health Status / Health Problems		**% (N)**	
Excellent	**4.8 (44)**	5.2 (26)	4.3 (18)
Very Good	**23.3 (213)**	20.5 (102)	26.6 (111)
Good	**34.8 (319)**	33.9 (169)	36.0 (150)
Average	**31.8 (291)**	34.5 (172)	28.5 (119)
Poor	**5.2 (48)**	5.8 (29)	4.6 (19)
Yes	**34.9 (326)**	39.3 (182)	36.6 (144)
No	**56.7 (530)**	60.7 (281)	63.4 (249)
Health Services (attended in the last 12 weeks)		**% (N)**	
General Practitioner			
Yes	**32.9 (286)**	34.1 (160)	31.6 (126)
No	**67.1 (582)**	65.9 (309)	68.4 (273)
Physiotherapist			
Yes	**12.1 (91)**	12.9 (51)	11.2 (40)
No	**87.9 (663)**	87.1 (345)	88.8 (318)
Other Health Related Services			
Yes	**13.6 (103)**	14.3 (59)	12.8 (44)
No	**86.4 (656)**	85.7 (355)	87.2 (301)
Prescription Medication (in the last 12 weeks)		**% (N)**	
Yes	**47.4 (427)**	50.1 (243)	44.3 (184)
No	**52.6 (473)**	49.9 (242)	55.7 (231)
WEMWBS Category at Baseline		**% (N)**	
Below Average (≤42)	**13.5 (116)**	15.8 (74)	10.7 (42)
Average (41 – 59)	**71.1 (613)**	69.7 (326)	72.8 (287)
Above Average (≥60)	**15.4 (133)**	14.5 (68)	16.5 (65)
Mental Well-being (WEMWBS) Score Bands		**% (N)**	
<20	**0.0 (0)**	0.0 (0)	0.0 (0)
21 – 30	**1.2 (10)**	1.3 (6)	1.0 (4)
31 – 40	**7.4 (64)**	8.7 (41)	5.8 (23)
41 – 50	**35.3 (304)**	36.1 (169)	34.3 (135)
51 – 60	**43.6 (376)**	43,2 (202)	44.2 (174)
61 – 70	**12.5 (108)**	10.7 (50)	14.7 (58)
Social Integration		**% (N)**	
Socially Isolated	**13.5 (118)**	14.3 (69)	14.5 (49)
Moderately Isolated	**19.8 (173)**	21.3 (103)	20.8 (70)
Moderately Integrated	**29.9 (261)**	29.2 (141)	35.6 (120)
Socially Integrated	**46.8 (222)**	35.2 (170)	29.1 (98)
Active Participation in Groups		**% (N)**	
Yes	**53.0 (424)**	45.6 (208)	62.8 (216)
No	**45.4 (363)**	52.4 (239)	36.0 (124)
Unknown	**1.6 (13)**	2.0 (9)	1.2 (4)
How often do you attend religious services?		**% (N)**	
Never or almost never	**25.0 (199)**	21.4 (98)	29.7 (101)
Once or twice a year	**13.3 (106)**	12.3 (56)	14.7 (50)
Every couple of months	**13.9 (111)**	14.9 (68)	12.6 (43)
Once or twice a month	**14.9 (119)**	15.8 (72)	13.8 (47)
Once a week	**27 (215)**	30.6 (140)	22.1 (75)
More than once a week	**4.0 (32)**	3.7 (17)	4.4 (15)
Unknown	**1.9 (15)**	1.3 (6)	2.6 (9)
How participants found out about MOM		**% (N)**	
Word of mouth	**31.2 (286)**	32.8 (164)	29.3 (122)
Referred	**3.8 (35)**	2.6 (13)	5.3 (22)
Health Professional	**2.0 (18)**	1.0 (5)	3.1 (13)
Local service club	**16.2 (148)**	7.4 (37)	26.7 (111)
Newspaper/Media/Social Media	**23.3 (213)**	34.2 (171)	10.1 (42)
Local Sports Partnership	**10.3 (94)**	7.6 (38)	13.5 (56)
Family	**8.4 (77)**	8.0 (40)	8.9 (37)
Other	**4.9 (45)**	6.4 (32)	3.1 (13)

Key: WEMWBS = Warwick-Edinburgh Mental Well-being Scale; IG = Intervention Group; CG = Comparison-in-waiting Group; N = number

Table III; Participant Baseline Health Indicators

	Total	IG	CG
Physical Measures	**Mean±SD (N) / Median (IQR)**		
Weight (kg) **	**92.7±16.0 (927)**	94.2±16.0 (501)	91.0±15.9 (426)
Waist Circumference (cm) **	**105.1±13.0 (918)**	107.7±12.4 (495)	102.1±13.1 (423)
BMI (kg/m^2) **	**30.2±4.9 (926)**	30.8±4.7 (501)	29.4±5.0 (425)
Time-to-complete 1 mile (min:dec) ++	**13.3±3.5 (797)**	13.9±3.1 (435)	12.6±3.9 (362)
VO_{2max} (ml/kg/min) ++	**21.2±7.4 (797)**	19.6±6.1 (435)	23.1±8.4 (362)
METS ++	**6.1±2.1 (797)**	5.6±1.7 (435)	6.6±2.4 (362)
Number of days Physical Activity per week totalling 30 minutes or more **	**3.0 (1.0 – 4.0)**	3.0 (1.0 – 4.0)	3.0 (2.0 – 5.0)
Portions of Fruit and/or Vegetables consumed day prior to Health Check	**4.0 (3.0 – 5.0)**	4.0 (3.0 – 5.0)	4.0 (3.0 – 5.0)
Number of Cigarettes per day	**15.0 (5.0 – 20.0)**	15.0 (5.0 – 20.0)	11.0 (5.0 – 20.0)
Number of Alcohol Units consumed on average	**9.0 (6.0 – 12.0)**	9.0 (6.0 – 12.0)	9.0 (6.0 – 12.0)
Number of days per week Alcohol consumed	**2.0 (1.0 – 3.0)**	2.0 (1.0 – 3.0)	2.0 (1.0 – 3.0)
Waist Circumference (cm) (WHO, 2010)		**% (N)**	
Healthy (<94cm)	**16.1 (148)**	9.9 (49)	23.4 (99)
Increased Risk (94 – 102cm)	**29.4 (270)**	26.5 (131)	32.9 (139)
High Risk (>102cm)	**54.5 (500)**	63.6 (315)	43.7 (185)
BMI (kg/m^2) (WHO, 2010)		**% (N)**	
Underweight (<18.50)	**0.1 (1)**	0.2 (1)	0.0 (0)
Normal (18.50 – 24.99)	**10.2 (94)**	6.9 (35)	13.9 (59)
Overweight (25.00 – 29.99)	**44.2 (409)**	39.9 (200)	49.2 (209)
Obese Class 1 (30.00 – 34.99)	**31.6 (293)**	36.7 (184)	25.6 (109)
Obese Class 2 (35.00 – 39.99)	**9.5 (88)**	12.0 (60)	6.6 (28)
Obese Class 3 (≥40.00)	**4.4 (41)**	4.2 (21)	4.7 (20)
Baseline level of fitness; Estimated VO2max (ml/kg/min)		**% (N)**	
Poor	**89.0 (709)**	93.3 (406)	83.7 (303)
Fair	**5.0 (40)**	3.0 (13)	7.5 (27)
Average	**2.9 (23)**	1.4 (6)	4.7 (17)
Good	**1.5 (12)**	0.5 (2)	2.8 (10)
Excellent	**0.0 (0)**	0.0 (0)	0.0 (0)
Other	**1.6 (13)**	1.8 (8)	1.4 (5)
Number of days Physical Activity per week totalling 30 minutes or more **		**% (N)**	
Never	**25.7 (231)**	28.7 (140)	22.1 (91)
1 Day	**17.5 (157)**	19.9 (97)	14.6 (60)
2 Days	**15.9 (143)**	15.8 (77)	16.1 (66)
3 Days	**17.2 (155)**	16.6 (81)	17.9 (74)
4 Days	**7.7 (69)**	6.6 (32)	9.0 (37)
5 Days	**5.9 (53)**	4.5 (22)	7.5 (31)
6 Days	**2.8 (25)**	2.9 (14)	2.7 (14)
7 Days	**7.2 (65)**	4.9 (24)	10.0 (41)
Portions of Fruit and/or Vegetables consumed day prior to Health Check		**% (N)**	
None	**5.9 (54)**	4.6 (23)	7.5 (31)
1	**12.2 (111)**	11.4 (57)	13.1 (54)
2	**22.4 (204)**	25.3 (126)	19.0 (78)
3	**25.2 (229)**	25.9 (129)	24.3 (100)
4	**18.4 (167)**	17.9 (89)	19.0 (78)
5	**9.6 (87)**	9.8 (49)	9.2 (38)
6	**3.5 (32)**	2.8 (14)	4.4 (18)
7+	**2.8 (25)**	2.2 (11)	3.4 (14)
Smoking Status		**% (N)**	
Never Smoked	**49.5 (454)**	49.9 (249)	49.0 (205)
Former Smoker	**37.2 (341)**	39.3 (196)	34.7 (145)
Current Smoker	**13.3 (122)**	10.8 (54)	16.3 (68)
If current smoker, how many per day?			
1-10 cigarettes per day	**11.9 (54)**	4.0 (20)	7.9 (34)
11-20 cigarettes per day	**12.1 (56)**	6.0 (30)	6.1 (26)

20+ cigarettes per day	**2.7 (12)**	0.8 (4)	1.9 (8)
Weekly Alcohol Consumption		**% (N)**	
Yes	**80.5 (737)**	77.7 (387)	83.7 (350)
No	**19.5 (179)**	22.3 (111)	16.3 (68)
Number of days per week alcohol consumed?			
0	**2.0 (13)**	2.9 (10)	1.0 (3)
1	**45.2 (298)**	42.9 (150)	47.9 (148)
2	**26.7 (176)**	27.4 (96)	25.9 (80)
3	**15.6 (103)**	16.6 (58)	14.6 (45)
4	**4.1 (27)**	4.3 (15)	3.9 (12)
5	**3.2 (21)**	3.4 (12)	2.9 (9)
6	**1.1 (7)**	0.9 (3)	1.3 (4)
7	**2.1 (14)**	1.7 (6)	2.6 (8)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; SD = Standard Deviation; N = number; kg = kilograms; cm = centimetres; BMI = Body Mass Index; m^2 = metres squared; ++ denote significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined by Chi-Square. yrs = years; ACSM = American College of Sports Medicine; VO_{2max} = maximal oxygen consumption; ml/kg/min = millilitres per kilogram per minute. BMI & WC based on World Health Organisation Classifications (World Health Organisation, 2008)

** denotes significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined using an Independent T-Test.

++ denotes significant difference ($p<0.05$) between observed frequencies in the IG vs CG determined by Chi-Square.

denotes significant difference ($p<0.05$) between the IG and CG medians determined by Mann-Whitney

Table IV; Most prevalent modifiable cardiovascular disease risk factors presented at baseline

	Total	IG	CG
Risk Factor		**% (N)**	
<3 Days Physical Activity	**59.2 (532)**	64.5 (314)	53.0 (218)
Waist Circumference >102cm	**57.3 (526)**	67.3 (333)	45.6 (193)
Alcohol Consumption ≥14 Units (Europe)	**19.5 (141)**	18.4 (71)	20.8 (70)
Alcohol Consumption ≥17 Units (Ireland)	**9.1 (66)**	9.3 (36)	8.9 (30)
Current Smoker	**13.3 (122)**	10.8 (54)	16.3 (68)
Blood Pressure Medication	**8.9 (83)**	10.7 (54)	6.8 (29)
Cholesterol Medication	**7.6 (71)**	9.7 (49)	5.2 (22)
Prevalence of Risk Factors		**% (N)**	
Zero Risk Factors	**14.5 (135)**	10.3 (52)	19.3 (83)
1 Risk Factor	**32.4 (303)**	29.3 (148)	36.1 (155)
2 Risk Factors	**35.7 (333)**	40.4 (204)	30.1 (129)
3 Risk Factors	**13.2 (123)**	14.3 (72)	11.9 (51)
4 Risk Factors	**3.7 (35)**	4.9 (25)	2.3 (10)
5 Risk Factors	**0.5 (5)**	0.8 (4)	0.2 (1)

Key: IG = Intervention Group; CG = Comparison-in-waiting Group; N = number; cm = centimetres. BMI & WC based on World Health Organisation Classifications (World Health Organisation, 2008).

[1] Note, the WHO (2016) criteria for 'inactive (<3 days per week) and therefore 'at risk' of CVD is different to National PA Guidelines (30mins or more at least 5 days per week; (Department of Health and Children, 2009))

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Paper 2 The impact of a gender-specific physical activity intervention on the fitness and fatness profile of men in Ireland.

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Abstract

Background: Amid increasing concerns about rising obesity rates and unhealthy lifestyle behaviours, physical activity (PA) is seen as a prophylactic to many chronic conditions affecting men. Men respond best to community-based PA programmes, using gender-specific promotional and delivery strategies. 'Men on the Move' (MOM) was developed on this basis and targeted inactive adult men in Ireland. **Methods:** Sedentary men (n=927; age=50.7±10.9yr; Weight=92.7±16.0kg; METS=6.06±2.13) were recruited across 8 counties; 4 'intervention group' (IG; n=501), and 4 'comparison-in-waiting group' (CG; n=426). The MOM programme involved structured group exercise twice weekly for 12 weeks, along with health-related workshops with the groups maintained up to 52W. Primary outcome measures (aerobic fitness, bodyweight and waist circumference (WC)) together with self-administered questionnaires were used to gather participant data at baseline, 12, 26 and 52 weeks (W). **Results:** Results show a net positive effect on aerobic fitness, bodyweight and WC, with significant ($p<0.05$) net change scores observed in the IG compared to the CG (METS: 12W=+2.20, 26W=+1.89, 52W=+0.92; Weight: 12W=-1.72kg, 26W=-1.95kg, 52W=-1.89kg; WC: 12W=-4.54cm, 26W=-2.69cm, 52W=-3.16cm). The corresponding reduction in cardiovascular disease risk is particularly significant in the context of a previously inactive and overweight cohort. The high 'dropout' (42.7% presenting at 52W) however, is of particular concern, with 'dropouts' having lower levels of aerobic fitness and higher bodyweight/WC at baseline. **Conclusions:** Notwithstanding dropout issues, findings address an important gap in public health practice by informing the translational scale-up of a small controllable gender-specific PA intervention, MOM, to a national population based PA intervention targeting inactive men.

Key Words: Men's Health, Gender, Community, Physical Activity

Introduction

Globally, concerns about men's health have come under increased public health scrutiny (Richardson, 2004; White, de Sousa, de Visser, *et al.*, 2011; World Health Organisation, 2018a, 2018b); across the western world, men have a lower life expectancy than women (World Health Organisation, 2016a, 2018b) and have higher death rates for most of the leading causes of death and at all ages (World Health Organisation, 2016a, 2018b). The emerging obesity 'epidemic' on international public health agendas (World Health Organisation, 2018b), is also evident in Ireland, particularly among men (Department of Health and Children, 2008). Male obesity has more than tripled since 1990 (Morgan *et al.*, 2008) with just 30% of men in Ireland of 'normal' weight (Department of Health, 2015). Obesity is linked to cardiovascular and metabolic disease, musculoskeletal problems, decreased physical function, and cancers (Villareal *et al.*, 2005). Notably, central adiposity, which is specific to men (Krotkiewski *et al.*, 1983; Kuk *et al.*, 2005), is more relevant than total body fat in assessing obesity and in predicting associated health risks (Larsson *et al.*, 1984; Rexrode *et al.*, 1998). There is also an important gendered-dimension to obesity; unlike women, overweight/obese men tend to be unconcerned about excess weight until it has reached obesity proportions or has become associated with obesity-related co-morbidities (McPherson and Turnbull, 2005).

Physical activity (PA) is a prophylactic to many chronic conditions affecting men (Shook *et al.*, 2015; Soares-Miranda *et al.*, 2016). However, a high percentage of men in Ireland become less physically active with age and lead inactive lifestyles (Department of Health, 2015). Ireland's PA guidelines (Department of Transport Tourism and Sport, 2016) follow those defined by the World Health Organisation (WHO). Whilst not accounting for gender, there is increasing support for gender-specific approaches to increase PA levels among men. Notably, Ireland's National Men's Health Policy stresses the importance of PA as a hook in the development of 'gender-sensitive' health promotion initiatives for men (Department of Health and Children, 2009), whilst the recent WHO men's health strategy identifies recreational and sports settings as part of 'gender-transformative' health promotion approaches to engaging men (World Health Organisation, 2018a).

Evidence suggests that gender-specific strategies related to community-engagement, programme development and delivery, partnerships and capacity-building (World Health Organisation, 2007; Heath *et al.*, 2012; Lefkowich, Richardson and Robertson, 2015), are necessary in creating sustainable health promotion activities that appeal to 'hard-to-reach men' (Carroll, Kirwan and Lambe, 2014), or 'hard-to-engage-men' (Pringle *et al.*, 2011). Specifically, community-based interventions work best when they; use sports related stadiums/venues and associated branding as a hook; consult with men in setting out clear and tangible goals; create a safe, positive group dynamic that prioritises individual needs; use incentives; provide programmes free of charge or at minimal cost; and offer programmes outside of regular work hours (which enables unemployed men to engage without facing the stigma associated with being unemployed; Carroll *et al.*, 2018).

Despite this evidence, creating the right interventions in the right environments that engage men has proved difficult (White, de Sousa, de Visser, *et al.*, 2011). A Lancet report highlights that the effectiveness of PA interventions hinges upon more holistic approaches that address the determinants of PA at individual, behavioural, social, environmental, and policy levels (Foster *et al.*, 2014). However, this ideal can be challenging to translate within the realities of public health practice, particularly when engaging 'at-risk' sub-groups.

Building upon these guiding principles and strategies, 'Men on the Move' (MOM), was funded by the Health Service Executive (HSE) in Ireland as a gender-specific community-based 'beginner' PA programme for inactive adult men. This paper reports on the findings of a large pragmatic controlled trial of the MOM programme; primarily in terms of its impact, up to 52 weeks, on fitness and fatness variables, and also on participants' general health and well-being. Findings have informed the recent decision by the HSE to support the national roll out of MOM. This paper will support others seeking to (i) engage men in their health via PA interventions and/or (ii) translate gender-specific PA intervention trials to 'real-world' population-based intervention programmes.

Methods

The efficacy and replicability (Canavan, 2013) of MOM were investigated across eight counties with a view to disseminating the programme nationally. The full MOM study protocol is available elsewhere (Carroll *et al.*, 2018). Briefly, MOM is a free 12-week (W) programme targeting men who do not meet PA guidelines, are likely to be 'at risk' of cardiovascular disease (CVD; Kelly *et al.*, 2018) and is delivered through Local Sports Partnerships (LSPs – recreational sport providers). It comprises of structured group exercise for 1 hour twice weekly, along with health-related workshops (diet and mental well-being). The core components of the structured group exercise are cardiovascular fitness and strength and conditioning training; however, in keeping with good practice, some flexibility is catered for between programmes to ensure that core components were achieved in a way that best suited participants' needs. Post 12W, groups are maintained by LSPs as per their regular practice. Notably, ~70% [n=342] of the 501 men who presented at baseline attended over 50% of the programme i.e. they attended weekly. The study received ethical approval from Waterford Institute of Technology Research Ethics Committee and has been registered with the 'International Standard Randomised-Controlled Trial Number' registry [ISRCTN55654777].

Group Allocation

A pragmatic controlled trial was adopted for this study. Eight LSPs were selected for inclusion in the study; four in the 'Intervention Group' (IG) and four in the 'Comparison-in-Waiting Group' (CG). Each LSP had a target to recruit 105 men across 3 community settings; the programme was delivered at 12 IG sites with 13 CG sites. Randomisation of sites was not done because of the risk of contamination, particularly in rural areas. Group allocation occurred at LSP level and was not randomised; allocation was based on the point at which LSPs committed to the project.

Data Collection

All variables were assessed at baseline, 12W, 26W and 52W and were undertaken at designated group meeting times. Rescheduling of assessments was not possible. To minimise missing data, men were contacted by the LSP co-ordinator in the days before

data collection and the absence of data for an IG participant does not necessarily indicate dropout. Dropout was defined as an IG participant who attended baseline data collection only. Participant flow through the programme is presented in figure 1. Of those presenting at baseline, 63% of the IG and 73% of the CG had at least one follow-up assessment. At 12W, 50% of the IG and 61% of the CG were retested. At 52W 35% of the IG and 51% of the CG were retested.

All frontline MOM staff underwent data collection training to ensure standardised measurement and questionnaire administration across sites. To safeguard against inter-tester errors, the same personnel conducted weight, height and waist circumference (WC) measures across sites. The three primary outcome measures for this study were aerobic fitness, percentage bodyweight and WC. Aerobic fitness was assessed using the one-mile walk/run test and participation was lower for this variable than for others. Fitness scores were estimated using the Daniels and Gilbert equation (Daniels, 2013). Mental well-being was assessed via the Warwick-Edinburgh Mental Well-being Scale (WEMWBS; Stewart-Brown, 2008), with social well-being was assessed via the Berkman-Syme (Berkman and Syme, 1979) social network index at all time-points. Self-reported lifestyle behaviours were recorded via self-administered questionnaires, including PA, consumption of fruit and vegetables, smoking, consumption of alcohol and perception of health.

Data analysis

The intervention targeted a 1 MET increase in aerobic fitness, a 5% reduction in bodyweight and a 5cm reduction in WC. Numbers achieving those targets at 12W, 26W and 52W are presented as a percentage of (i) those tested at these time-points (best-case scenario) and (ii) those (n=628, n=548 for fitness) who participated in the programme to 12W and beyond (worst-case scenario). Missing data were not relevant for the best-case scenario analysis as only those present were included in the denominator at each time-point. All those with one post-baseline assessment were included in the denominator for this worst-case analysis (n=628), with imputation for missing data. The intervention effect on aerobic fitness, bodyweight and WC values was also determined by comparing the change scores from baseline at 12W (n=428-508),

26W (n=286-378) and 52W (n=269-390) between the groups using a one-way Analysis of Variance (ANOVA), without imputation for missing data. The ANOVA was undertaken using SPSS Complex Samples, which adjusts confidence intervals for the nesting of participants within 25 community groups.

Of the 501 men who were tested at baseline and allocated to the IG, 315 (programme participants) were present for at least one further assessment, with the remainder (n=186) classed as early dropouts. Baseline differences between the IG participants and early dropouts and baseline differences between the IG and CG were determined using independent t-tests, Mann-Whitney *U*-tests and Chi-square analysis as appropriate. Significance was set at *P*-value <0.05.

Results

In total, 927 men registered for MOM; IG (n=501) and CG (n=426). The comparative demographic group means were as follows; IG: age = 52.0±10.7 years, height = 174.6±6.5cm, weight = 94.2±16.0kg; CG: age = 49.3±11.4 years, height = 176.0±6.6cm, weight = 91.0±15.9kg. Key baseline characteristics are published elsewhere (Kelly *et al.*, 2018).

Intervention effect - mean differences

There was a positive intervention effect on aerobic fitness, bodyweight and WC, with significantly greater change scores from baseline in the IG compared to the CG at 12W, 26W and 52W (Table 1). Mean METS values were increased ($p<0.05$) by ~2 METS at 12W and 26W and still higher ($p<0.05$) than baseline (1.3 METS) at 52W. Bodyweight was reduced by 1.67, 1.92 and 2.07kg in the IG at 12W, 26W and 52W respectively. Waist circumference was reduced by 4.7cm, 4.5cm and 3.9cm in the IG at 12W, 26W and 52W respectively. There was some evidence of small CG changes in aerobic fitness and WC at 26W and 52W (Table 1). There was a positive intervention effect ($p<0.05$) on PA frequency and mental well-being at 12W and 26W but not 52W. There was no intervention effect on fruit and vegetable intake, alcohol consumption or social integration.

Intervention effect – percentage success rates

The 1 MET increase in aerobic fitness targeted in the intervention was achieved by 73%, 71% and 51% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 2). The 5% reduction in bodyweight targeted in the intervention was achieved by 13%, 16% and 22% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 2). The targeted 5cm reduction in WC in the intervention was achieved by 48%, 45% and 42% of the IG men who presented for testing (best case scenario) at 12W, 26W and 52W respectively (Table 2). When all IG programme participants are included in the denominator with imputation for missing data, the percentage success rates are reduced, particularly at the 52W time-point (Table 2). A small percentage of the CG also achieved the targeted changes at specific time-points, though the probability of achieving the 5cm reduction in WC was considerably higher in the IG (Table 2).

Comparison of programme IG participants (n=315) vs early dropouts (n=186)

At baseline, those allocated to the IG who went on to participate in the programme were slightly older, had higher levels of aerobic fitness and PA with a lower bodyweight and WC, compared to those who were classified as early dropouts (all $p<0.05$; Table 3). Compared to early dropouts, fewer programme participants self-reported health problems and more were in full-time employment or self-employment ($p<0.05$; Table 3).

Discussion

This evaluation of a community-based, multiple site, group PA intervention (MOM), used a partnership model to target at 'at-risk' men (Carroll *et al.*, 2018), with a view to scaling up the programme for national roll-out. Results demonstrated a considerable increase in aerobic fitness, evident at 12W, maintained through 26W with values still elevated 52W. The effects on bodyweight and WC were more modest but the initial losses were maintained through 26-52W. Findings provide strong evidence of

programme efficacy but do need to be considered in the context of the dropout that occurred in this real-world intervention.

Intervention efficacy was evaluated with reference to the change scores from baseline in the IG and CG but also in terms of the percentages that achieved the 1 MET fitness, 5% bodyweight and 5cm WC targets. The percentages achieving these targets were determined without and with imputation for missing data. The former approach reflects intervention efficacy in those who were part of the intervention at that time-point and available for testing, a likely best-case scenario, but indicative of results that can be achieved with ongoing participation in our MOM community groups. The latter approach, with imputation for missing data, reflects the successes that are likely to be achieved in a group of 'at-risk' men who were part of the MOM intervention at some post-baseline time-point. We considered this to be the most appropriate denominator when estimating the original participating group success rates as the economic costs of delivering the programme relate to the size of this group who continued beyond baseline. These best- and worst-case scenarios were similar at 12W but differences widened at 26W at 52W, particularly for those variables for which the intervention had the greatest effect.

The aerobic fitness data at 12 and 26W represent the most notable intervention effect. The >2 METS achieved post 12W in aerobic fitness equates to a potential 30% CVD risk reduction (Kodama *et al.*, 2009) and this was maintained to 26W. The 1 MET aerobic fitness target was achieved by over 70% of the 12 and 26W participants. There was a loss in fitness gains at 52W, potentially due to a summer break lag in programme momentum. Nevertheless, the average improvement of 1.3 METS at 52W equates to a potential 20% CVD risk reduction (Kodama *et al.*, 2009), and is particularly important in the context of a previously inactive and overweight cohort. Even with the worst-case analysis and allowing for the summer break, nearly one-third of the IG achieved the 1 MET target at 52W. In line with the fitness changes, there were increases in weekly frequency of PA participation in the IG through 52W. The intervention also achieved a positive mental well-being effect at 12 and 26W in ongoing participants, with a reduction in this effect at 52W. The mean change at 26W approximates the clinical meaningful score for the WEMWBS tool (Stewart-Brown, 2008).

The programme effects on bodyweight and WC were more modest; not surprising perhaps for a PA-focused intervention. If anything, the modest weight loss of ~2kg and targeted weight loss success rates were continuing to improve at 52W. It is unlikely that PA interventions will lead to a 5% change in bodyweight in the majority of participants. The significant reduction in WC at 52W (~4cm) equates to a CVD risk reduction of ~8% (De Koning *et al.*, 2007). This is particularly relevant to men who tend to accumulate adipose tissue in the trunk/abdomen (Krotkiewski *et al.*, 1983). Waist circumference provides an accurate reflection of total and abdominal fat accumulation and associated health risks (Lean, Han and Morrison, 1995). At 52W, the 5cm waist reduction target was achieved by 42% of ongoing participants and 26% of the MOM participant group, which is likely to have a meaningful impact on population health if replicated in a national rollout.

There were small unexpected positive changes in the CG, particularly in WC and fitness at 26 and 52W. These changes might be attributed to a CG who were gearing up for the commencement of the intervention promised to them after their 52W assessments.

The numbers presenting for retesting at 52W was the disappointing element of this programme. It was an unrealistic expectation that we would sustain the engagement of the large numbers who presented at baseline. Early dropout is more likely in a 'real-world' setting, but there will still remain a large cohort of 'at-risk' men for risk improvement with potential impact on population health and well-being. More concerning is the reduction in numbers between 12 and 52W which impacted on a widening of best and worst-case analysis differences between these time-points. Although MOM was modelled on 'Football Fans in Training' (FFIT), notably, FFIT was predominantly a weight loss intervention where participants were rewarded for undertaking assessments (Hunt, Wyke, *et al.*, 2014). Weight loss assessments were readily made and FFIT participants were sometimes assessed in their own homes (Wyke *et al.*, 2015). We were limited to conducting group-based assessments in community settings at designated times and not all missed assessments were lost to the programme. Nevertheless, strategies will be needed in a national rollout to retain men beyond 12W and to avoid a long summer break. Additionally, MOM would possibly

require restructuring to give more emphasis to healthy eating and weight management if targeting a 5% reduction in weight.

Although not the primary purpose of this study, the comparison of ongoing participants to early dropouts reveals some noteworthy differences. Dropouts were more overweight, inactive and less fit with greater health problems. A national MOM roll-out will need to be sensitive to these factors. The impact of self-reported health problems on early dropout was considerable and, clearly, alternative approaches will be necessary for this cohort. Further work relating to barriers and self-efficacy is needed (Dishman, Sallis and Orenstein, 1984). Findings also draw attention to the wider question of what constitutes 'success' in terms of adherence by 'at-risk' groups to health promotion interventions in real-world settings (HSE UK; Social Inclusion Branch, 2004).

The absence of randomisation is the other major limitation of this evaluation. Although differences at baseline between the IG and CG in fitness and fatness variables were small, they were, nevertheless, statistically significant in the contest of the large sample size. Randomisation at an individual level was not conducted within community settings because contamination was a major risk, especially in rural Ireland. We recognise the limitation of non-randomisation at group level but also assert that the decision regarding LSP group assignment, is often a natural occurrence in building successful community-based interventions of this type with multiple 'practitioner partners' (Farahani *et al.*, 2015). A number of LSPs were involved in the study's conception and funding application and were therefore allocated to the IG. The research team decided to accept the limitation of non-randomisation to safeguard against the potentially more negative impact that randomisation would likely have on the strong group dynamic within the network of partners and consequently the integrity of programme delivery.

In summary, the findings show that a gender-specific community-based physical activity (CBPA) programme can enable previously inactive men to achieve, and sustain, significant increases in aerobic fitness as well as significant reductions in weight, waist measurements and CVD risk. However, results highlight the challenges with maintaining adherence to CBPA interventions, particularly for 'at-risk' men. Against a backdrop of WHOs recent call for more 'gender-transformative' health promotion approaches to

engaging men (World Health Organisation, 2018b), findings address an important gap in public health practice by informing the translational scale-up of a small controllable gender-specific PA intervention, MOM, to a national population-based PA intervention targeting inactive men.

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Conflict of Interest: The authors have no conflicts of interest.

Key Points:

- Findings show that a gender-specific CBPA programme can enable previously inactive men to achieve, and sustain, significant increases in aerobic fitness as well as significant reductions in weight, waist measurements, and CVD risk.
- Findings have prompted the national roll out of 'Men on the Move' in Ireland from 2019.
- The results presented highlight the challenges with maintaining adherence to CBPA intervention for men, particularly amongst those most 'at-risk'.
- Findings address an important gap in public health practice by informing the translational scale-up of a small controllable gender-specific PA intervention to a national population-based PA intervention targeting inactive men.

Table 1: Change scores of the IG and CG between baseline and 12W, 26W and 52W

	Baseline	Baseline to 12W	Baseline to 26W	Baseline to 52W
		Mean±SE (N)		
Fitness (METS)				
IG	5.61±1.75 (435)	2.27±0.28* (216)	2.34±0.29* (124)	1.32±0.13* (119)
CG	6.60±2.41[#] (362)	0.07±0.14 (212)	0.45±0.17 (162)	0.40±0.14 (150)
Waist Circumference (cm)				
IG	107.71±12.44 (495)	-4.67±0.62* (246)	-4.51±0.87* (171)	-3.88±0.64* (170)
CG	102.12±13.08[#] (423)	-0.13±0.43 (255)	-1.82±0.47 (197)	-0.72±0.42 (211)
Weight (kg)				
IG	94.12±16.04 (501)	-1.67±0.29* (250)	-1.92±0.32* (178)	-2.07±0.27* (174)
CG	91.01±15.87[#] (426)	0.05±0.19 (258)	0.03±0.19 (200)	-0.18±0.19 (216)
BMI (kg/m^2)				
IG	30.83±4.67 (501)	-0.55±0.09* (250)	-0.64±0.11* (177)	-0.68±0.09* (174)
CG	29.40±4.96[#] (425)	0.02±0.06 (258)	0.01±0.806 (200)	-0.06±0.06 (216)
Number of days Physical Activity per week totalling 30 minutes or more				
IG	3.02±1.97 (485)	1.03±0.11* (237)	1.04±0.14* (170)	1.49±0.77* (170)
CG	3.61±2.19[#] (410)	0.11±0.10 (246)	0.33±0.12 (192)	0.40±0.19 (202)
Previous day Fruit and Vegetable intake (portions)				
IG	3.93±1.5 (496)	0.46±0.13 (244)	0.43±0.13 (175)	0.19±0.13 (173)
CG	3.97±1.7 (410)	0.08±0.06 (248)	0.21±0.09 (189)	0.36±0.05 (202)
Weekly Alcohol Consumption (units)				
IG	9.69±5.4 (385)	0.06±0.17 (182)	-0.02±40.39 (121)	-0.66±0.29 (133)
CG	9.92±5.1 (333)	-0.22±0.20 (201)	-0.38±0.28 (155)	-0.49±0.05 (156)
Mental Well-Being (WEMWBS)				
IG	50.90±8.1 (466)	2.23±0.52* (204)	2.90±0.50* (151)	1.88±0.42 (150)
CG	52.06±8.0[#] (393)	0.30±0.37 (226)	0.35±0.56 (182)	0.89±0.45 (186)
Social Integration (BSSNI)				
IG	16.41±6.1 (418)	-0.28±0.28 (187)	0.38±0.31 (125)	0.28±0.31 (123)
CG	16.45±6.0[#] (361)	-0.53±0.24 (201)	-0.48±0.28 (150)	-0.28±0.29 (161)

a = statistical significance (P<0.05) compared to group baseline score. The analysis takes into account the change between groups from baseline.

b = statistical significance (P<0.05) compared to change score in CG.

W = week; SD = Standard Deviation; N = number; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; IG = Intervention Group; CG = Comparison-in-waiting Group; BMI = Body Mass Index; WEMWBS = Warwick-Edinburgh Mental Well-being Scale; BSSNI = Berkman-Syme Social Network Index.

Table 2: Best- and worst-case scenario for the percentage of men who achieved targeted changes in fitness and fatness at 12W, 26W and 52W

	N = without imputation (N = with imputation)	IG	CG	Relative Risk of achieving target in IG
FITNESS (METS)				
1 MET increase in fitness @ 12W	428	73.1%	18.4%	3.98 (95% CI 2.96 – 5.34)
	(548)	(68.5%)	(18.3%)	3.74 (95% CI 2.85 – 4.91)
1 MET increase in fitness @ 26W	286	71.0%	24.7%	2.87 (95% CI 2.15 – 3.85)
	(548)	(43.5%)	(19.5%)	2.23 (95% CI 1.68 – 2.97)
1 MET increase in fitness @ 52W	269	51.3%	20.0%	2.56 (95% CI 1.78 – 3.69)
	(548)	(31.4%)	(13.9%)	2.00 (95% CI 1.61 – 3.19)
WAIST CIRCUMFERENCE				
5cm reduction in waist circumference	501	48.4%	10.4%	4.66 (95% CI 3.19 – 6.81)
@12W	(624)	(44.3%)	(10.6%)	4.19 (95% CI 2.94 – 5.88)
5cm reduction in waist circumference	375	45.4%	20.4%	2.23 (95% CI 1.62 – 3.06)
@26W	(624)	(30.6%)	(15.2%)	2.02 (95% CI 1.48 – 2.75)
5cm reduction in waist circumference	389	42.0%	15.8%	2.65 (95% CI 1.86 – 3.78)
@52W	(624)	(26.1%)	(12.6%)	2.08 (95% CI 1.47 – 2.94)
WEIGHT				
5% reduction in bodyweight @12W	511	13.5%	1.5%	8.81 (95% CI 3.17 – 24.45)
	(628)	(13.0%)	(1.3%)	10.19 (95% CI 3.69 – 28.10)
5% reduction in bodyweight @26W	378	16.3%	4.5%	3.62 (95% CI 1.76 – 7.44)
	(628)	(12.1%)	(3.8%)	3.15 (95% CI 1.68 – 5.91)
5% reduction in bodyweight @52W	391	21.8%	5.5%	3.95 (95% CI 2.13 – 7.32)
	(628)	(13.7%)	(4.8%)	2.85 (95% CI 1.62 – 5.02)

Note: Percentages have as the denominator those who presented for retesting at each time-point and also (in parenthesis) all those who engaged with the programme beyond the baseline assessments with imputation for missing data

N = number; IG = Intervention Group; CG = Comparison-in-waiting Group; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; W = week; CI = Confidence Interval; cm = centimetre.

Table 3: Baseline characteristics of Intervention Group Participants (n=315) and Early Dropouts (n=186)

	Participants (PT)	Dropouts (DO)	
	Mean±SD (N) / Mean (IQR) / % (N)		p-value
Age, Fitness and Fatness			
Age (years)	52.7±10.2 (311)	50.7±10.9 (182)	p=0.040
Weight (kg)	92.2±14.1 (315)	97.3±18.5 (186)	p<0.001
Waist Circumference (cm)	105.9±10.8 (310)	110.7±14.3 (185)	p=0.003
BMI (kg/m^2)	30.1±4.1 (315)	32.1±5.3 (186)	p=0.010
METS	5.7±1.8 (294)	5.3±1.7 (139)	p=0.022
Mental well-being and social integration			
Mental Well-Being (WEMWBS)	51.61±7.8 (297)	49.64±8.6 (169)	p=0.140
Social Integration (BSSNI)	16.43±6.1 (272)	16.38±6.1 (146)	p=0.623
Perceived health status and self-reported health behaviours			
% self-reporting health problems	32.9 (96)	50.6 (86)	p<0.001
Physical activity >30minutes (days/week)	3.0 (1.0 – 4.0)	2.0 (1.0 – 4.0)	p=0.033
Previous day fruit and veg intake (portions)	4.0 (3.0 – 5.0)	4.0 (3.0 – 5.0)	p=0.359
% who are current drinkers	79.2 (248)	75.4 (138)	p=0.323
Weekly Alcohol Consumption [a]	8.0 (6.0 – 12.0)	10.0 (7.5 – 14.0)	p=0.086
% who currently smoke	9.3 (29)	13.5 (25)	p=0.144
Education, martial and employment status			
% reporting some third level education	43.7 (136)	39.9 (73)	p=0.404
% married/co-habiting [b]	79.9 (250)	74.7 (139)	p=0.180
% in full time employment or self-employed [c]	65.0 (204)	53.3 (98)	p=0.010

Note: Statistical significance *P*-value <0.05.

a Alcohol Units; Pint = 2 units, ½ Pint = 1 unit, Glass of wine (large) = 2 units, Spirit measure = 1 unit.

b Other categories; separated/divorced, widowed, single, in a relationship

c Other categories; looking after family home, student, employed (part-time), unemployed, retired, volunteer, unable to work due to long-term illness

PT = Participants (participant in intervention group who attended baseline and at least one other data collection); DO = Dropouts (participant in intervention group who attended baseline data collection only); SD = Standard Deviation; IQR = Inter-Quartile Range; N = number; kg = kilograms; cm = centimetres; BMI = Body Mass Index; METS = 1 metabolic equivalent (1 MET) = 3.5ml/kg/min; WEMWBS = Warwick-Edinburgh Mental Well-being Scale; BSSNI = Berkman-Syme Social Network Index,

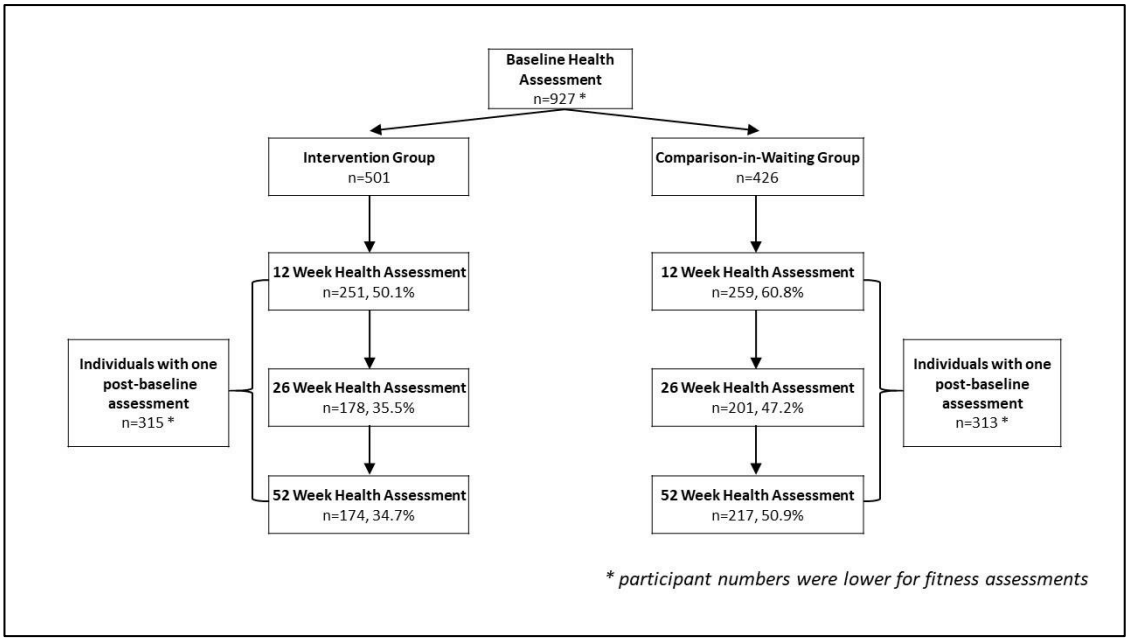

Figure 1: Participant flow through the MOM programme

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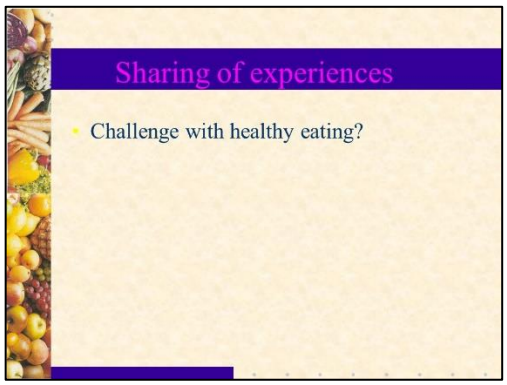
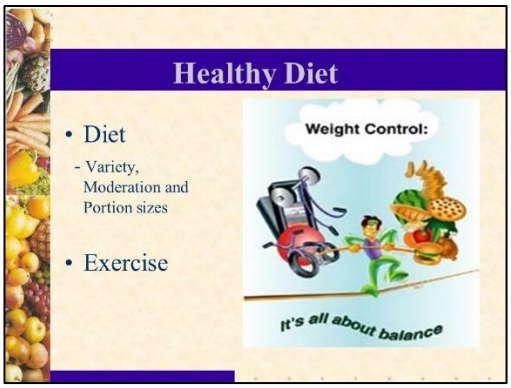
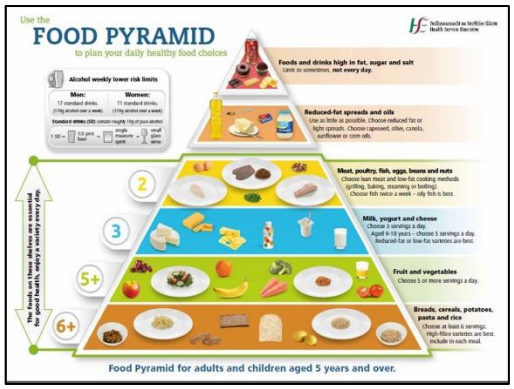
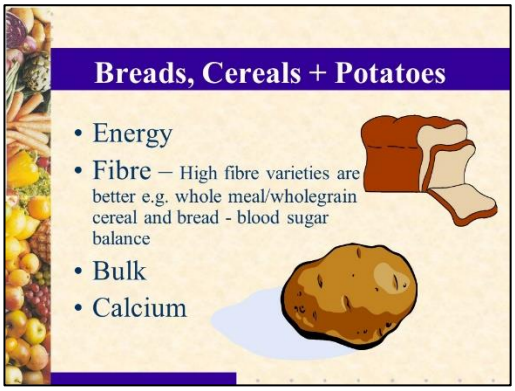
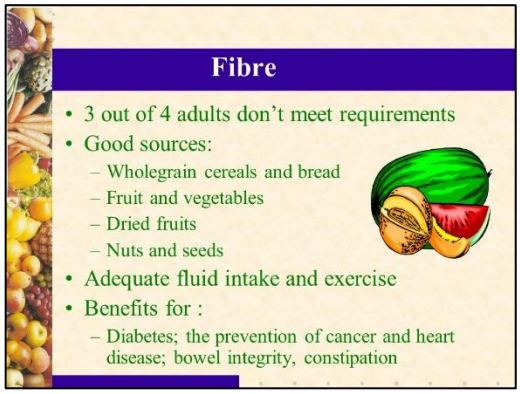
Appendix C Sample of Men on the Move Nutrition Workshop

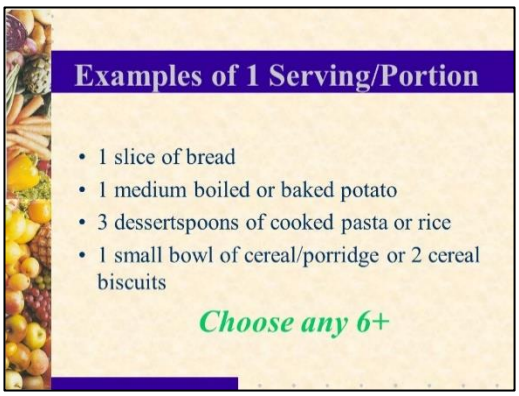


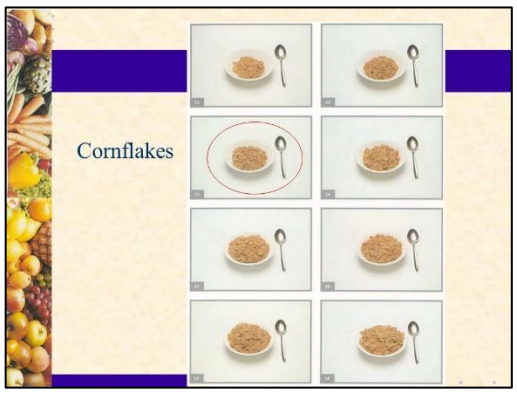




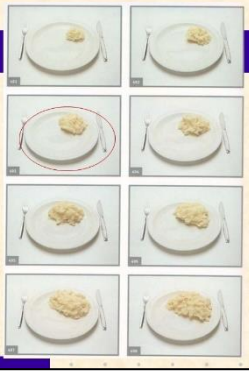




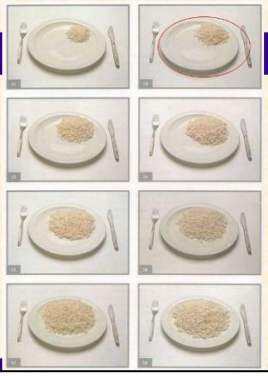




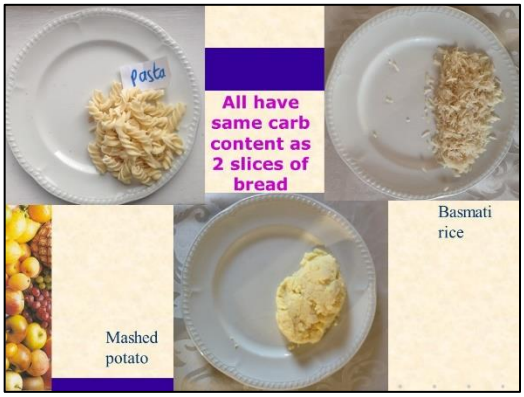
Mashed Potato



Rice



- These are all 1 portion of carbohydrate (circled)
- Can overeat and not realise
- If do it on a daily basis can gain weight



Fruit and Vegetables

- Antioxidant Vitamins A,C+E
- Vitamin A: healthy skin and eyes
- Vitamin C: wound healing, healthy gums, helps iron absorption
- Fibre
- Low in calories

Examples of 1 Serving/Portion

Try to eat at every meal and as a regular snack

- Half glass of unsweetened fruit juice
- 1 medium sized fresh fruit
- 3 dessertspoons of cooked /tinned fruit
- 3 dessertspoons of cooked vegetables/salad
- Small bowl of homemade soup

Choose any 5+

Milk, Cheese & Yoghurt

- Calcium - Strengthens bones
- Helps in prevention of osteoporosis
- Energy
- Protein
- Vitamins and Minerals

Examples of 1 Serving/Portion

- 1/3 pint/200mls of milk
- 1 carton of yoghurt (125g)
- 1oz/30g Chedder, Blarney or Edam cheese
- Milk pudding made with 1/3 pint of milk

Choose any 3

Low fat options

Vitamin D

- Needed for absorption of calcium and bone health
- Manufactured from UV rays on the skin

FOODS RICH IN VITAMIN D:

- Oily fish
- Eggs
- Liver, Pate
- Margarines fortified with Vitamin D

Meat, Fish, Eggs, Beans and Peas

- Protein
- Fuel for muscles (muscle maintenance)
- Vitamins and Minerals – particularly Iron

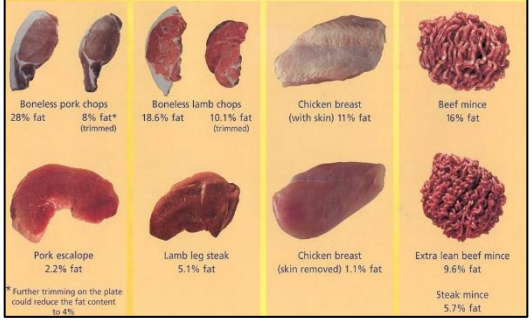
Examples of 1 Serving/Portion

- 2oz/60g of lean meat or poultry
- 3oz/90g cooked fish
- 2 eggs (not more than 7 per week)
- 9 dessertspoons of peas/beans
- 2oz/60g cheese
- 3oz/90g nuts

Choose any 2

Opt for lean/ low fat options

Lower-fat cuts of meat and poultry are available. However an added advantage of these meats over some other foods is that the fat can be removed easily both before and after cooking



Top Shelf

- High in Fat, Sugar, Calories

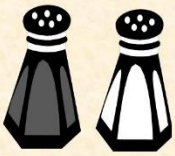
- Sugary snacks
- Cakes biscuits
- Mayonnaise and cream
- Fizzy drinks
- Oils and spreads

– use Olive, rapeseed, sunflower, soya, corn oil

VERY SMALL AMOUNTS!

Other tips

- Use a variety of seasonings, try not to rely on salt to flavour foods



- Fluids
- At least 8 cups a day

Alcohol

Low risk drinking:

- Up to 17 standard drinks men
- Up to 11 standard drinks women
- > 5 std drinks in one sitting = binge
- Have with food

- ↑ **blood pressure**
- ↑ **triglycerides**

Alcohol and weight

- **Calorie guide**

  Pint cider: 210 calories
  Pint lager: 200 calories
  Pint stout: 170 calories

  Longneck cider: 122 calories
  Longneck alcopop: 220 calories
  Medium glass wine (175ml): 130 calories
  Pub measure vodka, gin, brandy, whisky: 80 calories
  Pub measure cream liqueur:120 calories

- **How long would it take to burn off those calories?**

  1 pint of lager:
  Walk?
  Swim?
  Dance?

Alcohol and weight

1 pint:

Walk for 50 mins
Swim for 30 mins
Dance for 35 mins
Play golf for 1 hour & 20 mins
Do aerobics for 32 mins

5 pints: 4hr 10 min walk

5 whiskies/brandies: 1hr 20 min walk

Calories on menus can help consumers to choose smaller portions.

Food portion sizes available to consumers have become much bigger in recent years. Bigger portions lead consumers to eat more calories.

TURKEY SANDWICH

20 Years Ago	Today
	
320 calories	? How many calories are in today's turkey sandwich?

TURKEY SANDWICH

20 Years Ago	Today
	
320 calories	820 calories

Caloric Difference: 500 calories

Maintaining a Healthy Weight is a Balancing Act

Calories In = Calories Out

? How long will you have to ride a bike in order to burn those extra calories?*

*Based on 160-pound person

Calories In = Calories Out

If you ride a bike for **1 hour and 25 minutes**, you will burn approximately **500 calories.***

*Based on 160-pound person

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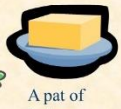
Food and heart health:

- Irish Heart Foundation: not necessary or recommended; wider range of health benefits from eating more fruit & veg every day

Which has the most Calories?

½ pint beer



A pat of butter

1oz toffee

Portion of chicken

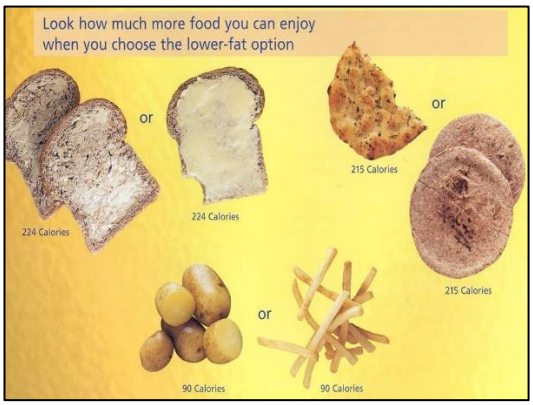
A jacket potato

Portion of vegetable

Tablespoon of oil

Answer

- All 100 kcal
- If cut out 100kcal a day, in a year would lose 10-14lbs



How do I know which products or brands are healthier?

Nutritional Labels

38

By understanding food labelling

- Healthier eating through informed choices
- More variety in diet

39

Supermarket Nutrition Tours

40

Advertising

95% Fat Free

or

Low Fat?

41

Labelling

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Examples

Product	Fibre /100g	Sugar/100g	Fat/100g	Salt/100g	Cost
Weetabix	10g	4.4g	2g	0.65g	€2.65 for 24
Dunnes Wheat Bisk	10g	4.4g	2g	0.65g	€1.49 for 24
Aldi Harvest Morn Wheat Bisks	10g	4.4g	2g	0.65g	€1.99 for 36

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Nutritional information

Energy	378kcal			
Protein	7g	15g	13g	5g
Carbohydrate	84g	75g	76g	85g
Of which sugars	8g	17g	23g	35g
Fat	0.9g	1.5g	3g	2.5g
Of which saturates	0.2g	0.5g	1.5g	1g
Fibre	3g	2.5g	2.5g	2g
Sodium	0.5g	0.45g	0.35	0.3g

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Supermarket Tours

It's not only about what we eat, but also HOW we eat

Comments?

Getting the balance right

- Most people gain weight gradually over the years e.g.

Gain 2lbs/year
= 7 years, 1 stone heavier
= 14 years, 2 stone heavier

2lbs/year is only 20calories per day
e.g. ¼ slice bread or ½ teaspoon margarine

Energy balance

What can you do

- MORE ↑
  - Fibre
  - Fruit
  - Vegetables
  - Balance
  - Regular Meals
  - Physical activity
  - ENJOY!

- LESS ↓
  - Fat
  - Salt
  - Sugar
  - Processed Food
  - Snacking
  - Alcohol in moderation

Useful Websites

www.healthpromotion.ie
www.hse.ie
www.indi.ie
www.weigh2live.eu
www.getirelandactive.ie
www.fsai.ie

Thank you

Men on the Move
The best MOVE you'll ever make

Thank you!

Any Questions?

Appendix D Sample of Men on the Move Well-being Workshop

Sample 1: Men on the Move, Well-being Workshop Mayo. Presented by Paul Gillen

Introduction and welcome to all: Introduced myself and gave background to the workshop (part of a national study). Asked each person to say in one word what MOTM meant to them…to give everyone a chance to speak

Activity 1
Brainstorm what 'Wellbeing' meant to them - took down all response and discussed

Activity 2
Asked the men to think of two or three scenarios that they found it hard to cope…

- Under pressure at work or on the land or at sea - boss keeps piling on the work no feedback from boss but workload increases
- A good friend betrays your confidence
- You are caught for speeding at 53km p
- You notice you have a flat tire as you are about to sit in the car on your way to a wedding.

I took down all responses, and emotions felt

Activity 3

- Brainstorm what coping strategies do we normally employ as we try to deal with the emotions mentioned—listed all coping strategies mentioned
- Then we discussed the strategy in terms in it being helpful/unhelpful/useless

Activity 4

- Input Re the importance of recognising emotions….a normal response to everyday ups and downs.
- Recognising emotions allow us to deal with the situations…form of protection vis a vis fear, worry need help etc.
- Importance of not concealing our emotions - panic, fear, grief, anger, worry - impact on body re stress hormones and health outcomes
- Importance of finding our support - to talk out our emotions - cllr, priest, friend, partner, GAA club, write it down, paint it…
- Recognise intense emotions - things to do to prevent intense emotions leading to rash behaviour - count to 10, do PA, empathise, do nothing - walk away, talk it out, gain perspective, do something you enjoy…
- Importance of establishing a network of support - I asked each man to write down their network of support once they got home…

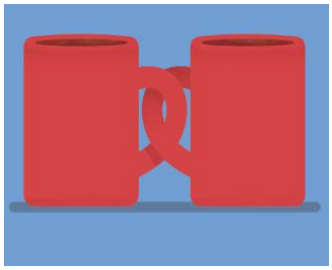
Activity 5

- Looked at the Little things coping strategies and we discussed these - I asked the men to choose two that they could relate to when they needed to

I gave them the link to the 'Little things' campaign

Thanked them for coming

Sample 2: Men on the Move, Well-being Workshop Mayo.



Men on the Move
#littlethings Wellbeing Workshop

Target Group: Participants of the "Men on the Move" Programme, adult men involved in what is primarily a physical activity programme.

Introduction
The aim of this workshop is to introduce and explore the concept of wellbeing and our understanding of it. #little things is a mental health and wellbeing campaign from the H.S.E.'s National Office for Suicide Prevention, created in partnership with over 20 organisations. The campaign has three messages to share. We want to increase the number of people who believe and know that the following are true:

- We all experience life's storms – the day to day difficulties that are an ordinary, everyday part of life. Things like stress, grief, and feeling down, worried or anxious.
- There are things that you can do for yourself and others that will have a positive impact on how you feel and how you cope.
- You can find out more about the #littlethings and about mental wellbeing on yourmentalhealth.ie, or call Samaritans on 116 123 for a listening ear. There are also many local supports available to people within their own communities. (See attached list for local support services).

Objectives
Participants will be able to

- Define wellbeing
- Identify the little things that can impact wellbeing and the supports available to maintain positive mental health and wellbeing

Materials

- Tennis ball, Flipchart and markers, Audio/visual equipment, #littlethings posters and postcards, Pens, and Handout – definitions of wellbeing & supports available

Time: 1 Hour

Facilitator: Resource Officer for Suicide Prevention

Activities

- Introduction and getting here exercise
- Brainstorm in small groups
- The experience
- Small group work
- Feedback to large group
- The postcards
- Closing round

Due to time constraints evaluation of the wellbeing workshop will become part of the overall evaluation of the "Men on the Move" Programme

Getting here and introduction

The facilitator introduces the session.

The getting here exercise is an energiser. The facilitator(s) starts by holding a tennis ball, she introduces herself and shares one thing about herself that others would not ordinarily know, she then throws the tennis ball to the next person and so on until everyone has spoken. (The assumption here is that the focus within the group so far has been on physical activity so there may not have been much "sharing", using the tennis ball emphasises the "Men on the Move" theme.)

Brainstorm

The participants will split into groups of four or five and will be asked to brainstorm all of the words they associate with the term wellbeing, the groups will feedback the information to the room and these will be recorded on the flipchart.

The Experience

The experience in the workshop is three short recordings, Una's Story, Robert's Story and Alan's Story. Each recording lasts approximately 30 seconds. In each case the individual tells of his/her experience and of the little things that he/she did to cope when life became difficult for him/her.

Small Group Work

Each small group will be given the opportunity to discuss the individual experiences they have heard within the context of wellbeing. Each group will nominate a speaker to relay the discussion to the larger group. (Use the processing questions as a guide for discussion within the small groups).

Processing in the large group

The key questions are:

a) What were the prominent feelings experienced by Una, Robert and Alan?
b) What are the little things that a person can do to maintain and/or improve wellbeing?
c) Did any of the characters/stories resonate with you, what are your signs and symptoms when things may not be going too well?

(Direct the participants to where stress signals are outlined in the "Men on the Move" handbook)

The Postcards

There are nine key messages within the #littlethings campaign, each participant is invited to take a postcard with the message that speaks to them, and everyone will also be given a blank postcard to record their own little thing. The postcards will lead into the closing round.

Closing Round

Each participant will be asked:

1. What is the little thing that you would like to share in tonight's workshop? (You can either use one of the nine messages that is significant for you or the #littlethings that you recorded for yourself).
2. Participants will be invited to post their completed postcards in a box and the facilitator will submit their #littlethings to yourmentalhealth.ie (These submissions will be anonymous).

Note: The #littlethings campaign is about tackling human distress using Social Contact Theory. The campaign argues that prevention and resilience building is what is most effective and that mental health is a continuum, the earlier that one gets appropriate help the less likely one is to experience extreme distress.

Appendix E Men on the Move Health Information Booklet

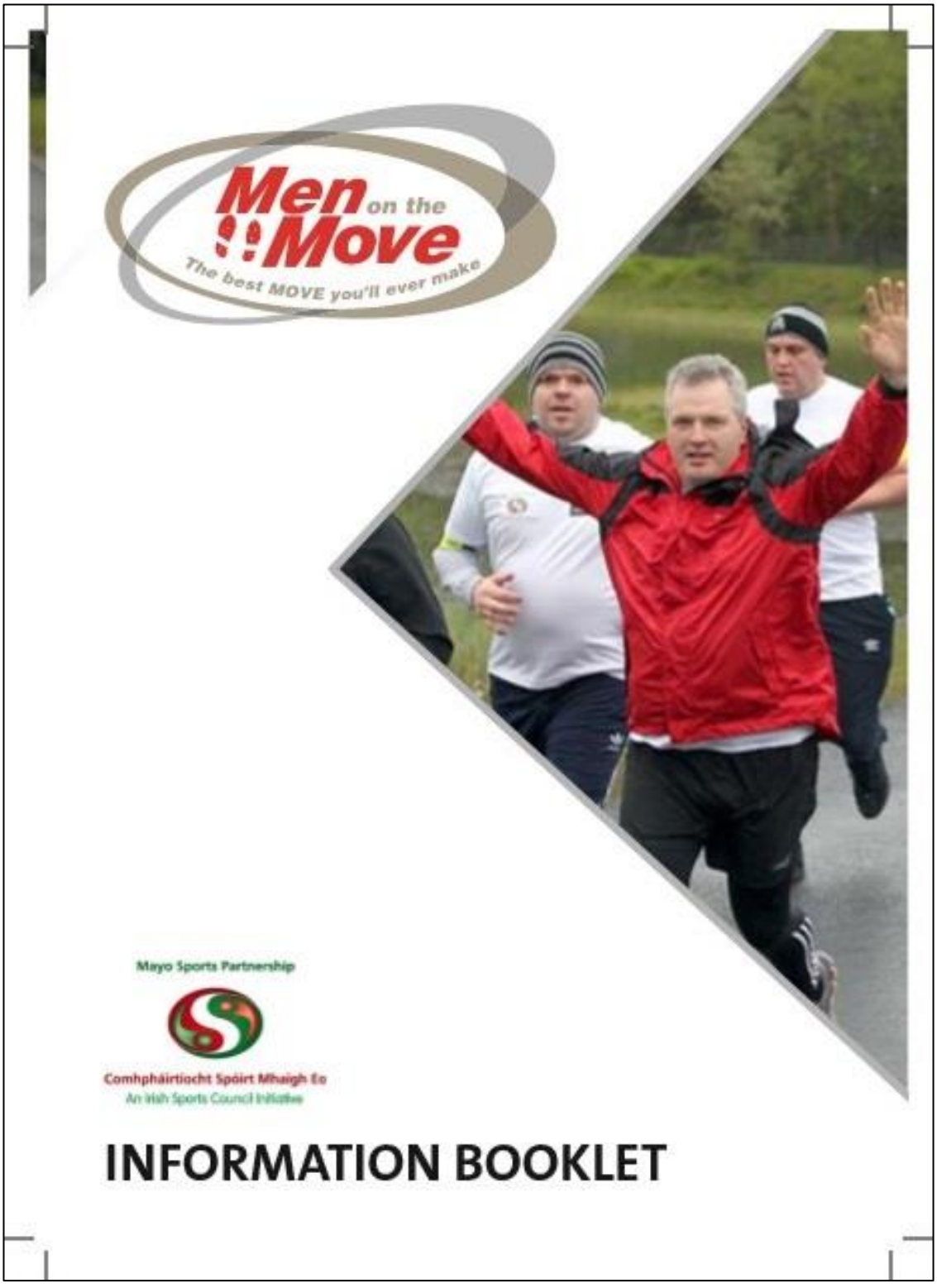


Table of Contents

What is Men on the Move?

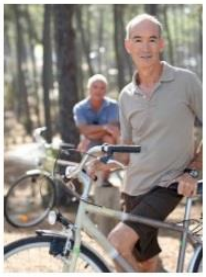
Men on the Move is a physical activity programme that is aimed at adult men to get them active, have fun and improve their fitness levels. It involves twice weekly activity sessions that are leader led. You don't need to be fit to take part; the physical activity sessions are structured so that you can find the level appropriate for you to join and progress your fitness at a pace that suits you!

What do I need to wear?

- Wear a **tracksuit/jogging bottoms** and a **t-shirt/sweat shirt**. Jeans are uncomfortable when doing physical activity and when wet.
- Wear **layers**. It may be cold some nights but you will warm up quickly so a couple of layers are much easier than one big jumper.
- Bring lightweight, **waterproof** top and bottoms in case of rain.
- Wear **trainers/runners** to all sessions.
- Bring a **bottle of water** to all sessions.

How do I know if I am working at the right pace?

- If you can talk while you are doing physical activity you are probably moving at a pace that is right for you.
- If you are too breathless to talk you should slow down.
- If you can sing while doing the physical activity you may not be working hard enough so you should pick up the pace.



Get up! Get out! Get going!

Why get physically active?

Regular physical activity can prevent and help prevent different health conditions including heart disease, stroke, diabetes, a number of cancers, osteoporosis and depression. Physical activity also helps you to reduce stress, improves your sleeping, builds up your bone and muscle strength and helps you to control your weight.

However, too many men in Ireland are not doing enough physical activity to have good health. Some reasons for this are:

- Many men use their cars more than they walk or cycle.
- Some men stop doing sport when they feel that they can no longer do it competitively.
- Many men find it hard to get time when balancing their work and family life.

The latest figures show that 70% of men in Ireland are either overweight or obese.

So how much physical activity is enough?

People should do 30 minutes of activity five times a week [see Page 4 for information on what pace is good for you]. Activity can be anything from walking the dog to doing something more structured such as going to the gym or doing the 'Men on the Move' programme.

So what physical activities can I do?

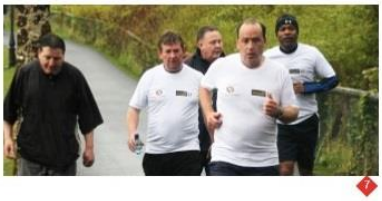
Aim to do a little activity most days of the week either on your own or with someone else. Making just a few small changes to your everyday routine can make a big difference to your health. You can choose from the examples listed below:

- Wash your car by hand every week,
- Play active games with your children,
- Take your dog for a walk,
- Cut the grass and dig over the flower beds,
- Play video games that get you moving, such as Wii Sports or Kinect,
- Walk to the bus or the train and jump off a stop or two before your destination,
- Use the stairs rather than the lift.

Get up! Get out! Get going!

Ten reasons for you to be physically active any way, anywhere…

1. **Energy.** Activity helps to give you more energy and helps you to be more alert.
2. **Metabolism.** You burn more energy as a result of being active, so it's great for maintaining or losing your weight.
3. **Mood.** Activity creates the "happy hormones" which makes you feel good.
4. **Concentration.** Activity helps to re-focus your mind and improves the quality of your work and how much work you do.
5. **Stress.** Activity can help to relax your mind and body and helps to reduce the build up of tension.
6. **Strength.** Regular activity helps to keep your bones and muscles strong including your heart.
7. **Health.** Regular activity can help to improve your quality of life. It can help you to reduce the risk of developing diseases such as heart disease, stroke, obesity, diabetes, a number of cancers, anxiety and osteoporosis.
8. **Immunity.** Activity boosts your immune system, helping to stop you getting ill.
9. **Self-esteem.** Physical activity can help you to develop skills, build confidence and feel more in control of your life.
10. **Social life.** Doing activities in teams, clubs or leisure centres is great for meeting people and can help you meet new friends.



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Functional Fitness

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Functional Fitness

What is functional fitness?

We usually associate the term **physical fitness** with people who play sports like gaelic games, rugby, athletics etc. Depending upon the sport, sports people will need to develop various types of physical fitness. The footballer will need to develop **speed** in order to beat opponents in the chase for the ball. The rugby player will need to improve **strength** in order to be successful in scrums. **Power** is a key component for the high jumper, while **flexibility** is important to prevent injury.

Most of us, however, need to be fit to get us through daily life with ease. This type of fitness is called **functional fitness**. The components of functional fitness are:

1. Muscle strength
2. Joint mobility
3. Aerobic fitness
4. Stretching

Muscle strength

Please get your 'Men on the Move' physical activity tutor to demonstrate the exercises before attempting them.

Muscle strength keeps you strong as you get older; it helps you to grip, push, pull, lift, climb, get you from sitting to standing and help you get back up if you fall over.

Here are some strength exercises that can be done on a daily basis to help build your muscle strength:

- Calf raises
- Squats
- Lunges
- High knees
- Front raise
- Side raise
- Overhead raise
- Press ups

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Functional Fitness

Joint mobility

Please get your 'Men on the Move' physical activity tutor to demonstrate the exercises before attempting them.

Good joint mobility gives you a range of movement allowing you to bend, reach, twist and turn.

Here is a list of mobility exercises. Aim to do these even a few times a day:

- **Head:** Stand straight, slowly turn your head from side to side.
- **Shoulders:** Stand straight, start by rolling your shoulders in small backward circles and slowly make the circles bigger. Then slowly roll your shoulders forward, again starting small and slowing making the circles bigger.
- **Trunk:** Stand straight with your feet hip width apart, place one hand on top of the other on your chest bone, keeping your elbows high. Slowly, turn your shoulders to one side until you feel a mild stretch on your waist. If you can, continue to turn until you are looking behind you and lift your heel as you continue to turn. Slowly return to facing forward and repeat the movement on the other side.
- **Hips:** Standing straight with your feet hip width apart and feet flat on the floor, make circles with your hips in one direction and then repeat the movement in the other direction.
- **Knees:** Standing straight, lift one knee at a time to march on the spot. Initially, start with a low lift and work towards bringing your knee to hip height.
- **Ankles:** Hold on to something for balance e.g. the back of a chair. Lift one foot off the ground and with a pointed toe, start to make small circles in one direction with your foot. Then slowly reverse the direction of the circle.

Aerobic Fitness

Please consult your 'Men on the Move' physical activity tutor about which level of intensity is most appropriate for you.

Aerobic fitness allows you to move at pace without getting out of breath. It is achieved by doing aerobic activities on a regular basis. Aerobic activities are done at an intensity that challenges your heart and lungs to work harder and these can be either a **moderate intensity level** or **vigorous intensity level**:

Moderate intensity level: activities include fast walking, swimming, dancing or water aerobics.

Vigorous intensity level: activities include jogging, aerobics, basketball, fast swimming and fast dancing.

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Functional Fitness

Stretching

Please get your 'Men on the Move' physical activity tutor to demonstrate these stretches before attempting them.

To warm up and cool down from being active, it is important to stretch. Stretching helps our joints to move, enhances the effects of being active and can also help to prevent injury. The stretches listed here should be held for approximately 10 seconds. Holding stretches for slightly longer can help improve flexibility e.g. 20-30 seconds.

How will I know if I am stretching properly?
When you perform a stretch correctly, you will feel **mild discomfort** in stretched muscles. **STOP** if you feel pain or a stabbing sensation.

Chest stretch

- Stand straight with feet wider than shoulder width apart and knees slightly bent.
- Hold your arms out to the side parallel with the ground and the palms of your hands facing forward.
- Stretch your straight arms back as far as possible.
- You should feel the stretch across your chest.

Upper back stretch

- Stand straight with feet wider than shoulder width apart and knees slightly bent.
- Interlock your fingers and push your hands as far away from your chest as possible allowing your upper back to relax.
- You should feel the stretch between your shoulder blades.

Functional Fitness

Shoulder stretch

- Stand straight with feet wider than shoulder width apart and knees slightly bent.
- Bring your right arm across your chest, parallel to the ground.
- Bend your left arm up and use your left forearm to ease the right arm closer to your chest.
- You will feel the stretch in your shoulder.
- Repeat with the other arm.

Side Bends

- Stand straight with feet wider than shoulder width apart, knees slightly bent and hands resting on your upper thighs.
- Bending from the hip, slowly lean to one side and run your hand down the side of your leg. Come back to standing straight and again, bending from the hip, lean to the other side.
- You will feel the stretch in the side of your body that is moving upwards.
- Please note that you should not bend forwards or backwards when leaning to the side.

Functional Fitness

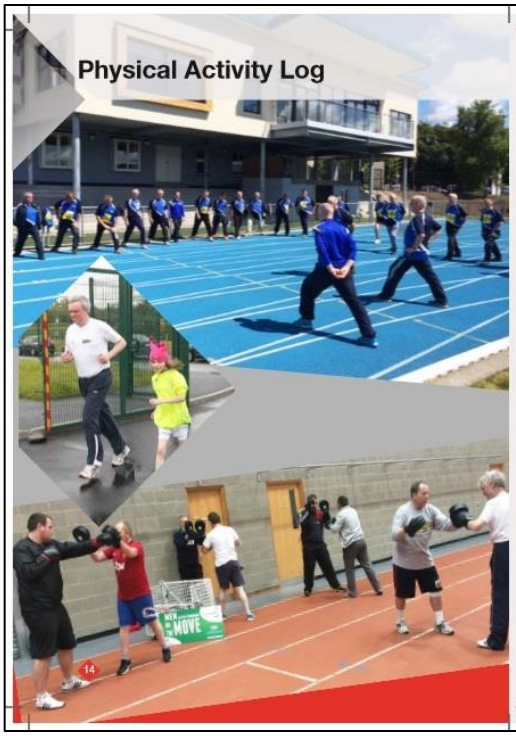
Calf Stretch

- Stand straight, feet shoulder width apart with one foot about a foot in front of the other.
- Place your hands flat against a wall at shoulder height.
- Keeping your back leg straight, ease it slowly further away from the wall keeping your heel pressed firmly against the floor.
- Keep your hips facing the wall and the rear leg and spine in a straight line.
- You will feel the stretch in the calf of the rear leg.
- Repeat with the opposite leg.

Adductor Stretch

- Stand straight with your feet approximately two shoulder widths apart, feet facing forward.
- Bend the right knee, keeping your hips facing forward, your back straight and the soles of your feet on the ground.
- Use your arms to balance you on the thigh of the bent leg.
- You will feel the stretch on the inside of the straight leg.
- Repeat with the left leg.

Physical Activity Log



Physical Activity Log

Date	Type of Activity [Walk/Jog/run/cycle/swim etc]	Distance /Route	Time	Steps	Notes

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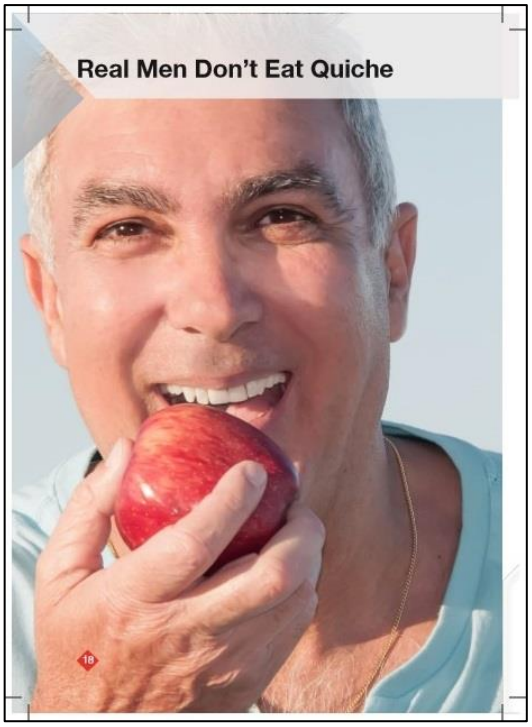
Real Men Don't Eat Quiche



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Real Men Don't Eat Quiche

Getting the balance right when you are eating is not always easy. We can have a 'grab and go' attitude to food and this can affect our health. Eating healthy foods can reduce our chances of getting many cancers, diabetes, osteoporosis, depression and metabolic syndrome – which is linked to obesity, diabetes and heart disease. Healthy eating is also very important to give us the nutrients and energy to work, play and get the most out of living!

A lot of men are not aware of the links between the food they eat and their health. Some men simply see food as fuel as they do not know about food and how it works. Also, your partner may be the one who buys and cooks the family meals so you may not have control over what you eat.

Men can see healthy eating and dieting as a woman's thing and therefore 'unmanly'. So many men tend to eat too much meat, processed carbohydrates, fried foods and snacks that are high in fat, salt and calories. We know that 70% of men in Ireland are either overweight or obese and that this will have a serious effect on their health and well-being.

What is healthy eating?

There is a myth that a healthy diet means you can only eat small portions of tasteless foods. Healthy eating is not about depriving yourself of the foods you love. Healthy eating is about having a wide range of different foods. **Choose the right amount and type of fat. Eat foods lower in sugar and salt and most importantly it's about portion size and how much we eat.** See your practical tips on page 20 to help you start eating a healthier diet.

Just a few small changes to what you eat can make all the difference to your health. Knowing what foods to eat as well as which foods to limit are as important in helping you to have a healthy lifestyle. **It is essential for men to eat well to maintain their strength, virility, stamina and vitality for living.**

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Real Men Don't Eat Quiche

Top Tips for *Better Nutrition*

1. Eat slowly and chew your food well.
2. Pick foods that are baked, roasted, poached or steamed.
3. Eat three meals a day. Eat breakfast.
4. Include vegetables or fruit at every meal. They also make a healthy snack.
5. Include a starchy food with every meal. Some examples of starchy foods are cereal, bread, potatoes, rice and pasta. A ¼ of your dinner plate is the ideal serving for starchy foods. Choose wholegrain varieties.
6. Eat fish twice a week. Choose oily fish, for example, mackerel, herring, trout, salmon, sardines and kippers.
7. Eat less fat, especially saturated fat. Saturated fat is found in butter, lard, suet, dripping, cream, mayonnaise, fat on meat, cakes, pies, pastries, buns, biscuits, crisps, fried food and meat products like sausages, black pudding and salami type meats.
8. Stop eating when you are full.
9. Drink 6-8 glasses of water each day as well as other fluids.
10. Drink alcohol in moderation – keep within the national guidelines of not more than 17 standard drinks each week and no more than 4 standard drinks in one day. Have at least 3 alcohol free days a week

One Standard Drink of alcohol is about equal to a half a pint of beer, lager or cider, a small pub measure of spirits or a small glass of wine.

Always follow your doctor's advice first if it differs from these guidelines.

For more information on alcohol check out www.yourdrinking.ie. **Alcohol is high in calories and can contribute to weight gain**. For advice on weight loss check out www.weight2live.safefood.eu.

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Stress – A Male View

The most worrying thing about stress is that, even when people all around us may notice we're a bit wired, we often don't see it ourselves. Stress has an immediate impact, in that it influences how we interact with our friends, family and colleagues, and it can also cause long-term problems to our health so it's important to monitor stress levels.

Stress Checklist - Do you have any of these symptoms?

Symptoms to look out for	*Effects of stress on health*
Headaches	Bowel disorders
Not sleeping properly	Nervous indigestion
Feeling tired or forgetful	Difficulty swallowing
Mood swings	Rashes, allergies
Not being able to concentrate	Dizziness or blurred vision
Feeling tense, useless, worried or nervous	Hyperventilation, asthma, palpitations
Eating more or less than normal	Neck and back problems
Too much drinking or using drugs	Heart and artery disorders
Sexual difficulties	High blood sugar
Sweating more than normal	Ulcers

If you do, you could be experiencing stress. If you don't deal with stress over a long time, it could lead to more serious general health, mental well-being and relationship problems.

Stress is a common feature in the lives of many men in Ireland today. Many men want to reduce stress as a priority to improving their general health. Unfortunately, many men struggle with their stress alone and rely on bad ways of coping with it such as drinking more alcohol, smoking more cigarettes or gambling.

However there are many positive ways that you can use to support yourself to reduce the stress in your life. Try out some of the stress busting tips and check out the telephone numbers on page 23 of this booklet for further information or support. And remember, you are not the only person to feel stress and that you can take control of the level of stress in your life.

For information on mental well-being check out www.yourmentalhealth.ie.

Stress – A Male View

Top Ten *Stress Busting Tips*

1. Work it off. Doing exercise gives you energy and makes you feel better.
2. Get enough sleep. Rest is important to revitalise your body and mind.
3. Keep it simple. Take things one step at a time.
4. Take time to relax. Make time for yourself. Do something you enjoy such as listening to music, reading or meditating.
5. Prioritise. Review how you organise your time. Prioritise tasks, make lists and reward yourself for doing them.
6. Be assertive. Don't try to please everybody. Learn to say 'no'.
7. Aim to eat healthy. Eat lots of fruit and vegetables. Cut down on eating foods with a lot of fat [see top tips on page 20].
8. Keep your mind active. You can do this by playing cards, doing quizzes or researching something you are interested in on the internet.
9. Get it all off your chest. Talking to someone you trust can help your feelings of stress and anxiety.
10. Accept the things you cannot change. Try to recognize the things in your life that you have no control over and see if you can try to accept them.

For information on how to quit smoking ring the National Smokers' Quitline on FREEPHONE 1800 201 203 or check out www.quit.ie

Appendix F Examples of Local Sports Partnership's Local Media Campaigns

Example 1 Mayo LSP Local Press Release – Recruitment Campaign

Men on the Move "The best move you'll ever make"

Worried about that extra weight? Thinking about getting more active? Want to improve your overall health and wellbeing?

Mayo Sports Partnerships in collaboration with HSE West, Roscommon Sports Partnership and Waterford I.T. are offering a new programme for men aged 35+ over the coming weeks in the Ballaghdereen, Ballina and Crossmolina areas. These new groups will be part of a national study on Men's Health taking place in several counties across Ireland.

Men on the Move is a physical activity programme that is aimed at adult men to get them active, have fun and improve their fitness levels. It involves:

- Twice-weekly physical activity sessions over 12 weeks that are led by a qualified instructor to meet your needs.
- Structured physical activity sessions so that you can find a level and pace that suits you.
- Workshops on nutrition and well-being for men.

Mid-West Radio are also rowing in with the initiative and will be calling for 30 men to participate in the FREE 12 week programme in the Ballaghdereen, Ballina and Crossmolina areas which will culminate in a "Men on the Move" 5K walk / run in early December.

"Mid-West Radio are delighted to support this project and we plan to follow its progress through the 12 weeks. We hope that many men throughout the region avail of this fantastic opportunity" presenter Tommy Marren added.

3 open evenings are being organised, where men can come along and get a free health check (from 7pm), information on healthy eating and sign up to an activity programme. The open nights are in the following venues:

- Ballina Family Resource Centre on Tuesday 8th September 7.30pm
- Crossmolina GAA Centre on Wednesday 9th September 7.30pm
- Community Resource Centre, Market St, Ballaghaderreen, Co Roscommon on Thursday 10th September 7.30pm

Activities on offer include walking, jogging, strengthening exercises and there is no cost to the participant. There will be leader and HSE personnel there on the night to answer any question that you may have about any of the proposed activities. If you wish to register for the initiative in the above areas please call the Mayo Sports Partnership office on 094 9047025, email rmcnamara@mayococo.ie, or Text your name to 087 6973093.
Please note that Men on the Move is also available in Achill, Ballyhaunis, Ballinrobe, Erris, Castlebar, Claremorris, Manulla, Swinford and Westport. Registrations for these ongoing programmes will be open from the beginning of October.

So get out there and get active and be part of this super programme.

Example 2 Kilkenny LSP Local Press Release – Recruitment Campaign

Men Wanted

- **Do you want to start exercising?**
- **Do you want to feel fitter and have more energy?**

Kilkenny Recreation and Sports Partnership are delivering FREE, Men Only 12-week physical activity programmes in Thomastown, Castlecomer, Clara and Kilkenny (The Watershed) this autumn.

Men on the Move is a physical activity programme for adult men, to increase more active, have fun and improve fitness levels. It involves twice-weekly physical activity sessions over 12 weeks, led by a qualified instructor. The sessions are structured so that there is a level and pace to suit all. The programme also includes nutrition and well-being seminars.

Taking part in the programme couldn't be easier, simply turn up wearing comfortable clothes, runners and bring a bottle of water.

Caitriona Corr, Sports Development Officer with Kilkenny Recreation and Sports Partnership stated "We are delighted to be involved in this national programme, there has been huge levels of success from settings as diverse as Falcarragh, Donegal and Crossmolina, Mayo to Limerick and Waterford City. Men have enjoyed the health benefits but have also hugely enjoyed getting out and starting back into physical activity with other men. The fitness benefits are a bonus! We are really looking forward to launching this programme in Kilkenny."

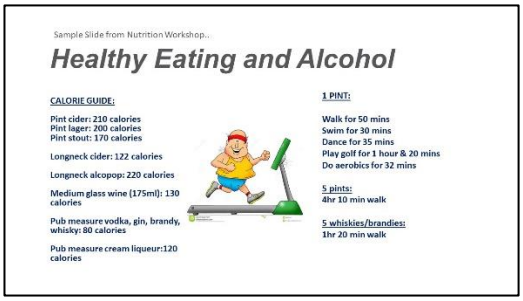
The project lead is Dr Paula Carroll from Waterford Institute of Technology. "Men on the Move has completely dispelled the myth that men are not willing to engage with their health and well-being, and that men don't talk. Men on the Move has certainly hit the right note for hundreds of men around the country and the benefits far out reach the physical benefits that motivated many men to get involved in the first place. Friendships have been formed, some men no longer feel isolated in their communities, dependence on medications have been reduced and so many men have a renewed vitality and stamina for living. I would encourage any man to contact their Local Sports Partnership and see how they can get involved locally".

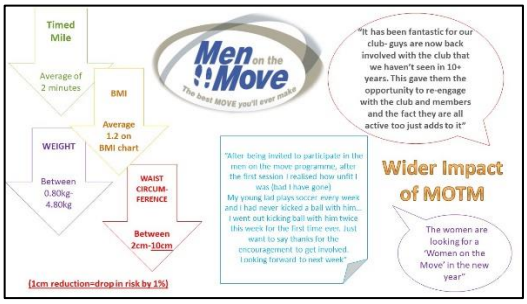
Men on the Move will take place in the following locations and there is no cost to participants. Come along and reap the benefits! Men on the Move is in Thomastown, Tuesday and Thursday at 8pm with tutor, Paul Dempsey, Castlecomer, Tuesday and Thursdays, 7pm with Elaine Sherwood, The Watershed, Fridays, 8pm with Sally Teehan and Clara, Wednesdays 8pm with Paul Ward. All venues kick off on the week of the 19th of September.

For further information, contact Caitriona on 0879750501 or the office on 056 7794991 or just turn up!

Men on the Move programme is rolled out in Kilkenny by Kilkenny Recreation and Sports Partnership, for further information contact Caitriona on 0879750501

Example 3 Limerick LSP Recruitment Information Night - Presentation





Example 4 National Press Release for Men's Health Week 2016

A Mass Movement of Men

Men of all ages, shapes and sizes across the country will move en-masse next Saturday June 18th to celebrate Men's Health Week which runs from June 13th to 19th. Men on the Move groups are active across the country and these groups will unite in each county and participate in their local Park Run or locally organised event. With each man completing a 5Km walk, jog or run at their own pace, collectively almost 330 men will complete the 1640Km distance from Dublin to Bordeaux to support the Irish Soccer team taking on Belgium that afternoon.

And it's not just for men who are part of a Men on the Move group. All men are welcome to take part on the day and be involved in this unique movement for men's health and well-being.

Since September 2016, over 900 men have across 8 counties in Ireland have been involved in a national Men on the Move research project. Men on the Move is a 12 week [two * 1 hour sessions per week] physical activity programme for men. The programme is designed for men who are currently inactive and who want to become active or resume activity. Sessions happen in local communities by trained physical activity co-ordinators in an atmosphere underpinned by fun, banter, safety and trust. Workshops on diet and well-being are also integrated into the programme.

The men who signed up were predominantly overweight (44.6%) and obese (45.6%) and 54% were in the high risk category for cardiovascular disease. After just 12 weeks, significant improvements have been in found in all measures including weight, BMI, waist circumference and physical fitness culminating in a reduction of cardiovascular risk of up to 30%. For one man the programme has been 'simply life changing'.

The project lead is Dr Paula Carroll from Waterford Institute of Technology. "Men on the Move has completely dispelled the myth that men are not willing to engage with their health and well-being, and that men don't talk. Evidence from this programme is that men will engage and go the distance when the service or intervention is tailored for their needs. Men on the Move has certainly hit the right note for hundreds of men around the country and the benefits far out reach the physical benefits that motivated many men to get involved in the first place. Friendships have been formed, some men no longer feel isolated in their communities, dependence on medications have been reduced and so many men have a renewed vitality and stamina for living. I would encourage any man to contact their Local Sports Partnership and see how they can get involved locally".

The theme of Men's Health Week 2016 is 'Men United - for Health and Well Being' [for further information see www.mhfi.org]

Local Contacts:

- Donegal Sports Partnership Offices

- Mayo Sports Partnership Offices
- Galway Sports Partnership Offices
- Limerick Sports Partnership Offices
- Waterford Sports Partnership Offices
- Kilkenny Recreation & Sports Partnership Offices
- Dublin City Sport & Wellbeing Partnership

Dr Paula Carroll is a Lecturer in the Department of Health, Sport and Exercise Science at WIT. She is Co-course leader of the MA in Advanced Facilitation Skills for Promoting Health and Well Being and lectures on the undergraduate BA in Health Promotion.

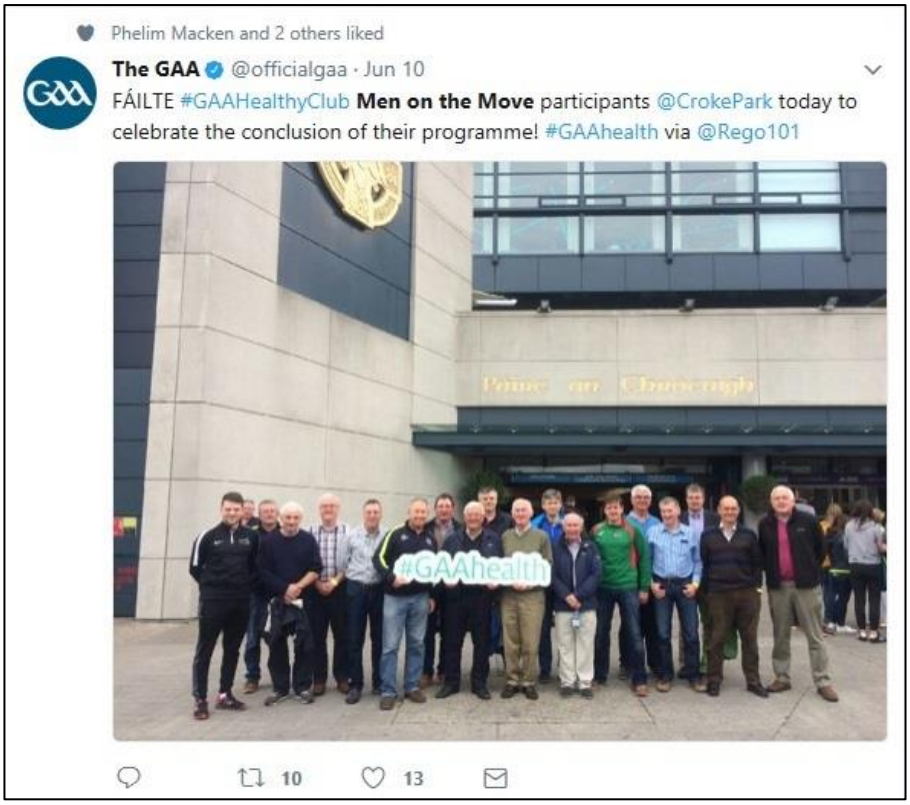
Example 5 Examples of LSPs Social Media Recruitment and Promotional Material


Men on the Move
The best MOVE you'll ever make
LIMERICK SPORTS PARTNERSHIP
SPORT IRELAND
MEN ON THE MOVE:
Twice weekly physical activity sessions
Aimed at:
Men aged 30+ who want to get back into physical activity
"I can even fit into my son's shirts now!!"
"There is an activity to suit eve-ryone, re-gardless of your age!"
"Having Craic with the lads+ getting fitter= WIN-WIN!!"
"Real sense of community spirit + Fun"
Limerick Sports @Limericksports · Jul 31
LSP Men on the Move Programme -www.limericksports.ie for info, contact Mairead at mfitzgerald@limericksports.ie #activelimerick :-)!!
Sport Ireland, HealthyIreland, HSE Ireland and Men on the Move
2
13
22

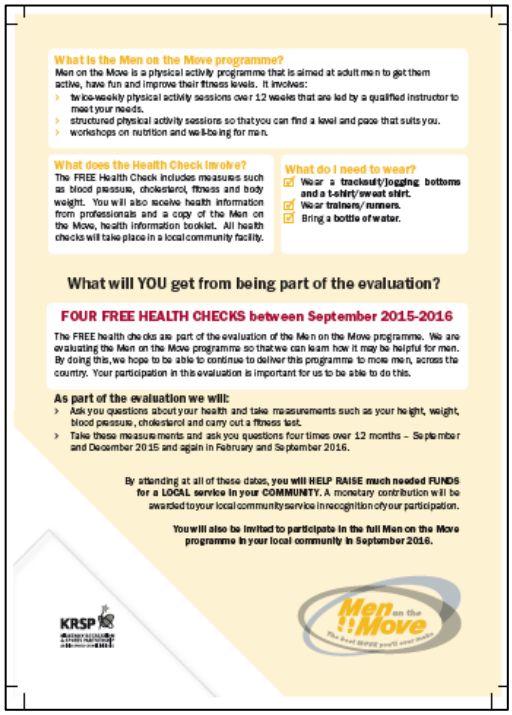

Limerick Sports @Limericksports · 22h
Men on the Move returns to @mungretgaa next week. All welcome #MenOnTheMove #ActiveLimerick
MEN WANTED
Want to start exercising?
Want to feel fitter and have more energy?
We are delivering a MEN ONLY, 12-week physical activity programme in your LOCAL AREA.
12 Week Physical Activity Programme
Mondays & Wednesdays
6pm- 7pm
Mungret GAA Club
For more information contact:
Mungret GAA Healthy Club Rep-
Kevin 087- 0601686
Men on the Move
LIMERICK SPORTS PARTNERSHIP
SPORT IRELAND
Limerick Sports, Sport Ireland, HealthyIreland and 7 others
5
7


Limerick Sports and 1 other Retweeted
Mairéad Fitzgerald @mair_fitz · Mar 30
Day 30 @Limericksports #40DayChallenge =40min camogie training before getting the 'Men on the Move'... on the move #activelimerick
2
6

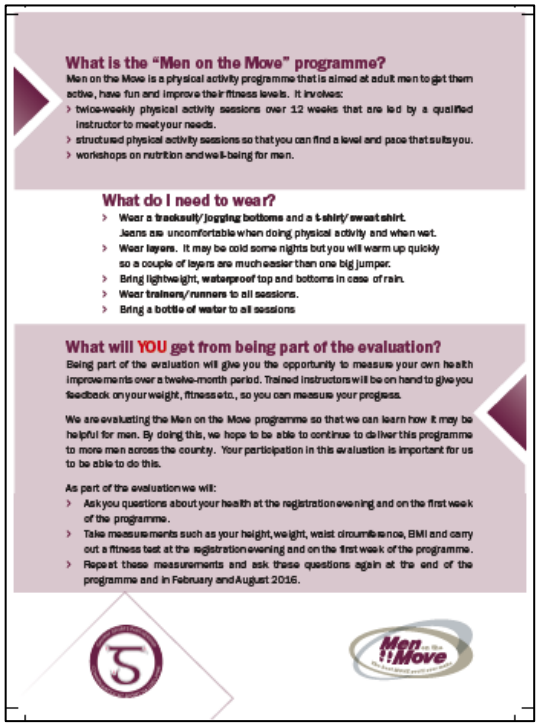

Men's Health Ireland and 2 others Retweeted
Men on the Move @MenontheMove_RT · May 12
Great video showing the of impact of Men on the Move @HealthWaterford @MensHealthIRL @NCMHcarlow
'Through the Eyes of Men' - Men on the Move, Dung...
Leaders and participants in the 'Men on the Move' programme in Dungarvan, Co. Waterford, speak about their experience of being involved in this initiative.
youtube.com
1
7
9


Phelim Macken and 2 others liked
The GAA @officialgaa · Jun 10
FÁILTE #GAAHealthyClub Men on the Move participants @CrokePark today to celebrate the conclusion of their programme! #GAAhealth via @Rego101
#GAAhealth
10
13

Appendix G Sample of a county posters and fliers.

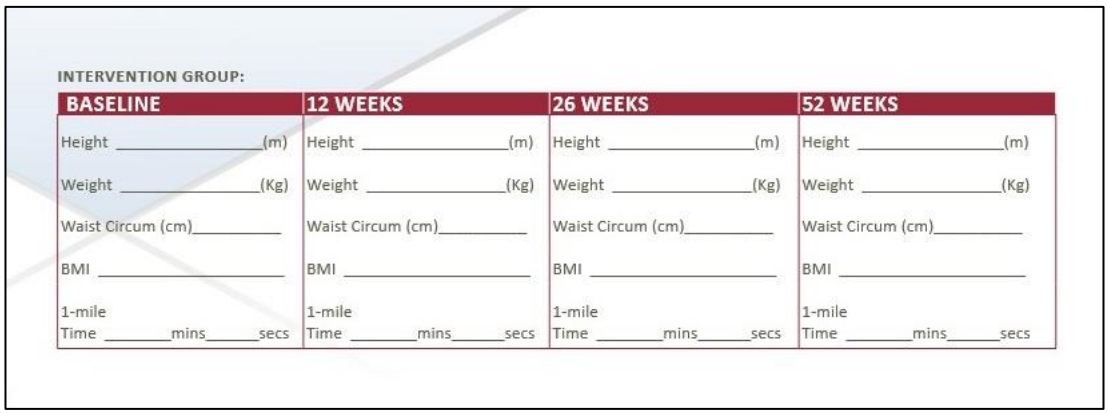


'Comparison-in-waiting' county poster and flier.



'Intervention' county poster and flier.

Appendix H Sample of Men on the Move Health Check Wallet Cards



INTERVENTION GROUP:

BASELINE	12 WEEKS	26 WEEKS	52 WEEKS
Height _____(m)	Height _____(m)	Height _____(m)	Height _____(m)
Weight _____(Kg)	Weight _____(Kg)	Weight _____(Kg)	Weight _____(Kg)
Waist Circum (cm)_____	Waist Circum (cm)_____	Waist Circum (cm)_____	Waist Circum (cm)_____
BMI _____	BMI _____	BMI _____	BMI _____
1-mile Time _____mins_____secs	1-mile Time _____mins_____secs	1-mile Time _____mins_____secs	1-mile Time _____mins_____secs

Appendix I Research Ethics Committee Approvals

INSTITUTE of TECHNOLOGY CARLOW
At the Heart of South Leinster

ETHICS IN RESEARCH COMMITTEE EVALUATION REPORT

School/Campus/Centre:	Science
Department:	Science & Health
Research Proposer:	Not assigned
Ethical Application Number:	125
Project Title:	'Men on the move': An investigation of a community based physical activity programme for men
Thesis Adviser:	Dr Noel Richardson, Dr Aoife Osborne, Dr Paul Carroll
Medical Consultant:	None
Evaluation Date:	4th June 2015

1.	Procedures have been followed according to those laid down by Governing Body	Yes ☑	No	☐
2.	Approval granted	Yes ☑	No	☐
3.	Referred for resubmission	Yes ☐	No	☑

Reason for resubmission

Signed: _____ **Date:** 19/06/2015

Mr Ivan Sheeran, Chairperson
Ethics in Research Committee

Ethics in Research Evaluation Report:SK

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Ref: 15/Dept-HSES/13

21st April 2015

Dr Paula Carroll,
Centre for Health Behaviour Research,
Department of Health, Sport and Exercise Science,
School of Health Sciences,
Cork Road Campus,
Waterford Institute *of* Technology,
Waterford

Dear Paula,

Thank you for bringing your project *'Men on the Move: An investigation of a community based physical activity programme for adult men'* to the attention of the WIT Research Ethics Committee.

I am pleased to inform you that we fully approve the conduct of this study and we will convey this to Academic Council.

We wish you well in the work ahead.

Yours sincerely,

Prof. John Wells,
Chairperson,
Research Ethics Committee

Appendix J Data Collection Procedures and Tools

The following data collection procedures and tools we provided to all LSPs prior to data collection;

1. Summary of Data to be Collected from Participants
2. Participant Coding Protocol
3. Proposed Data Collection Procedure – Registration Night / First Health Check Proposed 'Input' on the Evaluation
4. Consent Form for Intervention Group
5. Consent Form for Comparison Group
6. Baseline Questionnaire
7. Physical Activity Readiness Questionnaire [PAR-Q]
8. Time to Complete 1 mile: Intervention Group at Week 1
9. 'Time to Complete 1-mile' Protocol
10. Questionnaire at Weeks 12, 26 and 52 – see below
11. Data to be Collected at Programme Sessions [Intervention Group Only]
12. Data to be Collected from Partners – see below

1. Summary of Data to be Collected from Participants

The following data have been proposed in order to investigate the; Impact of the programme on the physical fitness, weight status and general health and lives of the men who attend, and Economic costs and benefits of the Men on the Move programme. This data will be collected by recording some objective measures [height, weight, waist circumference and time to complete 1 mile; body mass index will be calculated from height and weight].

- Weight to be measured using a Seca 813 weighting scales.
- Height to be measured using a Seca 213 stadiometer.
- Waist circumference to be measured using a tape measure [supplied by IHF]
- 1 mile distance to be measured using a Trumeter 5500E trundle wheel.
- Time to complete 1 mile to be recorded using a stopwatch.

All equipment with the exception of the stopwatch will be supplied to each county.

The rest of the data will be collected via questionnaire. Where possible the questionnaire will be administered to the men. Where this is not possible, questionnaires should be checked to ensure they are completed before men leave.

These proposed questions in the questionnaires that follow have been taken from the following sources:

- Carlow Men's Health Project – Health Needs Assessment.
- Premier League Football health initiatives evaluation study that was provided by Prof Steve Robertson, Centre for Men's Health, Leeds Beckett University.
- Marshall et al., 2010 domain specific sitting question [advised by Stuart Biddle} and provided by Dr Niamh Murphy WIT.
- Mental Well-Being scale - WEMWBS {n=14] as advised by Prof Steve Robertson, Centre for Men's Health, Leeds Beckett University.
- Workplace capacity questions that were provided by Dwayne Boyers, Health Economist, University of Aberdeen.
- Use of prescription medications and health services taken from Football Fans in Training study and further specific questions provided by Dwayne Boyers, Health Economist, University of Aberdeen.
- Berkman-Syme social network index.

Finally, attendance at every session must be recorded. Standardised attendance recording sheets must be used to capture participant attendance, staff involvement at every session and programme content.

2. Participant Coding Protocol

The Research Team will be responsible for coding all questionnaires.

	County Code	Baseline	End of Programme	26 weeks	52 weeks	Participant
Donegal	DL	B	EP	26P	52P	1-90
Mayo	MO	B	EP	26P	52P	1-90
Galway	G	B	EP	26P	52P	1-90
Waterford	W	B	EP	26P	52P	1-90
Cork	C	B	EP	26P	52P	1-90
Limerick	L	B	EP	26P	52P	1-90
Kilkenny	KK	B	EP	26P	52P	1-90
Dublin	D	B	EP	26P	52P	1-90

3. Proposed Data Collection Procedure – Registration Night / First Health Check

- Begin the night with the input from LSP Co-ordinator and GP. See section 4 re input to be given by LSP Co-ordinator re the evaluation.
- In order to ensure the questionnaire is completed fully and accurately, begin the whole group with the questionnaire first before moving to the other assessments. If men find they are doing the questionnaire towards the end of the evening, it's likely they won't attend to it properly as they may be tired etc. If it's done straight after the input where the evaluation piece is spoken about, then there is a greater chance of it being taken seriously.
- Note – questions 11, 12 and 14 should be flagged with the men and further instruction given as to how to approach answering them. Some space has been provided after Q14 on the questionnaire for a brief note about the man's circumstance e.g. if he does not have a consistent week.
- Divide men into groups, somehow. Either by colour or number as they arrive. OR consider literacy levels and have a lower 'men to helper' ratio for that group.
- Ensure that the PAR-Q is completed before the men complete the fitness test and refer any 'yes' answers to the GP present. It is important that the PA Co-ordinator is also aware of men's physical conditions. The LSP Co-ordinator should retain all PAR-Qs.
- Create a reason for the men to congregate together after all tests have been completed. This can be as simple as a cuppa and will provide an opportunity for them to meet one another and the local service providers. It will also give people a chance to check questionnaires and approach a man if something is incomplete.

For comparison counties;

- The BP has to happen before the fitness test. Therefore, for these counties, men move from the questionnaire to;

  Station 1: Height, weight, BMI and waist circumference OR

  Station 2: BP and cholesterol [preferably have two of each machines present as this will reduce the time this station takes]
- Men can move from Station 2 to the fitness test and then back to Station 1.

For intervention counties;

- After the questionnaire has been completed, men can move on to have their height, weight, BMI and waist circumference measured.

For both counties;

- The Irish Heart Foundation Referral Guidelines must be adhered to on the night.
- When taking the weight and waist circumference measures ensure that the rest of the group are seated at a distance from the man and, if possible, provide a screen so that his results could not be viewed by anyone else.
- For all results, ensure that any feedback to men could not be overheard. Therefore, take particular care in how you position the stations within the area.
- Please carefully review the video clip demonstrating the correct assessment of height, weight and waist circumference.
- Ensure that the same person takes the same measurements at each time point. Therefore, it is probably best that a member of the LSP staff takes the height, weight and waist circumference measures.

All questionnaires are to be checked for completion and placed into the addressed envelopes provided and sealed before leaving. All envelopes to be sent by registered post to WIT the next day [please!].

4. Proposed 'Input' on the Evaluation

This 'input' is to be given at the Information/Registration evening [Intervention Group] OR the night of the first health check [Comparison Group] by the LSP Co-ordinator.

Input for the **INTERVENTION GROUP:**

- We are delighted to be part of the National Evaluation of the Men on the Move Programme.
- 8 counties across Ireland have been selected to be part of this evaluation – 4 counties [including ourselves] are getting the programme this year and the other 4 counties will get it next year.
- Being part of the evaluation will give you the opportunity to measure your own health improvements over a twelve-month period. Trained instructors will be on hand to give you feedback on your weight, fitness etc. so you can measure your progress.
- We are evaluating the Men on the Move programme so that we can learn how it may be helpful for men and so that we can continue to improve how we work with men. By doing this, we hope to be able to continue to deliver this programme to more men both in this county and across Ireland.
- Your participation in the evaluation is really, really important to us as it will enable us to do this.
- As part of the evaluation we will:

  Ask you questions about your health and take measurements such as your height, weight, waist circumference, BMI and carry out a fitness test [how long it takes you to complete 1 mile].

  With the exception of the fitness test, all the others will happen here tonight and all information will be collected again at the end of the programme, next February and next August.
- We cannot stress enough, that all of this information will be held in the strictest of confidence.
- THE INFORMATION COLLECTED HERE WILL BE SEALED IN ENVELOPES THIS EVENING AND SENT VIA REGISTERED MAIL TO RESEARCHERS AT WIT. NO SERVICE PROVIDER HERE THIS EVENING WILL GO THROUGH THE INFORMATION IN DETAIL; THEY WILL SIMPLY CHECK THAT ALL OF THE INFORMATION IS RECORDED.
- RESEARCHERS AT WIT HAVE VERY STRICT ETHICAL GUIDELINES AS TO HOW THEY USE AND STORE THE INFORMATION – IT WILL BE TREATED WITH THE UTMOST

CONFIDENTIALITY AND SENSITIVITY.

- We just ask that you are honest in your feedback and as accurate as you can be.
- People are at hand this evening to help with the questionnaire for anyone who needs clarity or has forgotten their glasses – they'll even complete it for you if you like!
- You don't have to participate in this evaluation but we would really appreciate it if you did.

Input for the **COMPARISON GROUP:**

- We are delighted to be part of the National Evaluation of the Men on the Move Programme.
- 8 counties across Ireland have been selected to be part of this evaluation – 4 counties [including ourselves] are getting the programme next year and the other 4 counties will get it next year.
- Being part of the evaluation will give you the opportunity to measure your own health over a twelve-month period. Trained instructors will be on hand to give you feedback on your weight, fitness etc.
- We are evaluating the Men on the Move programme so that we can learn how it may be helpful for men and so that we can continue to improve how we work with men. By doing this, we hope to be able to continue to deliver this programme to more men both in this county and across Ireland.
- Your participation in the evaluation is really, really important to us as it will enable us to do this.
- As part of the evaluation we will:

  Ask you questions about your health and take measurements such as your height, weight, waist circumference, BMI and carry out a fitness test [how long it takes you to complete 1 mile].

  All information will be collected again in 12 weeks, next February and next August.

  A researcher from WIT will contact you next week and again in 12 weeks' time so that we can learn from your experience of tonight's health check. This contact will be by email or phone [whichever you prefer] and will take no more than 10 minutes of your time.
- By attending at all of the health checks, **a LOCAL service in your COMMUNITY will receive a payment to support their work with men in your community.**
- We cannot stress enough, that all of this information will be held in the strictest of

confidence.

- THE INFORMATION COLLECTED HERE WILL BE SEALED IN ENVELOPES THIS EVENING AND SENT VIA REGISTERED MAIL TO RESEARCHERS AT WIT. NO SERVICE PROVIDER HERE THIS EVENING WILL GO THROUGH THE INFORMATION IN DETAIL; THEY WILL SIMPLY CHECK THAT ALL OF THE INFORMATION IS RECORDED.
- RESEARCHERS AT WIT HAVE VERY STRICT ETHICAL GUIDELINES AS TO HOW THEY USE AND STORE THE INFORMATION – IT WILL BE TREATED WITH THE UTMOST CONFIDENTIALITY AND SENSITIVITY.
- We just ask that you are honest in your feedback and as accurate as you can be.
- People are at hand this evening to help with the questionnaire for anyone who needs clarity or has forgotten their glasses – they'll even complete it for you if you like!
- You don't have to participate in this evaluation but we would really appreciate it if you did.

5. Consent Form for Intervention Group

This has to be completed at the FIRST TIME POINT of data collection with each participant.

Participant Name: _____ [PLEASE PRINT]

Contact Details: Mobile _____ [PLEASE PRINT]

Email _____ [PLEASE PRINT]

To be completed by Research Team:

Code Assigned: County Code; B; 26P; 52P

Participant Code: _____

IF AN ADMINISTRATOR IS PRESENT – Protocol for Administrator:

- Read the instructions below to the participant prior to administering the questionnaire. In particular insure that the participant gives their consent to participating in this phase of the study.
- When necessary, use block capitals when documenting evidence, otherwise clearly mark the answer given.
- Ensure that the participant can see the questions at all times and that he can clearly see how you are responding on his behalf.

Informed Consent:

- We would appreciate it if you could take the time to participate in this study as part of the Men on the Move programme. Participating in this study involves having your height, weight, waist circumference and time to complete one mile recorded as well as completing a questionnaire at the beginning of the programme, at the end of the programme and again next February and next August. You will also be invited to participate in a focus group with other men who participated in the Men on the Move programme or a one-to-one interview.
- All information will be held in the strictest of confidence. All data will be stored securely and only the primary researchers will have access to the data. THE INFORMATION COLLECTED HERE WILL BE SEALED IN ENVELOPES THIS EVENING AND SENT VIA REGISTERED MAIL TO RESEARCHERS AT WIT. NO SERVICE PROVIDER HERE THIS EVENING WILL GO THROUGH THE INFORMATION IN DETAIL; THEY WILL SIMPLY CHECK THAT ALL OF THE INFORMATION IS RECORDED. The findings from this study may be disseminated via a variety of media; however, at no point will personal details be included in any report or paper published. Data will be stored for 5 years post publishing and will be destroyed thereafter (in accordance with WITs Data Protection Policy).
- While there are no physical risks from participating in this project, you will be asked some personal questions. However, as stated above, all data will be documented with the utmost respect and sensitivity and will be held in the strictest of confidence and stored anonymously.
- You are free to refrain from answering any question you choose to and/or to withdraw from this study at any time without consequence.

- **If you consent to participate in this research study please tick the box** ☐

6. Consent Form for Comparison Group

This has to be completed at the FIRST TIME POINT of data collection with each participant.

Participant Name: _____ [PLEASE PRINT]

Contact Details: Mobile _____ [PLEASE PRINT]

Email _____ [PLEASE PRINT]

To be completed by Research Team:

Code Assigned: County Code; B; 26P; 52P

Participant Code: _____

IF AN ADMINISTRATOR IS PRESENT – Protocol for Administrator:

- Read the instructions below to the participant prior to administering the questionnaire. In particular insure that the participant gives their consent to participating in this phase of the study.
- When necessary, use block capitals when documenting evidence, otherwise clearly mark the answer given.
- Ensure that the participant can see the questions at all times and that he can clearly see how you are responding on his behalf.

Informed Consent:

- We would appreciate it if you could take the time to participate in this study as part of the Men on the Move programme. Participating in this study involves having your height, weight, waist circumference and time to complete one mile recorded as well as completing a questionnaire in Sept and December 2015 and again in February and August 2016. We will also contact you 1 week and 12 weeks after your health check in September to ask you about your experience of the health check.
- All information will be held in the strictest of confidence. All data will be stored securely and only the primary researchers will have access to the data. THE INFORMATION COLLECTED HERE WILL BE SEALED IN ENVELOPES THIS EVENING AND SENT VIA REGISTERED MAIL TO RESEARCHERS AT WIT. NO SERVICE PROVIDER HERE THIS EVENING WILL GO THROUGH THE INFORMATION IN DETAIL; THEY WILL SIMPLY CHECK THAT ALL OF THE INFORMATION IS RECORDED. The findings from this study may be disseminated via a variety of media; however, at no point will personal details be included in any report or paper published. Data will be stored for 5 years post publishing and will be destroyed thereafter (in accordance with WITs Data Protection Policy).
- While there are no physical risks from participating in this project, you will be asked some personal questions. However, as stated above, all data will be documented with the utmost respect and sensitivity and will be held in the strictest of confidence and stored anonymously.
- You are free to refrain from answering any question you choose to and/or to withdraw from this study at any time without consequence.

- **If you consent to participate in this research study please tick the box** ☐

7. Baseline Questionnaire

A. RECORDED MEASUREMENTS

Height (m) _____

Weight (kg) _____

Waist Circumference (cm) _____

Body Mass Index _____

Time to complete 1 mile _____ **mins** _____ **secs**

[NOT AVAILABLE AT REGISTRATION EVENING FOR INTERVENTION GROUP]

NB: This data is to be replicated in the participant's wallet card.

For Comparison Group only:

Blood Pressure (mmHg) _____

Cholesterol (mM) _____

Have you been referred to your GP? Yes □ No □

How would you like to be contacted by the WIT researcher? Phone □ Email □

B. ABOUT YOURSELF

1. **Please state your date of birth** _____ [day/month/year]

2. **Which of the following best describes your ethnic background?**

(Please tick **one** box only)

White (Irish, Irish Traveller, Any other white background) □

Black or Black Irish (African or Any other black background) □

Asian or Asian Irish (Chinese or Any other Asian background) □

Other (including mixed background) □

If 'other', please specify _____

3. **Which of the following best describes your level of education?**
(Please tick **one** box only)

Primary education only □
Some or completed secondary education □
Some or completed third level education □

4. **Which of the following best describes you?** (Please tick **one** box only)

Married / cohabiting	□	Widowed	□	In a relationship	□
Separated /divorced	□	Single	□		

5. Which of the following best describes you? (Please tick **one** box only)

I live alone □ I live with family/wife/partner □ I live with friends □

6. Which of the following best describes you? (Please tick **one** box only)

Employed (full time)	□	Employed (part time)	□
Self-employed	□	Unemployed and looking for work	□
Looking after home/family	□	Retired from paid work	□
Student	□	Volunteer	□
Unable to work due to long term illness/disability			□

7. If you are in paid employment, please tell us whether in the last 12 WEEKS you have had:

Time off work Yes □ No □ If yes, how many days? _____
(Not including holidays)

8. Which of the following best describes how you found out about this project?
(Please tick **one** box only)

Word of Mouth	□	Newspaper/Media/Social Media			□
Referred	□	Sports Partnership	□	Local service/club	□
Family	□	Health Professional	□	Other	□

If 'other', please specify

_____

C. ABOUT YOUR HEALTH

9. I would say my health is: (Please tick **one** box only)

Excellent	□	Very good	□	Good	□
Average	□	Poor	□		

10. Do you consider yourself to have any health problems? Yes □ No □
If yes, please list what these are on the lines below:

_____

_____

_____

11. Please tell us whether in the last 12 WEEKS you have attended any of the following:

GP Yes □ No □ If yes, how many times _____

Physio Services Yes □ No □ If yes, how many times _____

Other health related services Yes □ No □

If yes, please list what services you attended and how often you attended them.

Service _____ number of times _____

Service _____ number of times _____

Service _____ number of times _____

12. In the last 12 WEEKS, have you have taken any prescription medication?

Yes □ No □

If yes, please list what these were on the lines below:

_____

_____

D. ABOUT YOUR PHYSICAL ACTIVITY

13. In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise and brisk walking or cycling for recreation or to get to or from places, but should not include household work or physical activity that may be part of your job. (Please tick **one** box only)

Never	1 Day	2 Days	3 Days	4 Days	5 Days	6 Days	7 Days
□	□	□	□	□	□	□	□

14. Think about the time you spend sitting on week days and at weekends. Please estimate how many HOURS you spend SITTING EACH DAY in the following situations (please write your answer):

	On a WEEK day		On a WEEKEND day	
	Hrs	Mins	Hrs	Mins
While travelling to and from places				
While at work				
While watching television				
While using a computer at home				
In your leisure time NOT including television (e.g. visiting friends, movies, dining out etc.)				

E. ABOUT YOUR LIFESTYLE

15. How many portions of fruit and/or vegetables (including pulses, salad, vegetables, fruit juices and fresh, dried and canned fruit) did you eat yesterday? (Please tick **one** box only)

None	1	2	3	4	5	6	7+
□	□	□	□	□	□	□	□

16. Do you currently smoke cigarettes, cigars, a pipe or use chewing tobacco? (Please tick **one** box only)

Never Smoked □

Former Smoker □

Current Smoker □

17. If you are a current smoker, how many per day on average do you 'smoke'? _____

18. Do you drink alcohol? Yes □ No □

19. If yes, how much alcohol do you consume on an average drinking occasion?
(Put the number in each of the spaces provided)

Pints of larger, or beer or stout _____

Small glasses of wine (about 175 mls) _____

Large glasses of wine (about 250 mls) _____

Shots of spirits _____

20. In an average week, how many days do you do you drink alcohol? _____

F. ABOUT YOUR WELL-BEING

21. Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the last 2 WEEKS.

Statements	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

G. ABOUT YOUR SOCIAL WELL-BEING

22. The following questions asks about your social support. Please read the following questions and tick one box only that most closely describes your current situation.

	None	1 or 2	3 to 5	6 to 9	10 or more	Unknown
How many *close friends* do you have, people that you feel at ease with, can talk to about private matters?						
How many of these *close friends* do you see at least once a month?						
How many *relatives* do you have, people that you feel at ease with, can talk to about private matters?						
How many of these *relatives* do you see at least once a month?						
Is there someone available to you whom you can count on to listen to you when you need to talk?						
Is there someone available to give you good advice about a problem?						
Is there someone available to you who shows you love and affection?						
Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?						
Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide?						

23. Do you participate in any groups, such as an active retirement group, social or work group, religious-connected group, self-help group, or charity, public service, or community group? (Please tick one box only)

Yes □ No □ Unknown □

24. About how often do you go to religious meetings or services?

Never or almost never □ Once or twice a month □

Once or twice a year □ Once a week □

Every few months □ More than once a week □

Unknown □

THANK YOU FOR YOUR TIME

8. Physical Activity Readiness - Questionnaire [PAR-Q]

The Physical Activity Readiness – Questionnaire [PAR-Q] is a sensible first step to take if you are planning to increase the amount of physical activity in your life.

For most people, physical activity should not pose any problem or hazard. PAR-Q has been designed to identify the small number of adults for whom physical activity might be inappropriate or for those who seek advice concerning the type of activity most suitable for them.

Common sense is your best guide to answering these few questions. **Please read them carefully and check the YES or NO opposite the question if it applies to you.**

	YES	NO
• Has your doctor ever said that you have a heart condition and recommended only medically approved physical activity?	□	□
• Do you have chest pain brought on by physical activity?	□	□
• Have you developed chest pain at rest in the past month?	□	□
• Do you lose consciousness or lose balance as a result of dizziness?	□	□
• Do you have a bone or joint problem that could be aggravated by the proposed physical activity?	□	□
• Is your doctor currently prescribing medication for your blood pressure or heart condition (diuretics of water pills)?	□	□
• Are you aware, through your own experience or a doctor's advice, of any other reason against your exercising without medical approval?	□	□

If you answer yes to one or more of the above questions you should consult your doctor before undertaking physical activity. It is your responsibility to do so.

Participation in physical activity as part of the Men on the Move Programme is done entirely at your own risk.

	YES	NO
I have read, understood and completed this questionnaire	☐	☐

Name: _____ **Date: _____**

9. Time to Complete 1 mile: Intervention Group at Week 1

Participant Name: _____ [PLEASE PRINT]

Contact Details: Mobile _____ [PLEASE PRINT]

Email _____ [PLEASE PRINT]

To be Completed by Research Team:

Code Assigned: County Code; B;26P;52P

Participant Code: **_____**

A. RECORDED MEASUREMENTS

Time to complete 1 mile **_____ mins _____ secs**

NB: This data is to be replicated in the participant's wallet card.

All forms are to be checked for completion and placed into the addressed envelopes provided and sealed before leaving. All envelopes to be sent by registered post to WIT the next day [please!].

10. 'Time-to-Complete 1 mile' Protocol

- Each group will move outside to do the fitness test together and it may be necessary to do two groups at the same time. If this is the case, give them two different starting points e.g.

- Stagger the start time of each man in the group by 10 seconds. This will reduce/eliminate the 'group effect' i.e. men within the group walking at someone else's pace rather than their own.
- Record the participants' name in the table below and calculate the time it takes them to complete 1 mile by accounting for their start time [see Table].
- Before the men begin the test, give the following input:
  - Clearly state that the objective should be for them to finish i.e. to complete the distance and in the quickest time that they can do it in. However, the primary objective should be that they complete the mile and let the time be secondary.
  - It's better for them if they can keep moving as opposed to having to stop for a break.
  - Therefore, don't start out too fast and be forced to stop. Move at a pace that is right for them – one that they can sustain for the 1 mile and will ensure that they complete the distance.
  - So this isn't a race against anyone else, or the clock.
  - Acknowledge that it may have been a while since some of them completed 1 mile – so this is all about them achieving that simple objective of finishing this distance.

Group Colour				
Name	**Start Time**	**Finish Time**	**Finish time – Start time**	**Time to Complete 1 mile**
	0		Finish time – 0 secs	
	+10 secs		Finish time – 10 secs	
	+20 secs		Finish time – 20 secs	
	+30 secs		Finish time – 30 secs	
	+40 secs		Finish time – 40 secs	
	+50 secs		Finish time – 50 secs	
	+60 secs		Finish time – 60 secs	
	+70 secs		Finish time – 70 secs	
	+80 secs		Finish time – 80 secs	

Note: Include this sheet with the questionnaires so that the research team can double check and secure this information along with the rest at WIT.

11. Questionnaire at Weeks 12, 26 and 52

Participant Name: _____ [PLEASE PRINT]

Contact Details: Mobile _____ [PLEASE PRINT]

Email _____ [PLEASE PRINT]

To be Completed by Research Team:

Code Assigned: County Code; B;26P;52P

Participant Code: _____

IF AN ADMINISTRATOR IS PRESENT – Protocol for Administrator:

1. When necessary, use block capitals when documenting evidence, otherwise clearly mark the answer given.
2. Ensure that the participant can see the questions at all times and that he can clearly see how you are responding on his behalf.

A. RECORDED MEASUREMENTS

Height (m) _____

Weight (kg) _____

Waist Circumference (cm) _____

Body Mass Index _____

Time to complete 1 mile _____ **mins** _____ **secs**

[NOT AVAILABLE AT REGISTRATION EVENING FOR INTERVENTION GROUP]

NB: This data is to be replicated in the participant's wallet card.

B. ABOUT YOURSELF

1. If you are in paid employment, please tell us whether in the last 12 WEEKS you have had:

Time off work Yes □ No □ If yes, how many days? _____
(Not including holidays)

C. ABOUT YOUR HEALTH

2. **I would say my health is:** (Please tick **one** box only)

Excellent	□	Very good	□	Good	□
Average	□	Poor	□		

3. **Do you consider yourself to have any health problems?** Yes □ No □
If yes, please list what these are on the lines below:

_____

_____

_____

4. **Please tell us whether in the last 12 WEEKS you have attended any of the following:**

GP Yes □ No □ If yes, how many times _____

Physio Services Yes □ No □ If yes, how many times _____

Other health related services Yes □ No □

If yes, please list what services you attended and how often you attended them.

Service _____ number of times _____

Service _____ number of times _____

Service _____ number of times _____

5. **In the last 12 WEEKS, have you have taken any prescription medication?**

Yes □ No □

If yes, please list what these were on the lines below:

_____

_____

D. ABOUT YOUR PHYSICAL ACTIVITY

6. **In the past week, on how many days have you done a total of 30 minutes or more of physical activity, which was enough to raise your breathing rate? This may include sport, exercise and brisk walking or cycling for recreation or to get to or from places, but should not include household work or physical activity that may be part of your job.** (Please tick **one** box only)

Never	**1 Day**	**2 Days**	**3 Days**	**4 Days**	**5 Days**	**6 Days**	**7 Days**
□	□	□	□	□	□	□	□

7. **Think about the time you spend sitting on week days and at weekends. Please estimate how many HOURS you spend SITTING EACH DAY in the following situations (please write your answer):**

	On a WEEK day		On a WEEKEND day	
	Hrs	**Mins**	**Hrs**	**Mins**
While travelling to and from places				
While at work				
While watching television				
While using a computer at home				
In your leisure time NOT including television (e.g. visiting friends, movies, dining out etc.)				

E. ABOUT YOUR LIFESTYLE

8. How many portions of fruit and/or vegetables (including pulses, salad, vegetables, fruit juices and fresh, dried and canned fruit) did you eat yesterday? (Please tick **one** box only)

None	**1**	**2**	**3**	**4**	**5**	**6**	**7+**
□	□	□	□	□	□	□	□

9. Do you currently smoke cigarettes, cigars, a pipe or use chewing tobacco? (Please tick **one** box only)

Never Smoked □

Former Smoker □

Current Smoker □

10. If you are a current smoker, how many per day on average do you 'smoke'? _____

11. Do you drink alcohol? Yes □ No □

12. If yes, how much alcohol do you consume on an average drinking occasion? (Put the number in each of the spaces provided)

Pints of larger, or beer or stout _____

Small glasses of wine (about 175 mls) _____

Large glasses of wine (about 250 mls) _____

Shots of spirits _____

13. In an average week, how many days do you do you drink alcohol? _____

F. ABOUT YOUR WELL-BEING

14. Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the last 2 WEEKS.

Statements	**None of the time**	**Rarely**	**Some of the time**	**Often**	**All of the time**
I've been feeling optimistic about the future	1	2	3	4	5

I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

G. ABOUT YOUR SOCIAL WELL-BEING

15. The following questions asks about your social support. Please read the following questions and tick one box only that most closely describes your <u>current</u> situation.

	None	1 or 2	3 to 5	6 to 9	10 or more	Unknown
How many *close friends* do you have, people that you feel at ease with, can talk to about private matters?						
How many of these *close friends* do you see at least once a month?						
How many *relatives* do you have, people that you feel at ease with, can talk to about private matters?						
How many of these *relatives* do you see at least once a month?						
Is there someone available to you whom you can count on to listen to you when you need to talk?						
Is there someone available to give you good advice about a problem?						
Is there someone available to you who shows you love and affection?						
Can you count on anyone to provide you with emotional support (talking over problems or helping you make a difficult decision)?						
Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide?						

16. Do you participate in any groups, such as an active retirement group, social or work group, religious-connected group, self-help group, or charity, public service, or community group? (Please tick one box only)

Yes □ No □ Unknown □

17. About how often do you go to religious meetings or services?

Never or almost never	□	Once or twice a month	□
Once or twice a year	□	Once a week	□
Every few months	□	More than once a week	□
Unknown	□		

THANK YOU FOR YOUR TIME

12. Data to be Collected at Programme Sessions [Intervention Group Only]

On any given night the following should be recorded in the tables below:

1. Participant attendance
2. Staff presence and function
3. Programme content overview

NB. BOTH TABLES ARE TO BE COMPLETED EACH NIGHT BY THE PHYSICAL ACTIVITY CO-ORDINATOR. A RESEARCHER WILL MAKE CONTACT ON A WEEKLY BASIS FOR AN UPDATE ON BOTH TABLES SO THAT DATA CAN BE TRACKED AND DUPLICATED.

	W1		W2		W3		W4		W5		W6		W7		W8		W9		W10		W11		W12	
Participant Name	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**	**N1**	**N2**

13. Data to be Collected from Partners

Week	Night	Staff Member(s)	Function & Time Present	Programme Content
1	1			
	2			
2	1			
	2			
3	1			
	2			
4	1			
	2			
5	1			
	2			
6	1			
	2			
7	1			
	2			
8	1			
	2			
9	1			
	2			
10	1			
	2			
11	1			
	2			
12	1			
	2			

Appendix K Details of hours used to calculate 'Indirect Costs' per Men on the Move programme (Refer to Table 4.4.2)

Item	Stage / Details / County	Group	N	Facilitator(s)	Hrs	Breakdown of Hrs			Totals
						B-12W	12W-26W	26W-52W	
Meetings	Planning Phase - 23/10/2014		11		8	88			
	Planning Phase - 09/12/2014		9		8	72			
	Planning Phase - 23/10/2014		14		8	112			
	Implementation, Reflection & Learning – 11/06/2015		16		8	128			
	Implementation, Reflection & Learning – 30/09/2015		16		8	128			
	Implementation, Reflection & Learning – 03/02/2016		16		8		128		
	Implementation, Reflection & Learning – 26/05/2016		15		8			120	
	Implementation, Reflection & Learning – 01/12/2016		24		8			192	
Training[1]	Donegal – 17/08/2015	IG	9	1	8	80			
	Galway – 24/07/2015	IG	10	2	8	96			
	Mayo – 14/05/2015	IG	8	1	8	72			
	Waterford – 29/04/2015	IG	10	2	8	96			
	Cork – 15/05/2015	CG	10	1	8	88			
	Dublin – 10/06/2015	CG	8	1	8	72			
	Kilkenny – 28/05/2015	CG	17	1	8	144			
	Limerick – 16/06/2015	CG	13	1	8	112			
Co-ordination[2]	National MOM co-ordinator	N/A			160	100	30	30	
	County engagement re implementation questions	ALL			0.5	4			
	County engagement in developing materials	ALL			4	32			
Data Collection	Donegal	IG	5		4	10	5	5	
	Galway	IG	3		4	6	3	3	
	Mayo	IG	2		4	4	2	2	
	Waterford	IG	3		4	6	3	3	
	Cork	CG	4		4	8	4	4	
	Dublin	CG	9		4	18	9	9	
	Kilkenny	CG	4		4	8	4	4	
	Limerick	CG	10		4	20	10	10	
	Total Hours					**1504**	**198**	**382**	**2084**
	Total Indirect Costs (€)[3]					**32,245.76**	**4,245.12**	**8,190.08**	**44,680.96**
	Hours for IG Only					**1034**	**171**	**355**	**1560**
	Indirect Costs (€)[3] **for IG Only**					**22,168.96**	**3,666.24**	**7,611.20**	**33,446.64**

Key: N = number; Hrs = hours; 1 = ENGAGE training (ref); 2 = includes development of materials, support and co-ordinating; 3 = Indirect Costs were based on Post-Doc Mid-Scale Salary for Ireland (approximately €41,800 (Jan 2019) = €21.44 per hour; i.e. 52 weeks / 37.5 hours per week)