

Mobile Me: Evaluation

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1. Executive Summary

1.1. Background

Mobile Me was a ten-week sport intervention delivered free to residents aged sixty-five years and over in fifty-one sheltered housing and care home sites in Norfolk between October 2015 and December 2017. The sports delivered were short mat bowls, Boccia, New Age Kurling, and table tennis. Mobile Me was developed with the aim of overcoming barriers to participation in the target audience, and because of this it was delivered on-site, in shared spaces within group homes. After delivery, the programme was intended to be sustained by staff, residents or external volunteers. The primary intended outcome of Mobile Me was a reduction in inactivity. Secondary outcomes were to improve functional status, well-being and social interaction, and to reduce sitting time, fall-risk and loneliness

Mobile Me was funded through Sport England's 'Get Healthy Get Active' initiative, with matched funding from Norfolk County Council Public Health, and NHS Norwich Clinical Commissioning Group. Mobile Me was devised and delivered by Active Norfolk, who are the County Sport Partnership.

1.2. Evaluation

Staff from Norwich Medical School at the University of East Anglia collaborated with Active Norfolk to undertake an evaluation of Mobile Me. This was a pragmatic, mix-methods evaluation, so both qualitative data and quantitative outcomes measurement were collected. As this was a population where physical and mental decline might be expected, a waiting-list control group was recruited to measure the counter-factual. The control sites were those that were expected to receive the intervention at a future point in time. The schedule for programme delivery was decided by Active Norfolk, so allocation to intervention and control was non-randomised. Outcome measurement were taken at baseline, ten-weeks, six months and twelve months for the intervention group. There were three data collection points for the control group, who were followed up at either ten-weeks or six months, but not both. In addition to self-report through a questionnaire, three types of objective measures were used for sub-groups of participants: functional fitness tests, accelerometry and standing-balance measurements. Qualitative data was gathered three time-points during the study, enabling the evolving views of stakeholders to be captured. In addition to this, a cost-effective evaluation was carried out using Sport England's MOVES tool.

1.3. Findings

1.3.1. Participation

Mobile Me was delivered in fifty-one sites; an estimated 28% of residents attended at least one session (595 residents in total). On average, those in the intervention group attended 6.4 sessions. The number of sessions attended was positively associated with participation in sport at baseline, but not with age, gender, setting type, baseline self-reported health or time of year.

In addition to the use of promotional materials, Active Norfolk's approach to recruiting residents was to build relationships with accommodation staff. This often appears to have worked well, depending on factors such as staffing levels and organisational support. Staff also need the knowledge to support residents being physically active and a training session helped with this, enabling them to allay the fears of residents about doing gentle physical activity when they had conditions such as arthritis.

While professional stakeholders identified a number of emotional and perceptual barriers to residents taking part in physical activities, such anxiety about risk and a fear of embarrassment, feedback from some residents revealed that they were already motivated to be active but faced tangible barriers such as ill health and disability. These two types of barriers to participation have been previously identified in the literature.

The Active Norfolk team delivering Mobile Me consciously avoided presenting it as a sporting intervention aimed at increasing physical activity in the belief that this would deter participation. The overwhelming message from stakeholders and participants was that the programme's defining characteristic was that was sociable, also that it was fun; these are two of the key ingredients identified in the literature as being drivers for participation in physical activity by older people.

1.3.2. Outcomes

Self-reported sedentary behaviour reduced in the intervention group compared to the control. Physical activity, including participation in sport increased. While it is likely that some of this was light physical activity, for some individuals, due to poor health and disability, this may be all that is possible. There was no difference at follow-up between the control and intervention for objectively measured physical activity using accelerometers, however this may be due to limitations of the measurement method.

Qualitative feedback from professional stakeholders and residents alike suggest that Mobile Me reduced social isolation, however scores on a loneliness scale did not improve. It is possible that this scale may not have been responsive enough to register change. While scores on a wellbeing scale improved, the difference between control and intervention was not statistically significant and may therefore be due to chance.

NICE guidance for non-pharmacological interventions for people living with dementia recommends activities that increase wellbeing. An observation study using Dementia Care Mapping indicated that, during Mobile Me sessions, those living with moderate to severe dementia experience increased well-being. To achieve this, sessions should be inclusive, failure-free and fun.

Qualitative feedback from accommodation setting staff, sports coaches and residents suggests that physical functioning improved in some individual as a result of taking part in Mobile Me. EQ-5D DL measures self-reported mobility, pain, depression, self-care and ability to carry out activities of daily living. While the intervention group scored more positively than the control group across follow-ups, this difference was not statistically significant so may be due to chance. A significant association, however, was found with the number of Mobile Me sessions attended and improved EQ-5D DL scores. When measuring physical functioning there was an improvement in the arm curl, and evidence of an improvement in the timed up-and-go. These two tests are likely to most replicate the activities involved in bowling.

Self-reported fear of falling has been found to be associated with a history of fall, and this reduced. However, an objective measure did not record any improvement in standing balance which has also been found to be related to fall risk in some studies.

Interviews with participants suggest that the effect of Mobile Me is dependent on context. Where an individual is already socially connected and active, they may consider that Mobile Me has made little difference to them; where an individual is socially isolated, or inactive, Mobile Me may make a difference to that individual's quality of life. Objective measures across all participants may therefore hide the differential effect of the intervention in some individuals.

Mobile Me differs from many other physical activity programmes described in the literature as it is unstructured and low-intensity. Despite this, there were improvement in some of the

outcomes measured. It provides an example of a different approach to engaging older people in physical activity. The next challenge, however, is to identify how, and whether, using Mobile Me as a gateway, progression to higher levels of activity can be achieved without losing the ethos of the programme.

It is also evident from the literature that, where it is measured, any increase in physical activity resulting from interventions, normally drops off over the longer term, and this also appeared to be the case in Mobile Me, a challenge for the future; is to methods for ensuring there is not a drop-off in physical activity over time.

1.3.3. Delivery

Mobile Me sports coaches adopted the role of facilitators rather than proactive instructors and consciously aimed to generate a positive, fun and inclusive atmosphere, for example, through the use of humour and banter. When well delivered, bowls activities can be highly accessible to people of all levels of abilities; they also enable a whole-group, social experience, with the motivating element of competition. Several lessons were learnt about facilitating the sessions, and these have been drawn up into the best practice guidance with the aim of promoting inclusivity, engagement and wellbeing during delivery. Additional guidance has also been developed for delivering physical activities, such as bowls, to individuals living with moderate to severe dementia.

1.3.4. Sustainability and legacy

Mobile Me was sustained in a high proportion of sheltered housing sites, and in all care settings (who were all part of the same provider). Mobile Me sustains better where there is organisational buy-in. Resident-volunteers are an important component of sustainability in sheltered housing sites, and often have experience and skills in running activities with their peers. A scheme providing off-site provision of physical activity in a leisure centre also successfully attracted residents, however it may not be suitable for those without the means or confidence to travel. The use of external volunteers was tested, however in this instance, it does not appear to have been easy to achieve consistent volunteer cover. Due to the changing nature of housing provision and social policy, any model of sustainability should probably aim to embed the importance of physical activity within an organisation's culture.

Mobile Me has contributed to a culture change at Active Norfolk that has increased its focus on older people across its programmes. It has also enabled Active Norfolk to grow its relationships with organisations working in this area and build capacity for further work with

this population.

1.3.5. Economic evaluation

Economic evaluation was carried out using Sport England's MOVES tool (version 2) which calculates the healthcare savings resulting from the reduced prevalence of health conditions due to physical activity. Four scenarios were tested using a different combination of input parameters and in order to establish the cost-effectiveness of Mobile Me using a 'willingness to pay' threshold of £20,000 per Quality of Life Year gained (QALY). In three out of four scenarios Mobile Me was cost effective. However, MOVES does not account for reduced social care costs, which may be an important economic outcome for projects such as Mobile Me. Further, MOVES is modelled on the health profile of the general population and is not designed for populations that may have higher levels of pre-existing conditions, such as those in residential care settings that comprised 13% of the analysis sample.

1.4. Conclusion

In summary, the evidence gathered during this evaluation suggests that the Mobile Me model provides a gateway into physical activity for older, inactive people. For future consideration is whether and how some of these individuals can be progressed to higher levels of activity without losing the ethos of the programme. Also for consideration is how the programme can continue to be sustained, and extended, by working with organisations to bring about culture change around the importance of physical activity for older people.

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2. Introduction

Mobile Me is a physical activity intervention delivered to residents aged 65+ in sheltered housing and care homes in Norfolk. Sporting activities, such as bowls, were delivered by trained sports coaches with the aim that the activity would continue at each site after the ten-week facilitated programme ended. Programme delivery commenced in October 2015 and ran until December 2018. The Mobile Me programme was funded through Sport England's Get Healthy Get Active initiative, with matched funding from Norfolk County Council Public Health and NHS Norwich Clinical Commissioning Group.

Mobile Me was devised and delivered by Active Norfolk, who are the County Sport Partnership. Staff at Norwich Medical School at the University of East Anglia collaborated with Active Norfolk to undertake an evaluation of Mobile Me. This document reports on the evaluation. This report initially considers the existing literature around older people, supported accommodation and physical activity. Following this, is a description of the project and the methods used to evaluate it. Results are presented in four sections: quantitative findings, qualitative findings, economic evaluation findings and methodological findings. Following this, the findings are drawn together in the context of the academic literature in a discussion chapter. Key findings are then presented along with recommendations, followed by a conclusion.

3. Literature Review

3.1. Introduction

The aim of Mobile Me was to promote physical activity among residents in group homes in and around Norwich with the aim of normalising physical activity. The primary outcome of the project was a reduction in inactivity. Secondary outcomes were to increase functional status, well-being and social interaction and to reduce sitting time, fall-risk and loneliness. This review of the literatures presents contextual information relevant to the project and its intended outcomes.

3.2. The older population and group settings

The older population in the UK is projected to grow. In 2016 18% of the UK population was 65 and over, by 2046 this figure is forecast to be 25% [1]. There is considerable variation however in the number of older people in different areas of the UK; currently areas with the highest proportion of older people are coastal. In the county of Norfolk, mid-year population estimates in 2017 were that 24% of usual residents were aged 65 and over.

In 2011, 3.2% of people 65 over in the UK were in residential care. As a result of increased disability-free life expectancy, an increase in the number of unpaid carers, and policies that aim to keep people in their own homes [2] the care home population is also aging, and also, consequently, the prevalence of dementia and multiple health conditions (Matthews et al. 2016). The four most common conditions in residential care settings are musculoskeletal (such as arthritis), stroke, dementia and Parkinson's Disease [3].

Sheltered housing can be segmented into three main types [4]: Housing without support (on-call or emergency provision only), housing with support (warden support however limited) and housing with care (schemes that offer care services). The level of support offered in sheltered housing has reduced [5], [6] and it is rare now to find live-in wardens. A review of sheltered housing in 2012 estimated that there were, across the UK, around 550,000 dwelling classed as sheltered housing [6]. The review estimated that excluding 'housing with care', around 60% of those moving in to social sheltered housing reported a 'disability-related requirement', including mental health and substance misuse. It also found that the age-range of those applying to live in social rented sheltered housing was widening (there were more residents below pension age, and a significant number of tenants aged 85+). Matthews et al. [7] found that in assisted living (housing with a warden) loneliness was consistently lower than in long-term care.

Strategy around the provision of supported housing has changed in recent years, particularly after the 1990 NHS and community Care Act. This broke from the concept of a linear continuum of care at different levels of dependency (i.e. from ordinary housing to sheltered housing, to residential care, and then to nursing care), and which placed an increased emphasis on providing care at home [6]. The future shape of provision for those with support needs in older age is unclear and currently much debated. While projections are that there will be an increase in years of old age spent independent, or in low-dependency, there will also be a group of older adults with dementia and other comorbidities that are likely to require complex care [8].

3.3. Physical activity and older people.

The UK government's physical activity guidelines for people aged 65+ recommend a minimum of 150 minutes of moderate physical activity a week; individuals who are already fit can alternatively aim for 75 minute of vigorous physical activity a week (or a combination of moderate and vigorous physical activities) [9]. Older adults should also undertake muscle-strengthening exercises twice a week, and for those at risk of falls, activities targeting balance and coordination. Apart from the recommendation around falls, these are the same guidelines as for younger adults. However, due to the high rates of inactivity in older people, there is more emphasis in the guidelines on older people doing something rather than nothing;

'...it is important to emphasise that those who are currently inactive can achieve some health benefits from increasing their activity even if it is below the recommendation.'

(Department for Health 2011, p.29)

Due to higher levels of poor health and disability in older people, the guidance also states that the recommendations should be 'be interpreted with consideration of individual physical and mental capabilities' (Department for Health 2011, p.38). A review of the evidence on sedentary behaviour by an expert working group [10] found that sedentary behaviours are associated with poor health outcomes such as all-cause cardiovascular mortality and diabetes. And another recommendation within the physical activity guidance is to minimise extended sedentary periods [9]. However, there is not yet sufficient evidence to develop a quantified target or strategy to break up sedentary behaviour.

Sparling et al. [11] argue for a change in focus away from the 150 minutes moderate activity recommendation for older people that cannot, or do not want to meet this target. Given

evidence about the benefits of even very small increases of physical activity for those that are inactive, they suggest that a more realistic message for these individuals should be that some activity is better than none, including light physical activity. Furthermore, given emerging evidence about the potential health risks of sedentary behaviour, that there should be more emphasis on encouraging older people to break up sedentary time.

A study examining adherence to physical activity guidelines in 2450 community dwelling older adults (age range 70-93) from 25 towns around the UK in 2010-11 [12] found that, based on objectively measured physical activity levels, 15% of men and 10% of women achieved 150+ minutes of moderate or vigorous physical activity in the last seven days in bouts of 10 minutes or more. Those adhering to guidelines were younger, healthier, more mobile and experienced less depression, they also had more positive attitudes to physical activity. A review of the literature in ten European countries between 1981 and 2014 [13] found that, on average, older adults (60+) spend on average 9.4 hrs per day sedentary, which equated to 65-80% of their waking day. In contrast, self-reported sedentary time averaged at 5.3 hours daily indicating that self-report surveys generally hugely underestimate sitting time. There was an association with age and sedentary time; older people spent more time sedentary, particularly men.

3.4. Physical activity and conditions

The benefits to older people of physical activity include lower prevalence of non-communicable disease, improved disease risk factor profiles and improved functioning [9]. Physical activity can also benefit specific health conditions, for example NICE guidance for osteoarthritis recommends exercise as a core treatment regardless of age, pain, severity or disability.

Falls can have serious implications for the health and wellbeing of older people; not only can falls impact independence, but they are a leading cause of death for those of 65 years and over [14]. Programmes of physical activity have been shown to be effective in reducing falls [15], however this is only where the physical activity challenges balance and improves strength. This is because impaired balance and reduced muscle strength are primary risk factors, therefore exercise that is solely chair-based is not suitable. To be effective for fall-reduction, there is evidence that a physical activity programme should be carried out 2-3 times a week (even if this includes exercises to do at home) and continued for at least fifty hours in total [15]. The programme should also be progressive (so should lead on to other suitable forms of physical activity) and be delivered by specially trained instructors.

In 2014, the Alzheimer's Society estimated that around 69% of those living in care homes had dementia although it varies by setting [16]. There is currently no cure for dementia, therefore the emphasis is often placed on pre-diagnosis prevention, prevention of progression and, in more advanced disease, improvement in physiological function and wellbeing. There is some evidence that physical activity may be preventative against Alzheimer's Disease [17], and also that multi-component exercise of moderate to high intensity improves physical and cognitive functions and activities of daily living in those living with dementia [18]. NICE recommend offering activities to promote wellbeing for people living with dementia, and that these should be tailored to individual preference [19]. Harmer & Orrell [20] found that people in care settings living with dementia had different views to relatives and carers about what made such activities meaningful. They valued activities that addressed their psychological and social needs, and this was related to the quality of the experience, rather than the specific type of activity. Relatives and carers valued activities that maintained physical abilities.

3.5. Drivers and barriers for physical activity

Goodwin et al. [21] found that, whereas the focus of research on physical activity for older people was often on outcomes around behaviour change and health; older people were more concerned about the social aspects of physical activity and sought pleasure, enjoyment, a sense of belonging, and independence, as well as health and fitness. In a thematic synthesis of 132 qualitative studies on older people's perspectives on participation in physical activity [22], six themes were found: social influences, physical limitations including pain and fear of falling, competing priorities, access difficulties, personal benefits of physical activity, and motivation and beliefs. Social influences were both positive and negative, for example, valuing interaction with peers or social awkwardness. The reviewers concluded that some older people believe that physical activity is unnecessary or potentially harmful. Others see the benefit, but face barriers to taking part. Strategies to encouraging participation should be, on one hand to raise awareness of the benefits and minimise perceived risk, and on the other hand to overcome the barriers that prevent older people taking part. Chase et al. [23], in another review of physical activity interventions for older people, while cautiously recommending cognitive behaviour-change approaches such as goal setting or self-efficacy enhancement, simultaneously acknowledge that there are contradictory findings in the literature with regards to interventions using such approaches. Equally, Zubala et al. [24] in a review of other reviews, conclude that purely cognitive/behaviour change approaches may be less suitable for older adults and

recommended interventions promoting social, fun, low to moderate intensity activity.

There are numerous toolkits and guidelines on how best to deliver physical activity programmes for older people that reflect different aspects of the finding in the literature. Researchers at the University of Bath, for example, in an evidence-based guide for local decision makers [25] highlight the importance raising awareness of recommended activity levels, as well as providing strategies to people to enable them to progress to the guidelines. Age Concern Northern Ireland [26], in a guide for sports development teams and leisure centres, recommend involving older people in the design of activities, embedding a social aspect into the activities, reducing the need for equipment, and providing role models; non-materials barrier to physical activity include fear, embarrassment, and lack of confidence.

3.6. Outcomes of activity programmes and older people

A review of randomised control trials for older adults in physical activity programmes [27] found that interventions were successful in increasing activity in the short-term, but, for those studies that followed participants in the longer term there was no difference between control and intervention groups. The definition of older adults however were those of a minimum age of 40 years; the average age across the 38 studies reviewed was 50 years. A review of physical activity interventions among community dwelling adults [23] found a clinically meaningful reduction in the time up and go for treatment versus control. This was associated with more minutes of physical activity in the last seven days and longer intervention session duration. Interventions were especially effective among frail participants and were all, in this case, supervised resistance and/or aerobic training.

Another review of interventions to increase physical activities in older adults [28], found that effect sizes were larger when interventions targeted only activity and did not include general health education, and where they included self-monitoring, were delivered in groups, recommended moderate intensity activity, involved intense contact between those delivering the activity and participants, and targeted patient populations. Effect sizes were also larger where the time to follow up was shorter (less than 90 days), indicating a dropping off effect. A large study in the United States [29] randomised participants to a health education program (n=817) or to a structured, moderate intensity, physical activity program (n=818) carried in a centre and at home that included including aerobic activity, resistance and flexibility exercises. All participants were sedentary, were 70-89 years old and had physical limitation, but were able to walk 400 meters. The structured moderate intensity physical activity programme reduced major mobility disability over 2.6 years. The

moderate intensity activity group reported higher rates activity than the health education group, although self-reported activity levels converge towards of the follow-up. Accelerometry results show a difference between the two groups over two years of follow-up; however, after an initial surge at first follow-up activity rates fell in the intervention group over time.

3.7. Older populations and physical activity: Summary and recommendations

There is evidence that physical activity is important for both maintaining and improving the health and mobility of older people, including those with specific conditions. In some circumstances, physical activity should be tailored to the condition, for example, where the objective is to reduce fall risk. While the aim should be to meet or exceed government guidance, some physical activity is better than none, and the priority should be to get people active in the first place, with a view to progressing activity levels where possible. It is also important to break up long periods of sedentary behaviour.

Some older people require information about the benefits of physical activity, including information that allays fears about the possible risks. Others do not need convincing of the benefits of taking part, but require help overcoming physical, practical or social barriers. While practitioners, researchers and family may prioritise tangible outcomes from interventions to increase physical activity; research indicates that older people themselves value enjoyment and social interaction in addition to health benefits.

Interventions can be successful in increasing physical activity and in bringing about other outcomes in older people. Often, however, when measured over the longer term increases in physical activity can drop-off over time. Physical activity interventions described in the literature normally involve moderate physical activity, often delivered in structured programmes and more than once a week; this differs to Mobile Me which involves light physical activity, that is not part of a structured programme and that is delivered only once a week for ten weeks.

4. Mobile Me delivery and implementation

4.1. Introduction

Mobile Me was a 10-week physical activity intervention for residents aged 65+ in sheltered housing and residential care homes in and around Norwich. The intervention aimed to normalise physical activity for residents as part of the culture, and to bring about wider health and social outcomes. Mobile Me was funded by Sport England's Get Healthy Get Active initiative, with matched funding from Norfolk County Council's Public Health and NHS Norwich Clinical Commissioning Group.

4.2. Project staff

Intervention delivery was by Active Norfolk who are the county sport partnership and are who are managed by Norfolk County Council. County Sports Partnerships aim to grow sports and physical activity in their areas. The evaluation of Mobile Me was carried out in conjunction with Norwich School of Medicine at the University of East Anglia (UEA).

4.3. Mobile Me Steering Group

The Mobile Me steering group met quarterly to discuss the project and offer recommendations for action. The group comprised of representatives from the following organisations: Active Norfolk, UEA, Norfolk County Council Public Health, Public Health Falls Prevention Group, Norwich City Council Sports Development, Breckland District Council Sports Development, British Gymnastics, a housing association social sheltered housing provider, a local authority sheltered housing provider, a private residential care provider and Age UK.

4.4. Venues

The Mobile Me project was delivered in sheltered housing accommodation and in residential care homes in and around Norwich. Delivering sport in these non-traditional venues was intended to break down barriers to participation by negating the need for transport in a population that were elderly and were likely to experience a high level of ill health and disability.

Delivery took place predominantly with main three providers, a social landlord providing sheltered housing, a local authority landlord providing sheltered housing, and a private limited company providing housing with care and residential care. These three partner

providers were involved in the early stages of programme development. In addition to this, a number of other providers of sheltered housing came on board at a later stage, including other social landlords and charities. Mobile Me was also delivered in one day-care centre, and one community centre.

Mobile Me was delivered in waves between October 2015 and October 2017, normally to six sites at each wave. There were four waves per year. In total, fifty sites received Mobile Me and the intervention was delivered fifty-one times (one large unit had two rounds of intervention). Planned delivery at six sites did not go ahead. Five of these were waiting-list control group sites that decided against having the intervention a year later (although some of these residents took part in Mobile Me at neighbouring sites). One site cancelled but received delivery at a later stage. Seven additional sites were recruited to replace sites that cancelled and for an extra wave of delivery (October 2017). See Appendix A for delivery waves, cancellations and additions.

4.5. Sport activities

The development of Mobile Me was informed by a pilot project¹. This helped identify appropriate activities that could be delivered within the communal areas of supported accommodation units. Activities were selected based on having the following characteristics:

- Accessible to people of all abilities
- Suitable for delivery in small spaces
- Sociable
- Do not require an external facilitator or sports coach (so they can be sustained).

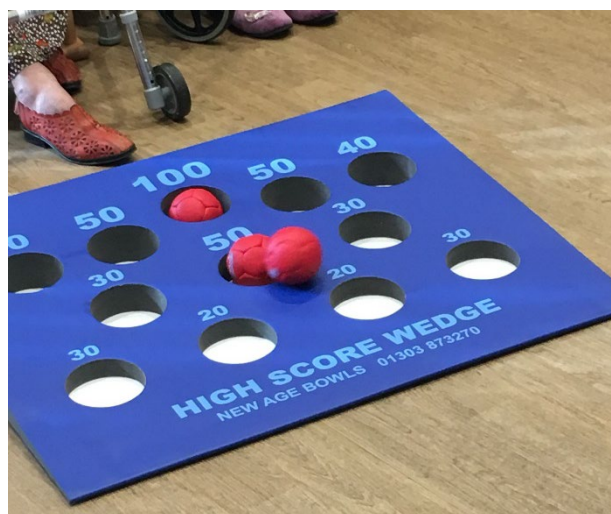
The activities delivered for Mobile Me were as follows:

- a. Short mat bowls: Bowls are rolled along a mat to a target. The bowls are weighted so that they curve when rolled, adding an extra level of difficulty. The game involves strategy, for example, knocking opponents' bowls away from the target.
- b. New Age Kurling: A 'land-based' version of curling on ice, whereby the stones are fitted with small rollers. A relatively smooth surface is required to play. The stones can be launched by hand or using a pusher, meaning players do not need to bend down. In another adaptation, the stones can be rounded up for collection at the

¹ Launched in October 2014 with weekly short mat bowls sessions in the communal areas of four sheltered housing schemes managed by Circle Housing, a number of residents continued to play bowls on a weekly basis over a year on particularly at two of the sites

end of a game using a trolley-like device. As above, this game involves strategy

- c. Boccia: Boccia is normally played by throwing leather/leatherette bowls to a target jack. For Mobile Me, target wedges were used whereby players throw into the balls to a numbered target (see photo). This makes the game easy to adapt, as the mat can be moved close to the player and gives instant feedback on scores. Played with a wedge, this game is also known as 'New Age Bowls'.



Target wedge used for playing Boccia

- d. Table tennis: Table tennis was played by fixing a net to existing tables within the settings. The playing area was therefore normally smaller than a standard table tennis table.
- e. Other: in addition to the above, sports coaches occasionally delivered seated exercise, where this was requested by residents.

In addition to the use of a target wedge for Boccia mentioned above, other adaptations were made to meet the needs of residents and their communal spaces. For example

- Twenty-foot bowls mats were used instead of traditional forty-foot mats, not only for space considerations, but to make it easier to lay out and retrieve the mat which are heavy. Where the mat was too heavy for residents to move, in some sites, bowling took place with a target rather than a mat, but only where the existing floor surface allowed i.e. thin carpet.
- Bowling ramps were available for residents with limited mobility or strength in the arms, hands, or upper body.
- A ball picker for Boccia (so that balls could be retrieved without the need to bend over). As well as collecting devices, and pushers for Kurling.
- All of the sports delivered could be played whilst seated.

4.6. Delivery

Relationships with the three main supported accommodation providers were established at the start of the project. Accommodation staff were asked to put up posters, give out leaflets

and encourage residents to attend. Often, the Mobile Me Project Officer visited prior to delivery, for example by attending residents' meetings. The emphasis was on person-to-person recruitment, as well as through printed materials. Prior to the session, either the Project Coordinator or Project Officer would visit the space where the activity was to be carried out in order, to undertake a risk assessment.

The first week of the intervention was focussed on data collection and on introducing residents to the activities. Initially, at week one, residents were asked to select one activity to continue playing for the remaining nine weeks of the intervention. However, this was changed after feedback from residents that they preferred more variety. From this point, more than one sport was offered, depending on residents' wishes. The exception was care homes, where there were high levels of disability, particularly in residents in dementia units; these residents were offered Boccia only, as this was the most accessible of the sports.

Sessions were generally two hours and took place either in the morning or in the afternoon. Sessions at dementia units were reduced to one-hour as it was observed that residents became tired.

Towards the end of each ten-week intervention, the Active Norfolk staff would discuss with residents and staff how activities might be continued at the site. Where there was the desire, and the capacity, to sustain the activity, equipment for one sport was left on site by Active Norfolk (residents decided which sport they wished to continue). At sheltered housing sites, activities were generally sustained by residents, often with the support and encouragement of staff. At residential care settings, where there were higher levels of ill health, disability and frailty, sessions were sustained by staff.

4.7. Extra events

In addition to the delivery of the Mobile Me interventions, a number of special events were hosted. These formed an integral element of the project as they aimed to maintain relationships with participants and encouraged them to continue being physically active.

Sainsbury's Sport Relief Flagship Games – March 2016: Mobile Me hosted a showcase festival as part of the day's activities. Residents who had taken part in the Mobile Me programme were invited to show their newly acquired skills in Short Mat Bowls, Table Tennis, New Age Kurling and Boccia at UEA Sportspark.

Cycling themed sessions – June 2016: In preparation for the Women's cycling tour visiting

Norfolk, Mobile Me delivered a number of cycling themed sessions. Resident shared memories of previously owned bicycles and tried adapted cycling on seated exercise pedal bikes.

Intergenerational project -2016: Students working towards a sports leader award at a local sixth form volunteered on the Mobile Me project and supported with delivery.

Memorial Match – February 2016: A match between two sheltered housing sites was held for a resident that had passed away. This provided a platform of comfort and support for the grieving process for residents and family. The resident’s family presented a trophy.

Christmas Competitions – December 2016 and December 2017: Competition days between schemes in their chosen activities.

Mobile Me Festival- September 2016 and September 2017: The event was hosted at the UEA Sportspark and consisted of the usual Mobile Me favourites of Short Mat Bowls, Table Tennis, Boccia and New Age Kurling (with an element of competition through a highest score/longest rally of the day award for each activity).

4.8. Training

As a result of feedback from one of the social housing partners, a daylong training seminar was developed in partnership with Pure Training and Development around the benefit of physical activity for older people in May 2017. This was open to all supported accommodation staff and delegates from all three of the main housing partners attended.

4.9. Participation

Active Norfolk administrative monitoring records show that altogether 595 participants attended at least one Mobile Me delivery session, however not all of these individuals consented to take part in the evaluation. Analysis of participation for those that consented to the evaluation can be found in the results section of this report.

5. Evaluation methods

5.1. Overview

The evaluation of Mobile Me was designed in accordance with the funding bid submitted to Sport England that described the intervention’s intended outcomes. The evaluation framework was developed in accordance with Sports England mandated Standard Evaluation Framework for Physical Activity Interventions (SEF) [30].

The evaluation took the form of a mix-methods, pragmatic, non-randomised, cluster-

controlled study, with a waiting list control population. This is a clustered design because participants were drawn from supported housing units (clusters) and it was hence the housing unit that was allocated to the waiting-list control or intervention group, rather than the individual. The incorporation of a control group allows outcomes for residents that received the programme to be compared to that have not yet. This was considered especially important in a population where physical and mental decline might be expected and where a positive outcome might be a reduction in decline, rather than improvements in functioning. Using a waiting-list control has the advantage of letting everyone receive the programme should they wish.

This was pragmatic research because it was an evaluation of a 'real-world' intervention rather than a trial set up by the university for research purposes. The value of such evaluations is that they have greater claim to ecological validity, in other words, they have greater claim to be generalisable to real-world settings. This is because they are designed and delivered by organisations that would normally carry out this type of work; the disadvantage is that the researchers can have less control over how the intervention is designed in order to accommodate the research, and have less hands-on control over how aspects of the research, such as data collection, are carried out [31].

This was a mix-method evaluation because, in addition to measuring quantitative outcomes, qualitative data was collected from a number of sources, for example, interviews with those involved in the project. While a quantitative outcomes evaluation can help identify whether a project has brought about measurable change, a qualitative evaluation can help explain why any changes may have come about, or why they have not. This is important because the delivery of social interventions is influenced by the manner in which they are delivered, by who they are delivered to, and by the context in which delivery takes place. So, while a project may be successful in one setting, it may be less successful in another. Combining a qualitative evaluation with a quantitative outcomes evaluation can help identify what makes a project work, for whom, and why, and thus inform future project delivery.

5.2. Evaluation Questions for Mobile Me

The following evaluation questions were identified for Mobile Me.

5.2.1. Primary evaluation question

How effective is the provision of a programme of tailored sporting provision ('the programme') at reducing the prevalence of **inactivity** amongst residents of supported housing who are classified as inactive ('the participants')?

5.2.2. Secondary evaluation questions

- How effective is the programme at improving functional status and reducing fall risk amongst the participants?
- How effective is the programme at reducing time spent sitting amongst the participants?
- How effective is the programme at improving well-being, increasing social interaction, and reducing loneliness amongst the participants?
- What are the components and processes of the programme that are most associated with its effectiveness?
- What is the cost effectiveness, measured in terms of the changes in QALYs, of the programme?

5.3. Sample and data collection time-points

The order in which delivery took place at sites was decided entirely by Active Norfolk with housing partners. Control sites were selected solely on the basis that they were earmarked to receive the intervention later in the programme (as this was a 'waiting-list control'); allocation to control was by Active Norfolk.

Participants in the evaluation were individuals at delivery sites that wished to participate in the intervention and that were willing and able to give informed consent. There is one exception to this where an observation study was carried out on individuals living with dementia who did not have the capacity to consent; this was done with the appropriate ethical approval from a national research ethics body.

Data were collected at four time-points for the intervention: the first session of the intervention (baseline), last session of intervention (ten weeks), six months and twelve months. Those that were not able to attend the first session were able to complete the baseline questionnaire at the second session (but not at subsequent sessions). Data collection for the control took place at three time-points: baseline, ten weeks or six months, and twelve months.

The control-group baseline session took the form of an information session about both the evaluation and the programme. This had the advantage of attracting residents who were potentially interested in taking part in the intervention and who were therefore more likely to be comparable to the intervention group (in terms of their interest, and willingness to take part in activity sessions).

5.4. Programme logic model

The programme logic model (Figure 1) identifies the key inputs, activities, outputs and outcomes for the project (*developed from proposal document by researcher*).

Figure 1: Mobile Me Programme Logic and theory of change

Theory of change	Programme efficiency	Programme effectiveness: outcomes	
	Outputs	Immediate outcomes	Longer outcomes
<p>Through developing activities with residents, and by delivering them for free in communal spaces and on site, Mobile Me will address some of the barriers to participation (transport, unsuitable activities, unfamiliar environments, cost) and thus engage inactive, older people in in sport. The sports will be easy-to-play, accessible and not require an instructor enabling them to be sustained on-site by volunteers or staff.</p>	<p><u>Delivery of sessions</u></p> <ul style="list-style-type: none"> • Number of participants • Throughput (number of sessions each participant attends) • Type of participants • Number and type of accommodation units engaged <p><u>Sustainability</u></p> <ul style="list-style-type: none"> • Number of sites at which activity continues for at least 10-12 weeks beyond the end of the intervention • Number of residents continuing to do a similar activity one-site or elsewhere. 	<p>Being physically active (including taking part in sport).</p> <p>Doing activities that improve balance.</p> <p>Positive, affirmative experiences. Enjoyment / fun.</p>	<p>Reduction in inactivity, increase in physical activity.</p> <p>Improved physical health.</p> <p>Improved mobility and balance.</p> <p>Improved mental wellbeing and reduced social isolation.</p> <p>Continued participation in physical activities.</p>

5.5. Data collection and analysis

5.5.1. Outcome evaluation

a. Data collection

The evaluation tools were developed with the aim of assessing the intended outcomes within in the project bid whilst being practical for the circumstances in which they were being delivered i.e. portable, within budget, suitable for the skills and capacities of those gathering the data, and suitable for an older population who may have sensory impairment, cognitive impairment, frailty and/or disability. In addition to a questionnaire, several objective measures were used with subgroups within the evaluation.

Outcomes data was collected using the following measurement tools:

- Questionnaire
- Functional fitness tests
- Standing balance measurements (using a force balance plate)
- An objective measure of physical activity (accelerometry)

Table 1: Outcomes described in the bid and measurement methods

Outcome/Indicator	Measurement Method
Sedentary behaviour and physical activity	<u>Questionnaire</u> : International physical activity questionnaire for the elderly (IPAQ-E). <u>Objective Measure</u> : accelerometer
Fall risk	<u>Questionnaire</u> : Fear of falling single-item visual analogue scale <u>Objective Measure</u> : Balance board– validated instrument
Functional status	<u>Questionnaire</u> : Euroqol EQ-5D DL– validated scale <u>Objective Measure</u> : Fullerton Functional Fitness Test – validated
Health related quality of life	<u>Questionnaire</u> : Euroqol EQ-5D, validated scale
Mental well-being	<u>Questionnaire</u> : Short form Warwick Edinburgh Well-Being Scale, validated scale (SWEMWBS)
Increasing social interaction and reducing loneliness	<u>Questionnaire</u> : Single item loneliness question from the English Longitudinal Study of Aging (ELSA) (taken from The Campaign to End Loneliness’s ‘Measuring your impact on loneliness in later life’)

Questionnaire

In selecting the scales for inclusion, evidence of validity, reliability and sensitivity to change were considered, as well as suitability for use with older people. This was balanced with the need to minimise questionnaire length.

The questionnaire was produced in large print and designed to maximise legibility. It was discussed and tested with four older people living in sheltered housing at a consultation event, and some minor adaptations made because of this consultation. Participants were assisted in completing the questionnaire by the Mobile Me sports coaches or member of accommodation staff if required (most residents required assistance).

Included in the questionnaire were the following items:

Fear of Falling Visual Analogue Scale: [32]. While the scale showed only fair test-retest reliability it was selected as it was simple and quick to complete. Scores on the scale were found to have an association with a history of falls, age and gender.

Single item physical activity question: [33] commonly used as a screener question for inactivity by Sport England at the time of this evaluation.

IPAQ-E: Sport England's recommended physical activity measure (at the time of this evaluation) was the International Physical Activity Questionnaire (IPAQ). The standard IPAQ has been designed for use with those aged 15-69 years only. This limitation may be for a number of reasons, for example, because definitions for the intensity of activity levels may change as people age. The IPAQ-E was developed for the elderly [34] in Sweden but available in translation. It is similar to the standard short-form IPAQ but includes example activities that are more relevant to older people. The order of the questions has also been altered so that it progresses from inactivity to increasing levels of activity. Older people have been found to under-report sitting time [35] and, in validation, the IPAQ-E was shown to have a stronger association with objectively-measured sitting time. For other properties, it was found to have similar characteristics to other versions of the IPAQ.

Loneliness: from the English Longitudinal Study on Ageing, sourced from The Campaign to End Loneliness guidance on 'Measuring your impact on loneliness in later life' [36]. This measure was selected as it was one of the single-item measures recommended and was quick and simple to complete.

Warwick Edinburgh Mental Wellbeing Scale (short form) developed by Warwick Medical School [37], the scale uses positive wording and assesses both feeling and functioning. It is a validated and has been shown to be sensitive to change when used to evaluate wellbeing interventions.

Weekly minutes in sport Asked in a similar method to the IPAQ-E, required by Sport England at the time of this evaluation.

Euroqol EQ-5D-5L and VAS: This is a widely used and validated tool for the measurement of non-disease specific, health-related, quality of life. The tool measures five domains of health-related quality of life. The 5L version gives five possible levels of response for each of the domains and is more sensitive than the 3L version which gives three possible responses. The EQ-5D VAS asks respondents to rate their health on a scale of one to a hundred.

Functional Fitness Tests:

The Fullerton Functional Fitness Test (also known as the 'Senior Fitness Test') has been developed to be used in elderly populations to assess different aspects of strength, flexibility, and stamina. It has been validated [38] and extensively used in research and evaluations. A manual and DVD is available for the Senior Fitness Test and was used to instruct Mobile Me staff in its use.

Objective physical activity

To gather objective measurements for sedentary behaviour and physical activity, an accelerometer was worn by a sub-set of participants. The Axivity AX3 was selected because it was relatively low cost and it is wrist-worn. Wrist-worn devices have been shown to have better wear compliance than waist worn ones. The AX3 it is also waterproof, and, at the time the evaluation was being developed, the only other waterproof, research-grade accelerometer required fixing to the thigh and covering with waterproof tape/bandage; this was not practical for the purposes of this evaluation. While the use of a commercial accelerometer was explored, at the time, there was no evidence in the literature to suggest that any of the models available would be suitable for research purposes, and it was not clear how participant data could be easily accessed from any such device.

Balance

Postural sway has been associated with fall risk in a number of studies [39] in group

settings as well as in the community [40]. Furthermore, there is some evidence that vigorous physical activity can influence postural sway [41],.

Postural sway (or standing balance) was assessed using a force platform which is able to measure, and record minor adjustments made when standing. Laboratory grade force platforms are expensive, therefore a lower cost alternative was sourced that was considered to be adequately sensitive and reliable for this type of study. This consisted of a Nintendo Wii-Fit balance board that numerous studies have validated as sensitive to change over time [42]–[45]. The Nintendo produced Wii-Fit software, that converts measurements from the equipment into useable data is not suitable for research purposes however, and therefore commercially available software developed and tested by the University of Seoul was sourced [46].

A protocol was developed for the measurement of standing balance by consolidating recommendations and findings from the literature.

b. Outcomes evaluation, statistical modelling: methods

Statistical modelling was carried out using regression analysis which estimates the relationship between inputs (independent variables) and outputs (dependent or outcome variables). In most cases linear regression was used, except in cases where the outcome variable was binary, in which case logistic regression was used, or in cases where the outcome variable was in counts, in which case, Poisson regression was used².

Where participants are grouped, as in the Mobile Me study because they live within accommodation sites, the results for those within groups are likely to be more similar to than to those in different groups. In the case of Mobile Me, this might be due to site-level factors such as the way a site is managed, or the number of other activities already happening. This may mean that the results of participants within each setting are not ‘independent’ of other, and this infringes one of the assumptions (or requirements) of regression. To account for this, hierarchical regression, a type of multi-level modelling was used³.

Outcomes data gathered for Mobile Me was taken at several time points for each

² For a simple explanation of linear regression and other regression types, see <https://www.statisticssolutions.com/what-is-linear-regression/> [Accessed 30.11.2019]

³ For a simple explanation of multi-level modelling, see <http://www.bristol.ac.uk/cmm/learning/multilevel-models/what-why.html> [Accessed 30.11.2019]

participant, this is known as 'repeated measures'. Measurements taken from the same individual over time are likely to be more similar to each other than to those between different individuals. This dependence must also be accounted for when modelling the data. This can also be done using multi-level modelling, which has the added advantage that it can be applied where there is missing data, such as in case of Mobile Me, where the control group had one less measurement point than the intervention group. In this analysis, where repeated measures data were being analysed, a three-level model was fitted with the following hierarchy:

- Level 3 (highest level): accommodation unit
- Level 2: participant
- Level 1: follow-up occasion (10 weeks, 6 months or 12 months)

As the participants were not randomised to control or intervention in the Mobile Me evaluation, we could not be sure there was no systematic difference between the groups at baseline (baseline equivalence). To account for this, baseline scores were used as an independent variable in the model. This enables us to control for the baseline readings, in other words, to allow the follow-up data to be analysed as if all cases had the same baseline readings. So, for each outcome variable, the data for all three follow-up points were included in the outcome variable (dependent variable), and the baseline scores as a covariate (independent variable).

In addition to baseline scores, an independent variable was included in the model that identified whether an individual was in the control or intervention group. Other independent variables fitted in the model included the participant's age at baseline, gender and setting type (care setting, sheltered housing, and other). Including these enabled us to control for the differential effect they may have on the control and intervention groups. Neither ethnic origin or disability status were included because less than 1% of respondents were non-white, and less than 1% did not report a disability or health condition.

Because the outcome (dependent) variable comprises of scores at all three follow-up points, we also included the number of weeks since baseline for each score as an independent variable; this allows change over the follow-up points to be modelled. The trajectory of change over time was fitted separately for the intervention and control groups (using an interaction term in the equation).

An alternative approach to the one we adopted of including all follow-up points in a single model would be to separately compare the intervention and control at each different follow-up point for each outcome. However, this would lead to numerous tests and to results which may be hard to interpret. Therefore, this more parsimonious approach was adopted.

c. Outcomes evaluation, statistical modelling: interpreting the results

The regression model estimates the relationship between the independent and dependent variables. Where an independent variable is a continuous measurement, for example, weeks since baseline, it gives an estimate of the rate of change in the dependant variable due to the independent variable; for example, the estimated rate of change in minutes sitting (this can be negative or positive). In the case of categorical variable, such as whether an individual is in the control or intervention, this is the average difference in the dependant variable attributable to being in one group or the other; for example, the average difference in minutes sitting between the control and intervention at follow-up. These estimates (or coefficients) are made when controlling for all other independent variables in the model, for example, controlling for the effect of age, or gender. Associated with each estimate is a p-value (or statistical probability) which tells us whether it is statistically significant i.e. whether this estimate is very unlikely to have occurred by chance. We have taken a p-value of 0.05, which is a convention for this type of analysis, therefore in the following text, any p-value of greater than 0.05 is not statistically significant. One caveat is that with small sample sizes, a significance test has less 'power' to detect a significant difference, or significant association; this particularly applies to some of the tests undertaken with subgroups in this analysis. In other words, there may be a difference, or an association, but we cannot be reasonably sure it is not due to chance.

Statistical analyses were carried out using SPSS v25 and MLWIN 3.02.

5.5.2. Qualitative evaluation

a. Qualitative evaluation: Data collection

The aim of the qualitative evaluation was to gain an understanding of what has worked, to identify areas for improvement and to examine the sustainability of the programme. This was done by gathering the views of those involved in Mobile Me in several ways. The process evaluation took place in two main stages (Summer 2016 and Summer 2017). Some additional data, reflecting on the end of the programme, was gathered in Summer 2018. Gathering data as the project progressed enabled experiences to be captured during project

delivery, rather than solely retrospectively. Two intermediate qualitative evaluation reports were written, enabling the research team to reflect and reconsider findings in light of new evidence; this is broadly the strategy proposed by 'constant comparative method' to qualitative data analysis (Silverman 2006).

The qualitative evaluation drew data from a number of different sources:

- Interviews with stakeholders such as housing providers, sport coaches and voluntary organisations, either by telephone or in person.
- Site visits to accommodation settings when Mobile Me was being delivered, and post-delivery.
- Interviews with participants at the 2017 Mobile Me Festival.
- Open-ended questions on the Mobile Me questionnaire.

It was designed around framework of four themes: recruitment, delivery, outcomes and sustainability. A bank of questions was developed for each of the themes within the framework. Within this, interviews could be adapted for the different stakeholders; for example, strategic staff and delivery staff. Interviews were semi-structured, in other words, the interviewer was able to deviate from the wording and the order of the questions, prompt for clarification and follow new lines of enquiry where these arose (Bryman 2004, p.320). For the second round of interviews, emphasis was placed on sustainability and on exploring the 'critical ingredients' of Mobile Me i.e. how it differs from other activities on offer at supported housing sites. The third set of interviews, which took place after the programme ended, focussed on sustainability and the legacy of the programme.

Participant interviews were carried out at the 2017 Mobile Me Festival as part of the second qualitative evaluation (informed by the framework of four themes). Responses to these interviews were, despite prompting, mostly fairly brief. Possibly practitioners and strategists had given more consideration to the delivery of Mobile Me (and related issues) than those receiving it, especially as it was ostensibly presented as something fun to do, rather than as an activity designed to bring about change. Participants may have also have been distracted by the ongoing activities.

Site visits were less formal. The evaluator sat with residents during activities and spoke to them about the programme, either individually or in groups, sometimes to the whole group during a refreshment break; discussions were guided by the four themes identified above. While it had been intended to adopt a somewhat more formal approach to site visits (i.e.

semi-structured interviews), as is sometimes the case in real-world research [49] the evaluator was forced to adapt. This was because visits took place during activity sessions and participants did not appear to want to be kept for too long from the activities or from socialising. Participants were also distracted by the activities; for example, by the need to get up to bowl when it was their turn. Apart from this, the evaluator did not want to unduly disturb the flow of these activities. Despite the informal nature of data collection, participants were made aware before and during the session of the researcher's purposes in being present to gather data for the evaluation, which took place only with those that had given informed consent.

Notes were taken at interviews and at the site visits. Interviews were recorded, except for those taking place at the Mobile Me Festival, as these were taking place at a busy public event. The recordings were used to clarify interview notes where necessary, and as a source of quotations. Site visits were not recorded.

In addition to site visits and interviews, open-ended questionnaire data was analysed. The post-intervention Mobile Me questionnaire included three such questions; these sought participants' views on the programme (the delivery theme) and about any outcomes that may have resulted from it (the outcomes theme). It should be noted that responses to the question were often given in the presence of the instructors (who assisted residents in completing questionnaires) which may have resulted in some bias.

b. Qualitative evaluation: data analysis

Data analysis was shaped by the fact that the principal researcher worked on the project from start to finish and therefore had prolonged involvement with the evaluation in the tradition of ethnographic approaches [31]. This included extensive contact with the Mobile Me team at Active Norfolk and, to a lesser degree, contact with steering group members and with participants. Due to broad range of data collected along with limited resources to enable the full transcription of interviews, the approach taken to the analysis of data was pragmatic [31]; for example the analysis of interview notes (often augmented through listening to recordings) rather than in-depth analysis of transcripts. For these reasons also, the analysis of interview data loosely followed an 'immersion approach', relying on researcher insight [31]. As with all forms of social research, the collections and analysis of data is inevitably shaped by the biography of the researchers and by the social processes surrounding it; this might be, for example, the relationships built up between researchers and deliverers over the course of the intervention. The researchers on this project remained

cognisant of this in order to minimise reactivity [50].

For the analysis of interviews, notes were combined and coded using the four framework themes with the software package NVIVO 11; this was done in so content from different respondents around these themes could be compared and consolidated for reporting purposes. Comparing responses on a theme enabled common views and experiences within it to be identified, but also differences between respondents or exceptions to the narrative to be identified [47], [51].

Questionnaire responses were coded into sub-themes in NVIVO 11; the sub-themes were developed inductively from the content of data iteratively i.e. reading through the data to develop a sense of the key sub-themes, commencing coding, and revising coding during the process where new themes or sub-theme arose [48]. While categories and sub-categories were counted or tabulated [47], the approach in reporting the analysis of questionnaire data has been to build a narrative, rather than present the data as 'counts'. This approach was taken to enable the evaluator to reflect on the results and offer some interpretation to the reader.

Case study reports were written to describe the sessions at the site and how these were run, to present any information on uptake and recruitment, and any factors related to sustainability. The aim of presenting a selection the case studies separately, rather than consolidating site visit information into a single stream of analysis, is to illustrate the different contexts with in which Mobile Me operates.

5.5.3. Observation study and development of best practice for individuals lacking the capacity to consent

One issue identified early in the planning stages was potential difficulties in evaluating with individuals with severe cognitive impairment who were not likely to be able to give informed consent or complete the evaluation. As this was a sub-group of the intended audience, and because there were not the resources to complete a separate outcomes evaluation, the decision was made to encourage this group to take part in the intervention, but to accept that participation in the outcomes evaluation was not likely to be possible. On the request of the Mobile Me sports coaches, who observed positive outcomes for those with moderate to severe dementia, this decision was re-examined, and an observation study was undertaken with this group inform the qualitative element of the broader Mobile Me evaluation and to develop good practice guidance. This involved observation of delivery

sessions by two observers, one using a structured observation method, 'Dementia Care Mapping' (DCM) [52], [53], the other a framework developed for observing group activities with older people [54].

Dementia Care Mapping is an established observational tool developed and regulated by the University of Bradford. DCM assesses behaviour, mood and engagement in continuous periods of five minutes' duration. A maximum of four people can be observed during a session. While DCM produces quantitative results in the form of scores, on this occasion it was being used as a method of in-depth observation to tease out what actions, or conditions, resulted in the increased wellbeing and engagement of participants, or otherwise. Scores generated in the three sessions were not compared to each other, or to scores taken at any other time-point to assess quantifiable differences, as this would have been outside the scope and resources of this small study. In addition to the DCM, a second researcher undertook a semi-structured observation to gather broader contextual information about the sessions guided by a framework developed by Chia et al [54]. The observers had, between them, many years of experience working within the care sector and with individuals with cognitive impairment (one a Mental Health Nurse, the other a Learning Disabilities Nurse). This expertise and their judgements, within the structure of the observation frameworks, were considered essential to this study and form the basis of its findings and recommendations

Three observations studies were carried out over three days in October 2017 at a large dementia unit in Norwich. This include a morning and two afternoon sessions. One session was in an unfamiliar environment (an activity room in another part of the facility) and the other two were in the residents' lounges. These variations were made because the aim of the study was to identify best practice, and this might include considerations of timing or setting. The groups had between 8 and 15 participants. Results from the observation study were written up by the observers, not by the UEA team.

The findings from the observations were reflected on at a workshop of stakeholders in January 2018. The aim of the workshop was to seek feedback on the findings and to discuss how they could be disseminated in order to inform best practice. This meeting included health professionals (an occupational therapist, a physiotherapist and a GP), academics from the UEA, and Active Norfolk Staff (including a Mobile Me sport coach), as well as the two researchers who had conducted the observation study.

In a final step, the findings were used along with set of recommendations produced as part of the Mobile Me qualitative evaluation (Figure 5) in order to develop best practice guidance for delivering bowling, or similar physical activities, to individuals living with moderate to severe dementia. These materials consist of a poster and video that will be hosted on a website being developed by Active Norfolk around delivering physical activity for older people. Also on the website will be more general materials on how to play Kurling, Table Tennis, Boccia and Bowls.

5.5.4. Cost Effectiveness Evaluation

The cost effectiveness evaluation was carried out using Sport England's MOVES tool [55]. The tool is based in Microsoft Excel and requires the inputting of several parameters, for example programme delivery costs and participation levels. The MOVES tool calculates the reduction in risk of seven long-term conditions to calculate financial gains in terms of reduced health care costs. A cost per 'Quality Adjusted Life Years' (QALY) gained is calculated. A QALY provides a method of assessing the extent of the benefits gained through an intervention. It is related to both increased survival and quality of life, so one QALY can equate either to one year of life in perfect health or several years of life in less than perfect health. The cost per QALY gained can then be compared to a benchmark 'willingness to pay' per QALY gained used by NICE in order to estimate the programme's cost effectiveness.

There are some caveats about using MOVES with the Mobile Me population. For example, MOVES does not estimate savings in social care costs, only health care costs. MOVES is also modelled with the assumption that individuals are healthy to start with (as it is based on avoiding health problems through physical activity), so is likely to over-estimate cost-effectiveness in the Mobile Me population.

Four different scenarios were tested using MOVES, the parameters inputted, and the limitations of the tool, are discussed further in the results section.

5.6. Ethics and consent

Ethical approval for the Mobile Me evaluation was granted by UEA Faculty of Medicine (reference: 20152016-11 SE). Additional consent for the observation study with individuals lacking the capacity to consent was obtained from the National Social Care Research Ethics Committee (reference: 17/IEC08/0011).

6. Findings: outcome evaluation

6.1. Introduction

This section presents results from the statistical analysis of four types of outcome measures; questionnaires, functional fitness tests, accelerometer readings and force platform readings.

Data collection points for the intervention group were at baseline, post intervention (ten weeks), six months and twelve months. For the control group, data collection took place at baseline, at either ten weeks or at six months, and at twelve months.

For information on statistical modelling and the interpretation of the results, please refer to the methods section of this report.

6.2. Participation in the evaluation

Of those that took part in a baseline intervention session, or attended a baseline control-site event, 79% consented to take part in the evaluation. Just under 14% declined to take part and around a further 7.5% were considered not capable of consent (Table 2).

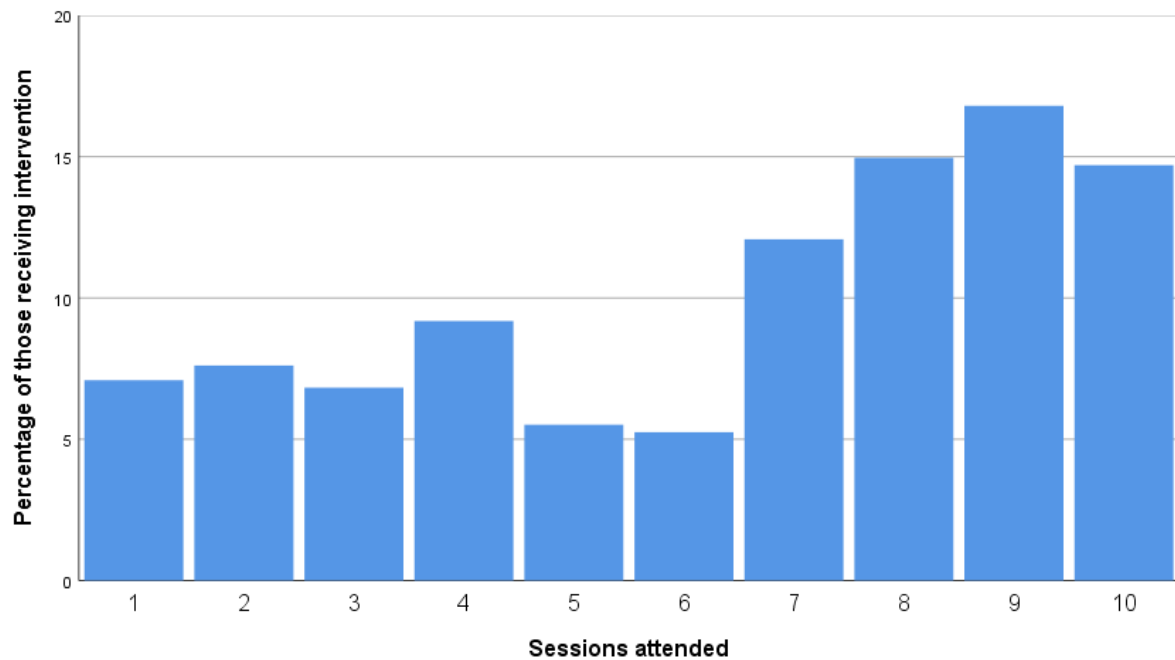
Table 2: Those consenting to take part in the evaluation (including those in waiting list control group)

	Number	Percent
Consented	548	78.7%
Not capable	52	7.5%
Refused	96	13.8%
Total	696	100.0%

6.2.1. Predictors for level of participation

Due to the design of the study, all participants in the intervention that agreed to take part in the evaluation attended at least one session (n=379). Just over seven percent attended one session only and over half (58%) did seven sessions or more (Figure 4). The mean number of sessions attended for those in the intervention group that agreed to take part in the evaluation was 6.38 (SE 1.706).

Figure 2: Percentage attending by number of sessions



Levels of attendance were analysed for the intervention group (n=368) to identify variables that may be associated with increased attendance. The analysis was carried out using multi-level modelling at two levels: accommodation unit and participant to account for the structure of the data (i.e. that there were multiple observations for each participant and that participants were grouped into accommodation units)⁴. Independent variables were age, gender, setting type, baseline EQ-5D DL score and a binary variable for whether a participant was involved in sport or not at baseline. The latter two variables were included as it was theorised that health and/or current levels of sport may be associated with increased attendance. A variable was also included to mark whether the intervention was in the warmer months or not (April-September).

Baseline participation in sport had a statistically significant relationship with attendance (p=0.043). The odds ratio of 1.15 suggested that the number of sessions attended was 15% higher amongst those reporting any minutes of sport at baseline compared to those reporting none. There were no other statistically significant relationships.

6.2.2. Percentage of residents taking part

The number of individuals taking part in Mobile Me at each sheltered accommodation site

⁴ Using a Poisson model as this is count data. This is not three-level as described in the methods section as it does not include repeated measures for different follow-up periods.

was divided by the number of units (rooms or flats) at that site to arrive at an approximate percentage of residents attending Mobile Me. It is estimated that around 28% of residents at delivery sites took part in the Mobile Me; this figure is the same for residential care settings and sheltered housing.

6.3. Self-reported physical activity, health and well-being

6.3.1. Background

Table 3 lists the outcome measures reported on in this analysis; column three describes whether a higher or lower result is expected for a positive outcome. For further information about these outcomes measures and statistical methods used, please see the Methods section of this report.

Table 3: Outcome measures - questionnaire

Outcome	Instrument Range	Desirable score
Fear of falling visual analogue scale (VAS)	0-10	Low
Daily minutes sitting (IPAQ-E)	0-1440*	Low
METS (walking, moderate and vigorous activity from IPAQ-E)**	0-3780	High
Loneliness (English Longitudinal Study on Ageing)	1-3	Low
SWEMWBS (Warwick Edinburgh Metal Wellbeing Score, short form)	7-35	High
Weekly minutes in sport (Sport England measure)	0-1440*	High
EQ-5D DL (Five dimensions of health-related quality of life)	7-25	Low
EQ-5D VAS	1-100	High

* While the IPAQ protocol places a limit on the number of minutes activity per day (180), there is no rule for truncating sitting times.

** Using the IPAQ protocol one minute of walking is 3.3 METS, one minute of moderate activity is 4 METS and one minute of vigorous activity 8 METS.

6.3.2. Sample size

In total, 378 participants completed both baseline and at least one follow-up test; these participants are included in analysis and are referred to as the 'analysis sample'. An additional 130 participants completed baseline but no follow up, and 28 completed at least one follow-up but no baseline. These individuals were not included in the analysis.

Table 4 shows the split between intervention and control for the analysis sample at each follow-up. Control participants were tested at either ten weeks or six months (but not both). One round of intervention participants who received delivery towards the end of the project

were not followed-up at 12 months (as this extended some time beyond the end of the evaluation).

Table 4: Split between control and intervention at each stage - questionnaire

	Control		Intervention		Total
	N	%	N	%	
Baseline	90	23%	297	77%	387
10 weeks	39	13%	264	87%	303
6 months	35	15%	207	86%	236
1 year	59	31%	134	69%	193

6.3.3. Baseline characteristics by control and intervention

At baseline, there were no differences between the percentage of females in intervention and control sites (75.7% vs 75.6%, $p=0.979$), or the percentage in sheltered housing between intervention and control sites (73.6% vs 73.8%, $p=0.108$). The control group averaged a higher number of METS per day compared to the intervention group, a higher number of minutes of physical activity and a lower EQ-5D VAS score (Table 5). However, differences in baseline readings between intervention and control groups for all outcomes are controlled for in the statistical model.

Table 5: Baseline characteristics of analysis sample - questionnaire

Baseline characteristics	Control			Intervention			Statistically significant?	
	Mean	SE	N	Mean	SE	N	Yes/No	p-value
Age	79.4	1.06	89	77.7	0.60	295	No	0.155
Fear of falling	4.4	0.35	89	4.8	0.19	297	No	0.260
Sitting mins per day	525.3	23.09	88	539.2	13.22	289	No	0.712
METS in last 7 days	1776.4	218.07	90	1243.2	89.55	297	Yes	<0.001
Moderate/vigorous mins in last 7 days	197.0	33.94	90	113.21	12.92	297	Yes	0.005
Loneliness	1.6	0.08	90	1.6	0.04	297	No	0.749
SWEMWBS	23.9	0.45	87	24.4	0.27	296	No	0.781
Sport last 7 days	16.5	8.62	89	18.6	3.54	297	No	0.541
EQ-5D DL	10.5	0.44	90	10.6	0.23	297	No	0.814
EQ-5D VAS	64.0	2.17	90	68.3	1.18	296	Yes	0.025

6.3.4. Comparisons to population data

When comparing baselines results for Mobile Me to results for the wider population using results from the Health survey for England 2016 [56], Mobile Me participants sit for longer (8.3 hours compared to 5.9 hours for ages 65-75, and 9.0 hours compared to 6.6. hours for ages 75+). Similarly, using population norms for EQ-5D VAS [57], the Mobile Me sample score lower compared to the UK population in the two relevant age bands (70 compared to 77 for those aged 65-7, and 68 compared to 75 for those aged 75+). Population norms for the SWEMWBS have been produced by Ng Fat et al. [58] using Health Survey for England data 2010–2013. Comparing these to the Mobile Me data, mental wellbeing scores are similar; for example, for Mobile Me participants aged 75+ score 24, as do the equivalent age group for the Health Survey for England.

Finding direct comparisons for physical activity levels is more difficult due to the different methods by which it is assessed in national surveys. In order to arrive at an approximate comparator for moderate and vigorous activity gathered through the IPAQ-E, the following categories from the Health Survey for England 2016 [56] were combined: mean minutes; ‘physical activity and exercise’, ‘heavy housework’ and ‘heavy gardening, DIY and manual work’. Values for the Mobile Me sample that are between 65 and 74 years olds are lower than the population (143 minutes per week compared to 198), but for those aged 75+ are higher (134 minutes per week minutes per week compared to 81). It is possible that these differences are due to the different data collection methodologies involved; physical activity levels also differ greatly by setting type as illustrated in the section below.

6.3.5. Baseline characteristics by setting (care or sheltered housing)

Residents in care settings in this study were, on average, older than those in sheltered housing (Table 6). Around 13% of the sample were in residential care. For many of the outcome measurements, care setting residents score much worse than those in sheltered housing at baseline; this may be expected due to their increased age and higher support needs.

Table 6: Baseline sample characteristics by setting type (analysis sample)

Baseline characteristics	Sheltered housing			Care setting			Statistically significant?	
	Mean	SE	N	Mean	SE	N	Yes/No	p-value
Age	77.1	0.53	325	87.0	1.26	49	Yes	>0.001
Fear of falling	4.8	0.18	326	5.0	0.45	50	No	0.691

Sitting mins per day	507.5	11.63	319	727.5	31.91	48	Yes	>0.001
METS in the last 7 days	1532.6	96.47	327	357.1	131.63	50	Yes	>0.001
Moderate/vigorous mins in last 7 days	149.9	14.72	327	27.4	13.86	50	Yes	0.001
Loneliness	1.6	0.04	327	1.8	0.10	50	Yes	0.023
SWEMWBS	24.5	0.25	323	22.5	0.60	50	Yes	0.003
Sport mins per wk	19.9	3.95	326	7.6	2.66	50	No	0.227
EQ-5D DL	10.2	0.21	327	13.1	0.68	50	Yes	>0.001
EQ-5D VAS	67.5	1.11	326	64.2	3.29	50	No	0.298

6.3.6. Findings - the numbers moved into sport and sporting activities

The section reports on the numbers in the intervention group that moved into sport, as this is a Mobile Me project outcome. Along with this, two other similar outcomes are reported: the numbers moved into sporting activities and the numbers moved into 150+ minutes of physical activity.

At baseline, only 13% (29 individuals) had done 30 minutes of sport or more in the past week. **Not including these individuals**, at ten weeks, 90% (n=204) of the remaining sample had moved into 30+ minutes sport, at six months the figure was 32% (n=86) and at twelve months 20% (n=52) (Table 7).

Table 7: Additional individuals moved into 30+ minutes of sport from a baseline of 13%

	Percentage	Number
10 weeks	90%	204
6 months	32%	86
12 months	20%	52

A question was added to the questionnaire in spring 2017 that asked what sporting activities residents took part in ('What sporting activities are you doing where you live now?' and 'What sporting activities are you doing elsewhere?' with options provided). At baseline, 37% (21 individuals) were doing a sporting activity. Not including these individuals, at ten weeks, 100% (n=124) of the remaining sample reported doing a sporting activity, at six months the figure was 87% (n=81) and at twelve months 62% (n=54) (Table 8). Note that some of these pursuits involved 'light' physical activity and this may not be reflected in a change in IPAQ

measurements or be considered sport; furthermore, these activities may not be done weekly. The main activities were bowling, table tennis, seated exercise, aqua, cycling, gym and walking.

Table 8: Additional individuals moved into sporting activities from a baseline of 37%

	Percentage	Number
10 weeks	100%	124
6 months	87%	81
12 months	62%	55

At baseline, 55% (162 individuals) had done 150 minutes or more of physical activity in the past seven days (this is any type of physical activity of more than 10 minutes duration, including walking at any intensity). Not including these individuals, at ten weeks, 37% (n=50) of the remaining sample reported 150 minutes or more physical activity, at six month the figure was 27% (n=37) and at twelve months 16% (n=22).

Table 9: Additional individuals moved into 150+ minutes activity from a baseline of 55%

	Percentage	Number
10 weeks	37%	50
6 months	27%	37
12 months	16%	22

If only moderate and vigorous activity is included, at baseline 23% had done 150 minutes physical activity. Not including these individuals, at ten weeks, 32% (n=64) of the remaining sample reported 150 minutes or more of moderate or vigorous physical activity, at six month the figure was 29% (n=45) and at 12 months 24% (n=24) (Table 9).

6.3.7. Findings - comparing the control and intervention groups

When comparing self-reported results for the control and intervention group across all three follow-ups, there was a statistically significant difference for four of the outcomes (Table 10). The coefficient in column two of the table can be interpreted as how much the intervention differs to the control when all other independent variables are at zero in the case of categorical variables, or at their mean in the case of continuous variables (note: the label of zero for categorical variables is simply an identifier, e.g. males=0 and females=1). In this case, it is the average difference between control and intervention for males, in

sheltered housing, at 78 years old and at 26 weeks from baseline.

An interaction term for sport minutes (not shown in table) was statistically significant ($p > 0.001$). The negative coefficient (-1.795, SE 0.484) means that the difference between the two groups reduced over time, although a further analysis shows that there is still a significant difference at final follow-up.

Table 10: Difference between control and intervention groups at follow-ups when controlling for age, gender, baseline scores and setting type - questionnaire.

Outcome	Coefficient (difference)	Standard error	Statistically significant?	p-value
Fear of falling	-0.960	0.33	Yes	0.004
Sitting minutes per day	-51.50	23.20	Yes	0.026
METS in the last 7 days	551.64	227.25	Yes	0.015
Loneliness	0.04	0.07	No	0.578
SWEMWBS	0.78	0.41	No	0.059
Sport minutes in the last 7 days	69.74	10.80	Yes	>0.001
EQ-5D DL	-0.612	0.32	No	0.057
EQ-5D VAS	1.048	1.88	No	0.777

As there was a high number of zeros in the results for sport minutes and physical activity (which can affect the validity of the results), a second analysis was conducted after converting these to binary variables i.e. doing 150 minutes activity or not, and doing any sport or not (Table 11). As with the previous analysis, there is a significant difference between control and intervention for both outcomes. The odds ratio (last column) show the odds of the intervention group doing 150 minutes activity at follow-up compared to the control group, and any minutes of sport at follow-up overall compared to the control group. This shows that the intervention group were more likely to do sport at follow-up and more likely to do 150 minutes physical activity at follow-up.

Table 11: Difference between control and intervention groups at follow-ups when controlling for age, gender, baseline scores and setting type – dichotomous variables, questionnaire.

Outcome	Odds ratio	Statistically significant?	p-value
150 minutes	1.982	Yes	0.018
Any minutes of sport	25.678	Yes	>0.001

A further analysis was conducted to examine whether any change in outcome is associated with the number of sessions attended (rather than to being in the control or intervention group). This analysis was carried out for the intervention only. Three outcomes, fear of falling ($p= 0.008$), weekly minutes of sport ($p>0.001$) and EQ-5D DL ($p=0.018$) all had a statistically significant association with the number of sessions attended.

When this analysis is repeated in a slightly different way i.e. number of sessions attended for the intervention group only, at first follow-up (immediately after the intervention) ($n=259$). No statistically significant differences were found, except for sport minutes being higher ($p>0.001$) which is to be expected.

6.4. Objective Measures: Functional Fitness

6.4.1. Background

The Fullerton Functional Fitness Test (also known as the ‘Senior Fitness Test’) was used to objectively assess aspects of functional fitness with a sub-group of participants. Six tests were used for this evaluation, and these measure different aspects of functional fitness (Table 12). For further information about the Fullerton Functional Fitness Test and statistical methods used, please see the methods section of this report.

Table 12: Outcome measures – functional fitness tests

Aspect of functional fitness	Test name	Test description	Desirable score
Lower muscular strength	30 sec chair stand	Sitting and rising as many times as possible without using arms to push off	Higher
Upper muscular strength	30 sec arm curl	As many arm curls as possibly using a weight (5 lb. for women and 8 lb for men)	Higher
Aerobic endurance	2 min step	Stepping on the spot and raising knees to a point halfway between knee cap and hipbone	Higher
Lower body flexibility	Chair sit and reach	While seated, extending one leg so it is straight (the foot remains on the floor). Reaching to touch toes with hands on top of the other. Any distance short of the toes is recorded as negative scores (and vice versa).	Higher

Upper body flexibility	Back scratch	Attempting to touch fingers behind the back (one hand over the shoulder, and the other under). Where fingers do not touch a negative score is recorded (and vice versa).	Higher
Agility and dynamic balance	8 foot up and go	Rising from seated to walk around a cone, back to the chair and sitting down.	Lower

6.4.2. Sample size

In total, 135 participants completed both baseline and at least one follow-up test; these participants are included in analysis. An additional 10 participants completed baseline but no follow up, and 31 completed at least one follow-up but no baseline; these participants are not included in the analysis. Feedback from sports coaches suggested that the relatively high number of participants who completed follow-up but not baseline for functional fitness tests (and balance tests) might be attributable to these participants gaining confidence and/or mobility through the programme.

Table 13 shows the split between intervention and control for the analysis sample at each follow-up. Control participants were tested at either ten week or six months (but not both). Many participants did not complete all six functional fitness tests (as some of the tests were too difficult for some residents), so sample sizes for individual tests may be even lower.

Table 13: Numbers in analysis sample by stage - functional fitness tests

	Control		Intervention		Total
	N	%	N	%	
Baseline	33	24%	102	76%	135
10 weeks	10	10%	91	90%	101
6 months	21	23%	71	77%	92
1 year	23	38%	37	62%	60

6.4.3. Baseline characteristics by control and intervention

At baseline, there was no statistically significant difference between the percentage of females in intervention and control sites (78.4%, 67.9%, $p=0.305$), or the percentage in sheltered housing residents in intervention and control sites (87.3%, 100%, $p=0.098$) or for any other baseline characteristics (Table 14).

Table 14: Baseline characteristics of analysis sample – functional fitness tests

Baseline characteristics	Control			Intervention			Statistically significant?	
	Mean	SE	N	Mean	SE	N	Yes/No	p-value
Age	76.7	1.47	33	76.9	1.02	102.00	No	0.155
Chair stand	10.1	0.85	26	9.3	0.40	72.00	No	0.260
Arm Curl	16.3	1.76	25	14.4	0.64	90.00	No	0.712
Two-minute step	57.3	7.77	21	48.8	3.11	69.00	Yes	<0.001
Sit and reach	-4.5	1.75	29	-6.3	1.03	97.00	No	0.749
Back scratch	-12.3	2.02	26	-12.7	1.18	82.00	No	0.781
Up and go	12.4	1.23	33	11.4	0.62	97.00	No	0.541

6.4.4. Comparisons to population data

Population data is provided for the Fullerton Functional Fitness Tests in five year age gaps [59] where a range is give within which 50% of the population falls. Results for the age a 75-79 are shown in Table 15. These scores were compiled using community dwelling adults in the United States, and results from individuals living in group homes have been found to be lower [60]. The only test for which the Mobile Me sample falls within the population range is the Arm Curl.

Table 15 : Population norms for Fullerton Functional Fitness Tests and Mobile Me baseline results

Outcome	Men	Women	Mobile Me Males			Mobile Me Female		
	75-79*	75-79*	Mean	SE	N	Mean	SE	N
Chair stands	11 - 17	10 - 15	9.8	0.72	24.00	9.4	0.43	74.00
Arm curls	13 - 19	11- 17	16.1	1.54	29.00	14.4	0.66	86.00
Steps in 2 mins	73 - 109	68 -100	68.0	5.69	20.00	45.9	3.28	70.00
Sit and reach	-4.0 - +2.0	-1.5 - +3.5	-6.1	1.63	30.00	-5.9	1.05	96.00
Back scratch	-9.0 - +2.0	-5.0 - +0.5	-16.7	1.89	24.00	-11.5	1.16	84.00
Timed up and go	7.2 - 4.6	7.4 – 5.2	11.3	1.15	31.00	11.8	0.64	99.00

6.4.5. Findings – comparing the control and intervention groups

A number of extreme outliers⁵ were detected in results for sit and reach (1 case at 12 months), arm curl (1 case at ten weeks, 1 at twelve months) and up and go (1 case at baseline, 1 at ten weeks, 2 at six months, 3 at twelve months); outliers are values that are very distant from other observations. An inspection of the data reveal that these do not appear to be errors (for example typos whereby an additional digit is added accidentally), but with small samples extreme outliers such as this may unduly influence regression analysis. In order to test this, the data was re-analysed with the outliers removed which made little difference to two of the variables affected, but changed the up and go test from statistically non-significant ($p=0.215$) to statistically significant (results shown in Table 16) . The result for arm curls was also statistically significant.

Table 16: Difference between control and intervention groups at follow-ups when controlling for age, gender, baseline scores and setting type – functional fitness test

Outcome	Coefficient (difference)	Standard error	Statistically significant?	p-value
Chair stands (counts)	1.03	0.65	No	0.111
Arm curls* (counts)	3.26	0.92	Yes	>0.001
Steps in 2 mins (counts)	7.60	4.85	No	0.117
Sit and reach* (cm)	2.54	1.54	No	0.099
Back scratch (cm)	0.34	1.66	No	0.835
Timed up and go* (seconds)	-1.10	0.49	Yes	0.024

* *Outliers removed*

A further analysis was conducted to examine whether any change in outcome was associated to the number of sessions attended (rather than to being in the control or intervention group), with control participants all recording zero instances of participation, and the intervention group between one and ten depending on the number of sessions attended. As before there were statistically significant results for arm curl ($p=0.001$) and timed up and go with (outliers removed) ($p=0.017$), and statistically non-significant for timed up and go where outliers are included ($p=0.79$).

⁵ Value three times the interquartile range

6.5. Objective Measures: Physical activity and sedentary behaviours

6.5.1. Background

Data from Open Movement's Axivity AX3 Accelerometers was downloaded using Open Movement's proprietary software. This software enables the raw data to be converted to one-minute long 'epochs' which are classified according to activity levels at sedentary, light, moderate and vigorous. The 'cut points' divide the results into time spent in activity levels: sedentary (< 1.5 METS), light (\geq 1.5 METS, < 4 METS), moderate (\geq 4 METS, < 7 METS), and vigorous (\geq 7 METS).⁶

Prior to analysis, participants' records were checked for continuity of wear using the Open Movement software tool; only participants with at least 6 days continuous wear were included in the analysis. Average readings per day were calculated for the four activity levels.

Table 17: Outcome measures - accelerometer

Outcome	Axivity software cut points	Desirable score
Sedentary	< 1.5 METS	Low
Light activity	\geq 1.5 METS, < 4 METS	Low
Moderate activity	\geq 4 METS, < 7 METS	High
Vigorous activity	\geq 7 METS	High

6.5.2. Sample size

In total, 51 participants completed both baseline and at least one follow-up test; these participants are included in analysis. An additional 41 participants completed baseline but no follow up, and 16 completed at least one follow-up but no baseline; these participants are not included.

Table 18 shows the split between intervention and control for the analysis sample at each follow-up. Control participants were tested at either ten weeks or six months (but not both).

⁶ Email correspondence from Dan Jackson, 'Open Movement Team', Newcastle University, 15/1/2016

Table 18: Split between control and intervention at each stage - accelerometer

	Control		Intervention		Total
	N	%	N	%	
Baseline	22	43.1%	29	56.9%	51
10 weeks	20	50.0%	27	58.7%	47
6 months	8	20.0%	15	32.6%	23
1 year	12	30.0%	4	8.7%	16

6.5.3. Baseline characteristics by control and intervention

At baseline, there were no differences between the percentage of females in intervention and control sites (72.4%, 81.8%, $p=0.433$) and only sheltered housing sites participated in this part of the evaluation. On all readings, the intervention group are more active and less sedentary at baseline. This may be because accelerometers were handed out at the first session of the intervention and are therefore not a true baseline reading as they record the subsequent seven days' activity.

Table 19: Baseline characteristics of analysis sample - accelerometer

	Mean	SE	N	Mean	SE	N	Yes/No	p-value
Age	77.1	1.64	22	75.5	1.76	29	No	0.155
Sedentary mins*	1317.2	15.61	22	1277.2	14.79	29	No	0.260
Light minutes*	72.0	7.62	22	83.8	5.65	29	No	0.712
Moderate minutes*	50.8	9.11	22	78.7	10.37	29	Yes	<0.001
Vigorous minutes*	0.1	0.04	22	0.4	0.25	29	No	0.749

*Daily average

6.5.4. Findings

Most participants did not record vigorous activity and for this reason it is not shown in the analysis (there are numerous outliers in the data). There were no statistically significant differences between the control and intervention groups for accelerometers readings (Table 20).

Table 20: Difference between control and intervention groups at follow-ups when controlling for age, gender, baseline scores and setting type - accelerometer

Outcome	Coefficient (difference)	Standard error	Statistically significant?	p-value
Sedentary minutes per day	31.05	19.57	No	0.113
Light minutes per day	-8.91	8.09	No	0.271
Moderate minutes per day	-12.54	11.44	No	0.273

As before, an association with the outcome and number of sessions attended was explored (with control participants all recording zero instances of participation, and the intervention group between one and ten depending on the number of sessions attended). No statistically significant associations were found.

6.6. Objective Measures: force balance test

6.6.1. Background

The force platform measures small adjustments made while standing still and produces a number of measurements including: the range of movement along the two main axes (forward/backwards and side-to-side), average velocity along these axes, overall path length, average velocity of the path, and circular, or elliptical area, covered by the sway. There appeared to be no consensus about which measurement is associated with fall risk. Two ‘omnibus’ measurements were therefore analysed for this report– average path length [cm], and average path velocity [cm/s]. However, as the results were very similar, and because none of the results was significant, only one set of results, for average path length, is reported.

Standing balance measurements were taken from participants in four positions for thirty seconds each, as follows:

- Feet apart, eyes open: LWEO
- Feet apart, eyes shut: LWES
- Feet together, eyes open: LTEO
- Feet together, eyes closed: LTES

While, often, when doing such test, more than one reading is taken and then the mean of these readings used, only one measurement was taken per position because there was limited time within sessions to carry out evaluation tests, and in order to reduce the burden on participants (some of whom found remaining standing still hard work).

6.6.2. Sample size

In total, **51 participants** completed both baseline and at least one follow-up test; these participants are included in analysis. Table 21 shows the split between intervention and control for the analysis sample at each follow-up for two of the positions (the position with the highest and lowest sample numbers). Control participants were tested at either ten weeks or six months (but not both).

Table 21: Split between control and intervention at each stage - force balance test

	Time-point	Control		Intervention		Total
		N	%	N	%	
LWEO	Baseline	22	43.1%	29	56.9%	
	10 weeks	17	56.7%	29	40.8%	46
	6 months	1	3.3%	25	35.2%	26
	1 year	12	40.0%	17	23.9%	29
LTES	Baseline					
	10 weeks	12	54.5%	27	42.9%	39
	6 months	1	4.5%	21	33.3%	22
	1 year	9	40.9%	15	23.8%	24
LWEO	Baseline					
	10 weeks	21	60.0%	28	41.2%	49
	6 months	1	2.9%	24	35.3%	25
	1 year	13	37.1%	16	23.5%	29
LWES	Baseline					
	10 weeks	20	60.6%	27	40.3%	47
	6 months	1	3.0%	24	35.8%	25
	1 year	12	36.4%	16	23.9%	28

6.6.3. Baseline characteristics by control and intervention

Only sheltered housing sites participated in this part of the evaluation. At baseline, there were no differences between the percentage of females in intervention and control sites (73.3%, 92.0%, $p=0.074$), or for any other baseline characteristics (Table 22).

Table 22: Baseline characteristics of analysis sample - force balance test

Baseline characteristics	Control			Intervention			Statistically significant?	
	Mean	SE	N	Mean	SE	N	Yes/No	p-value
Age at baseline	77.1	1.64	22	75.5	1.76	29	No	0.155
Vel. Av: LWEO	3.2	0.24	40	3.5	0.73	41	No	0.639
Path Len: LWEO	95.1	7.31	40	106.2	21.99	41	No	0.639
Vel. Av: LWES	4.4	0.33	40	4.5	0.76	40	No	0.895
Path Len: LWES	127.6	9.22	40	135.0	22.84	40	No	0.765
Vel. Av: LTEO	4.3	0.34	39	4.1	0.72	41	No	0.866
Path Len: LTEO	126.4	10.41	39	123.8	21.61	41	No	0.917
Vel. Av: LTES	6.5	0.61	34	6.3	0.89	36	No	0.903
Path Len: LTES	184.1	17.32	34	181.7	26.83	36	No	0.940

6.6.4. Findings - comparing the control and intervention groups

Analysis was run for three time-periods (omitting data at 6 months as there was only one control participant). Table 23 shows the mean difference between the intervention and control when adjusted for other independent variables in the model (age at baseline, gender and baseline readings). No statistically significant differences were found.

Table 23: Difference between control and intervention groups at follow-ups when controlling for age, gender, baseline scores and setting type - force balance test

Outcome	Coefficient (difference)	Standard error	Statistically significant?	p-value
LWEO – average path	2.05	4.98	No	0.681
LWES – average path	-0.78	14.79	No	0.958
LTEO – average path	-8.12	7.38	No	0.271
LTES – average path	0.44	14.70	No	0.976

Six cases for which there were outliers were noted when examining the data (i.e. data points of three times the interquartile range or more). The analysis was repeated without the outliers and resulted in small changes in coefficients, but made no material change to the results (i.e. still no statistically significant results were found).

As before, an association with the outcome and the number of sessions attended was

explored (with control participants all recording zero instances of participation, and the intervention group between one and ten depending on the number of sessions attended). No statistically significant associations were found.

7. Findings: qualitative evaluation

7.1. Introduction

The aim of the qualitative evaluation was to gain an understanding of what worked, to identify areas for improvement, and to examine the sustainability of the programme. The qualitative evaluation took place in two main stages (summer 2016 and summer 2017) with the aim of gathering the views of those involved as the project progressed. Some additional data as gathered in summer 2018. The results of the three stages of the evaluation are consolidated in this report.

In addition to the main qualitative evaluation, an observation study was carried out with individuals living in a dementia care unit with the aim of qualitatively assessing outcomes and developing guidance for best practice. The observation study compliments the qualitative evaluation but forms a discrete piece of work and is reported at the end of this chapter.

For information on methods, please see the 'Evaluation Methods' section of this report.

7.2. Case studies

7.2.1. Case studies: background

Seven site visits were arranged as part of the qualitative evaluation, three in summer 2016; and four in summer 2017. One took place in a care home and six in sheltered housing sites. They included local-authority sheltered housing, housing association sheltered housing, a sheltered housing site run by a charity, and commercial care home. One site had not sustained Mobile Me activities, the remaining sites were either receiving Mobile Me, or had sustained the activities. Site visits were prearranged with accommodation setting staff, and residents were informed of the purpose of the visits by both staff and the evaluator. All residents spoken to had consented to take part in the Mobile Me evaluation.

Site visits from Stage 2 of the qualitative evaluation are presented as case studies as a means of exploring the different contextual circumstances that may affect the delivery and sustainability of Mobile Me. A further case study has been added from a group interview with residents at the 2017 Mobile Me Festival, as this was considered to add a further perspective. Further points from site visits at Stage 1 can be found below.

7.2.2. Case studies: findings

Case study 1: Local-authority sheltered housing sustaining Mobile Me

This local authority sheltered housing site has minimal warden support (a few hours a week). Mobile Me had been delivered at the site a year before the evaluation visit and had been sustained by residents.

The activity session started with an exercise DVD; this had been purchased by the group of residents who enthusiastically took part. The activities, while mostly seated, included some standing exercises and the use of props (balls). The activities were enough to raise the breathing rate of the evaluator. Once the DVD had been completed, the group organised themselves to play New Age Kurling, with a break for tea/coffee partway through. There were ten people present.

The two residents in charge of organising the session had lived at the sheltered housing site for 18 years. Many of those present had known each other for some time and had attended other activities together. One participant lived at another local authority housing site where there were no activities. Residents spoke about being physically active in the past, and while aware of the need to remain active, facing barriers to this due to mobility problems. While there were other social activities at the housing site, none of these was physical activities.

The group were supportive of each other. One resident struggled to move from her chair and was helped by others. A blind player was given directions. There was laughter and good-natured banter. The organiser commented that it was hard to get 'new' members out of their flats for activities.

Case study 2: Local authority sheltered housing receiving Mobile Me

This local authority sheltered housing site has minimal warden support (a few hours a week). Present at the Mobile Me session were an Active Norfolk instructor, the researcher, another observer from UEA, and four residents, one of whom arrived late on a mobility scooter. Between them, the residents had several health problems such as breathlessness, poor hearing, poor mobility and poor sight. All the residents knew each other; they commented that some residents were unwell and unable to attend.

The Active Norfolk instructor led the group in Boccia and New Age Kurling. New Age Kurling was played in competitive pairs. The resident who used a mobility scooter put effort into

moving from her scooter to a chair to bowl. One competitor had poor eyesight, the instructor gave him the red 'stones' rather than the blue, as they are more visible.

While friendly, the mood at this session did not have the same level of energy and sociability as those attended elsewhere. This may be due to the low number of participants, especially as two were very quiet, or the presence of UEA staff. When the instructor and UEA staff joined in in the session, this boosted numbers and seemed to raise the mood.

Apart from a coffee morning, there were no other activities at this site. One resident spoke of the difficulties in running activities due to the presence of cliques. When discussing a reduction in attendance of Mobile Me, a resident commented 'they're not interested in anything'. Another suggested this could be due to the number of younger residents, some of whom work. Although the residents appeared to enjoy the session, they did not think the bowling would continue after Active Norfolk left.

Case study 3: Housing association sheltered housing sustaining Mobile Me

This site is one of several monitored by a warden who visits most days. The warden was present while the researcher visited. Mobile Me sessions had been delivered at this site around ten months previously and were continuing, organised by one of the residents.

A coffee morning was in progress during the evaluator's visit, as bowling had been moved to a different day of the week. This was because the coffee morning was felt to be a distraction from the bowling, and because not everyone attending the coffee morning wanted to bowl. Around twelve people were present at the coffee morning; many of these also took part in the bowling.

The resident organising the sessions described herself as not particularly sporty or interested in bowling, however she organised all activities and trips for the site. She had encouraged attendance at the bowling by introducing an element of competition (residents competing against each other in pairs). While the site was equipped to play Boccia, the residents were also keen to play New Age Kurling but did not have the equipment.

A resident talked of a desire remain physically active and of the difficulties of this due to health problems. One participant lived in a nearby bungalow (off site) but attended the bowling sessions.

Residents spoke positively (and unprompted) of the upcoming Mobile Me Festival that they hoped to attend.

Case study 4: Independent scheme receiving Mobile Me

This is an independent scheme run by a charitable trust and includes both sheltered housing and care accommodation, with a full-time staff presence. On this occasion, a relief warden attended the session and made tea and coffee for residents during a break. Along with the researcher, two Active Norfolk instructors were present. The session was well attended and friendly. There were ten residents present, although it was reported that numbers are higher when the regular warden is around to encourage residents to attend.

There were activities on-site on most days of the week, including chair-based exercise. Those present at the bowling mostly appeared to attend these other activities. Staff help organise the activities but do not deliver them. Most residents appeared relatively mobile, however one had a walking frame, and another struggled to rise from her seat

In spite of the levels of staffing and the number of activities on offer, residents said that some individuals remained in their flats and did not join in. One resident said that she had previously bought a table tennis set for the site, but it was not being used. The other residents seemed surprised, they were not aware of the set. Another person commented that the communal areas were not well used outside of organised activities.

Case study 5: LA sheltered housing - group interview at Mobile Me Festival

A group of residents from one site were interviewed at the Mobile Me Festival. While this site receives very minimal warden support (a few hours a week), the warden responsible has been supportive of Mobile Me. This was one of several sites receiving support from Age UK for the continuation of Mobile Me.

The effect on Mobile Me on the social lives of those that took part was emphasised several times by residents (and later, separately by Age Concern). Prior to Mobile Me there were no activities on site. While residents had been previously on 'nodding' terms ("we used to say 'hello' at the bus stop"), since Mobile Me, they have developed friendships. When interviewed, these residents were visibly supportive of each other. They appeared to come from a range of backgrounds and had different levels of health and mobility. They were vocally enthusiastic about Mobile Me and the difference it had made to them.

Key points from Stage 1 site visits:

- Housing Association sheltered housing site where Mobile Me was not sustained: The evaluator attended a coffee morning and spoke to three groups of residents. One possible reason for Mobile Me not continuing is that only a small number attended (four or five). It was also observed that there was a vocal resident in one group of three, who was somewhat negative about Mobile Me. Two residents spoke spontaneously of the Mobile Me Festival which they evidently greatly enjoyed.
- Care setting where Mobile Me was in progress: The care setting, activity coordinator was present and was supportive of the programme (assisting with delivery and data collection). Residents at this site were already doing other types of physical activity (there was equipment for this visible in the room). Mobile Me at this site had initially taken place in side room, but was moved to the communal lounge resulting in an increase in participants.
- Housing association sheltered housing site where Mobile Me was sustained: The evaluator visited on an afternoon when bowling was in progress. One resident had taken on the responsibility of organising the sessions (along with other activities at this site); she was assisted in setting-up the bowling by other participants as there were tables and chairs to move. The group included someone with dementia who was cared for by their partner. One resident was not bowling, as she did not feel able (due to a shoulder problem), however a ramp that might help was left behind stacks of chairs. Another resident had also found that setting up the table tennis was awkward, so did not play even though he would like to. Residents here had dispensed with the heavy bowling mat and were using a target. The group was animated, friendly and supportive of each other; one said, 'We look out for each other'. They did not feel that Mobile Me had increased their fitness because they did not play often enough (weekly); however, when asked later, a participant said he did not have time to play more as he was too busy.

7.2.3. Summary: Case studies

These case studies and site visits illustrate the difference contexts within which Mobile Me operates. Of the local authority sheltered housing sites, one appeared to have lower levels of community cohesion and there was relatively poor attendance at Mobile Me (which residents felt was unlikely to be sustained). Another, where there were existing social networks and residents willing to organise sessions, had enthusiastically embraced and sustained Mobile Me to the point of purchasing their own equipment. At a third, although

there were no pre-existing social networks, residents appear to have been keen to socialise (some were new to the area), and Mobile Me was the catalyst for this, along with support from Age UK Norwich.

At three of the sites, residents attending activities commented that some individuals were 'hard to reach', preferring not to join in. This was the case even at a site with a high degree of staff support and a range of activities available. It is not known whether these residents would be interested in attending activities such as Mobile Me, or would benefit from them, but it is possible that there are residents at some sites who face barriers to taking part but who need more support to do so.

It was apparent from feedback that some residents had previously been very active but were facing challenges in maintaining activity levels due to poor health and disabilities.

Resident-organisers (who were sustaining Mobile Me in sheltered housing settings) were spoken to at three sites, and in all cases were involved not only in sustaining Mobile Me, but in organising all, or most, of the other activities onsite. They had evidently built up a body of experience and thoughts on how to arrange activities for this audience. They were assisted in their endeavours through the support offered by those taking part in the sessions with whom they had friendships. Site visits at sheltered housing sites where Mobile Me was being sustained were characterised by the warmth and good humour that the residents showed each other (whether at a coffee morning or at bowling sessions).

7.3. Interviews with participants

7.3.1. Interviews: background

Fourteen interviews took place at the 2017 Mobile Me Festival with residents from nine sites. Over half were female and the average age was 80 years old, with a range from 61 to 95. One group interview took place with several residents from one site and is reported as a case study above. Half of respondents had been to a previous festival.

7.3.2. Interviews: findings

Residents gave a range of reasons for taking part in Mobile Me, including the desire for social contact, exercise, competition, because of specific health problems, or because others were taking part. One resident had joined because she was advised to be physically active after knee replacement surgery; another had been advised to lose weight by the hospital.

To do exercise, as I can't do a lot, it's better than doing nothing and the social aspect is enjoyable.

Interested, I was active as a younger person and I thought 'have a go'. I thought it might help with aches and pains.

It's competitive, you get to meet people.

When asked what they liked about Mobile Me, respondents predominantly spoke of the social aspects of the intervention. The bowling activities offered through Mobile Me were also found to be highly accessible.

It quite good, apart from the activities, there is the social side, you have tea and a chat.

I enjoy it. The chair-based fitness DVD is a bit too strenuous for some. I haven't noticed any improvement, it's enough having an extra activity.

It's a reason to go to the lounge, better than gossip. It's helped bring people together socially.

Responses to a question asking what difference Mobile Me had made, suggest that the effect of Mobile Me is dependent on that person's life circumstances, such as their physical health, their activity levels and levels of social engagement.

Not really, I am active anyway.

To the social side, I wasn't doing any activities before except walking. I just moved in last year. It's made no real difference physically.

Yes, it has helped me to keep mobile ... I feel you've got to keep moving. It's not made a difference socially, I was already social.

I feel more able to move, happier.

One respondent who had suffered a stroke said that bending to retrieve balls had improved his balance yet did not stand to bowl because no one else did.

Discussions with residents highlighted the difficulties some have in achieving recommended activity levels due to frailness, ill health, and disability. For example, a respondent with extreme breathlessness due to a tracheotomy which made aerobic activity very difficult. Despite this, this resident was able to participate in Mobile Me.

7.3.3. Summary: Interviews with participants

This was a small sample of respondents and all came from sites that has sustained Mobile Me. However, the interviews yielded some interesting findings. For example, while bowling activities done for Mobile Me involve only gentle movement rather than physical activity, they are accessible for individuals with serious health issues who may not be able to take part in other forms of activity. The outcomes of Mobile Me were predominantly around increased social interaction, and some examples of physical outcomes were given. However, the effects of Mobile Me were also found vary according to an individual's circumstances, particularly their pre-existing levels of social engagement and physical activity.

7.4. Qualitative self-report by participants

7.4.1. Background

Data from three questions on the Mobile Me questionnaire for the period October 2015 – July 2017 were analysed. There were 205 respondents in this period. The three questions were (bold as per the questionnaire):

- What did you **like** about the Mobile Me activities?
- What **didn't you like**? What are **your ideas** for making the activities better?
- Has taking part in the activity sessions **made any difference to you**? If so in what way? e.g. For example, has it helped with your daily activity, social life, or confidence?

7.4.2. Questionnaire: findings

When asked what they liked about the Mobile Me (n=203) the majority of responses related to Mobile Me encouraging social interaction:

People have mixed together and come out of their flats.

Getting together with the residents. Supporting & encouraging each other.

A number of comments suggest that Mobile Me may have increased community cohesion at sites outside of the session:

[The] Community has mixed together. [We have] Got to know people more and feel more at ease.

Mobile Me sessions were valued for being fun and enjoyable, but also, simply because they gave residents something different to do:

Sessions were a good laugh.

*Got involved with things I wouldn't normally get involved in.
It gets me out of the flat and doing things.*

Some residents particularly enjoyed the competitive side of Mobile Me:

*Competing against other residents and enjoying their company.
Setting myself goals to improve every time.*

The enabling role of the instructors (socially, as well as in playing the sport) was referred to by a small number of respondents; possibly, this benevolent 'third party' encourages interaction between those that do not know each other, and supports less confident residents:

*Having instructors there gives me more confidence in attending.
The instructor makes everyone friendly.*

There were a small number of responses to the question asking what aspects of Mobile Me required improving (n=37). While responses varied considerably, there were a few requests early in the intervention for more 'variety'; Active Norfolk responded to this by delivering a range of sports over the course of the ten-week intervention, instead of one sport.

Responses to the question asking whether taking part in Mobile Me had made any difference (n=182) were in keeping with earlier responses about what respondents liked about Mobile Me. Around a third of comment referred to reduced social isolation and improved relationships:

*It has made me feel included.
Have built a closer relationship with people.
I feel more cheerful and not so alone after activities.*

One respondent commented that the bowling had enabled them to see a different 'side' to people. Possibly, the activities prompt a different sort of conversation:

The games have revealed sides of each other not known in our other experiences.

The other categories of responses to this question were reports of increased mental or physical wellbeing and increased confidence:

I'm more confident leaving my bungalow.

Sessions helped with self-confidence and energy levels, especially as I'm going through a difficult time.

In addition to this, several specific examples of improved mobility/fitness were given. For example:

Can breathe better after the sessions.

I get less hip pain.

7.4.3. Summary: Questionnaire responses

In conclusion, comments suggest that Mobile Me is valued for bringing people together in a way that promotes social interaction. It also gives residents something to do and gets them out of their rooms. Participants enjoy it because it is fun, but also because, for some people, because it is competitive. Mobile Me can reduce social isolation, not only through companionship at the sessions, but in some cases through improving social cohesion in accommodation settings. As a result of having fun and/or feeling less isolated, some people experience improved wellbeing. Some respondents reported specific improvements in health or mobility and/or increased confidence.

7.5. Interviews with professional stakeholders

7.5.1. Background

Three sets of semi-structure interviews were carried out with stakeholders by telephone or face to face as follows.

Round 1: Summer 2016

Interview themes: recruitment, delivery, outcomes, and sustainability

- Four members of Active Norfolk staff
- Care provider Dementia Care lead (a member of the Steering Group)
- Project Manager of housing association sheltered housing provider
- Three sheltered housing site coordinators (one of whom is on the Steering Group)
- A steering group representative not directly involved in delivery (from public health and falls prevention)

Round 2: Summer 2017:

Interview themes: recruitment, delivery, outcomes, and sustainability but with a focus on sustainability and on the USP of Mobile Me activities.

- Three members of Active Norfolk staff
- Care provider Dementia Care Lead
- Local authority sheltered housing team leader
- Two members of staff from Age UK Norwich

Round 3: Summer 2018

Interview theme: Sustainability

- One member of Active Norfolk Staff
- One member of staff from Age UK Norwich
- Housing association sheltered housing coordinator

Findings from all three sets of interviews have been combined and are reported thematically. Where there are clear differences over time these are made evidence in the reporting.

Quotes are coded up by respondent type as follows:

AN: Active Norfolk

AC: Accommodation setting

O: Other e.g. steering committee member, Age UK

7.5.2. Recruitment

Where residents are socially isolated, joining a group activity may be daunting:

If they are used to sitting in their rooms and not coming out and meeting people, to get them out playing activities with people, it can be quite a big barrier to them. (AN)

There is also sometimes a perception that sport and exercise is not for older people:

A belief in certain stereotypes when you get to a certain age you have to stop, slow down. (AN)

Another issue is a lack of knowledge about the benefits of exercise, concern over injury, and fear of embarrassment:

Some people are probably afraid of doing it because they think they are going to injure themselves or think that those days are long gone and they are going to show themselves up. (AC)

While these barriers are not unique to supported accommodation residents, they may be

amplified by life circumstances that have reduced expectations and confidence in this group. There may be even greater difficulty in reaching socially isolated and socially inactive residents:

I still think it is a challenge getting new people involved because we find that people who come to coffee mornings also attend Mobile Me sessions...the biggest barrier is getting people that aren't doing anything involved. (AN)

Face-to-face contact was considered an effective way of encouraging residents of all levels of ability and age to take part.

You need to sell it face to face, you need someone to demonstrate and encourage them. (AC)

If you can see someone that's probably twenty years older than you doing something, you will realise that you can probably do it. (O)

They say, "I won't be very good at that, I can't do that". It's about getting them to actually have a go and realising that they can do it...There have been some who haven't wanted to, and they get very into it, and then they come every week. (AN)

Within some sheltered housing schemes, staff played an important role in encouraging residents to join:

You need the backing of your support coordinator to be on-board and enthused. You need an ambassador, someone to say, 'you are going to be fine, we are not asking you to put on your gym suit on and do twenty press-ups...I'll even make you a cup of tea'. (AC)

When I call up, on my daily rounds, I remind people to come down. (AC)

Training helps staff to advocate for Mobile Me, particularly to explain the benefits of exercise for arthritic conditions, and to mitigate residents' worries that exercise may be damaging:

That [the training] was absolutely brilliant, I learnt a lot. As in the arthritis, I've spoken to quite a lot of people, because a lot of people suffer from arthritis in different forms, and I say to them...you need to keep on with it, as it will strengthen it, strengthen the muscle around it... That was something that stood out for me. (AC)

It is also the case that staff need the capacity (time) and support from their organisations to enable them to promote activities. Staffing levels varied considerably across sheltered housing schemes. There were less staff hours at local authority run sites than housing association sites, and staffing levels at these sites fell further in 2018 due to the withdrawal

of housing related support funding. Influential residents are equally important in encouraging others to take part. Conversely, where residents are not on board, this can also present a barrier to delivery for example, where residents feel the status quo is challenged and where an activity impinges on a pre-existing coffee morning:

The biggest plus can also be the biggest negative if influential residents don't want new things or outside people. (AN)

There were fewer care settings within the Mobile Me project than sheltered housing sites. Recruitment in care settings has different drivers as they have higher levels of staffing and because it is shared living, rather than independent flats, with a community space. The communal areas in care homes are generally better frequented, creating a pre-existing audience for activities:

If we are doing the communal lounge area, residents will be down there anyway.(AN)

Due to poor health and disability, some residents within care settings are dependent on staff to bring them to communal areas for sessions. Therefore, staff need be aware of, and supportive of, the project.

Recruitment and attendance at sheltered housing sites may be affected by seasonality. In poor weather when it is windy or when paths are slippery, or in summer when residents are spending time with family and grandchildren.

7.5.3. Delivering the sessions

The Mobile Me sports coaches had experience in delivering sporting activities to individuals experiencing disability and ill health. Even so, the high level of need in care settings, and on occasions in sheltered housing, resulted in further development of the coaches' practice:

I have learnt so much...adapting, I feel I can go and make any of those activities inclusive for anybody. (AN)

That's something I've noticed in the last six months, a lot more people having a go at table tennis...I think maybe it's me getting a bit more confident, getting someone to play. (AN)

The coaches related other changes they had made in response to their experiences. For example, keeping a consistent appearance when working in a dementia unit to increase the likelihood that residents would recognise them:

...so, when you walk in they smile and wave...they recognise me...Someone asked me

what I was doing at the weekend... It's made me think about how I go about things...(AN)

The coaches derived job satisfaction from working with residents in care setting with a high level of need. Their experiences led to a re-evaluation of what might be defined as 'success', for example working patiently with a resident to enable them to independently pick up a ball:

In the way that you work, obviously, you have to be patient anywhere, I was patient before, but...knowing how a simple thing to us is, a big thing to them... (AN)

One suggestion was that where a facilitator has no professional or personal experience of a dementia unit, a familiarisation visit should be arranged. The presence of care staff during activity sessions in care settings is also necessary. This is both to attend to the care needs of residents, and to support the external deliverer because they have personal knowledge of residents and their capabilities. While care staff were normally present at the start of Mobile Me sessions, on occasions, they melted away as it progressed. This may be due to the pressure of other work, as taking part in activity sessions may be seen as lower priority than more tangible care tasks:

'If it were made as part of work, I think that would definitely be beneficial.' (AN)

The approach to delivery within sheltered housing was different to that at care settings, where the aim primarily was to develop an enjoyable social activity that would self-sustain:

It's completely different at sheltered housing to care homes. At sheltered housing, it's more like a coffee morning. A bit of fun, a bit of a laugh, and you kind of have to join in with that.. (AN)

It was found to be important to offer a variety of sports over the ten-week intervention. The competitive nature of bowling also helped keep it engaging, especially if this is capitalised on, for example, by recording scores on whiteboard, or playing in teams:

Sometimes when you do the same activities over and over again it can become tedious, but the competitive side of it, we found has been a positive in helping people want to come back (AN)

A summary of more detailed lessons learnt for delivering sessions can be in Figure 5 which was developed in conjunction with the Active Norfolk, Mobile Me Team.

Delivering sports sessions in residential sites for older adults: Lessons learnt and recommendations from Mobile Me

The Mobile Me project took place in fifty-two sheltered housing accommodation and residential care setting sites in Norfolk. Each site was visited for two hours a week over ten weeks. Residents were introduced to sports such as Boccia, New Age Kurling, Short Mat Bowls and Table Tennis. After the ten weeks the activities continued, sustained either by residents themselves or, in care settings, by staff who delivered sessions to residents. This document aims to pass on some of the lessons learnt about the delivery of these sports.

Ways we found to:

Encourage residents to come back to the sessions

- Making the sessions welcoming and fun
- Enjoying the sessions ourselves
- Using people's names
- Varying activities across the ten weeks
- Introducing friendly competition (see below)
- Welcoming family members and staff, and letting them join in
- Liaising with staff who could remind residents to attend
- Checking timings – is there something else on that day, will there be staff around?
- Delivering in communal lounges to ensure sessions were physically accessible and in a familiar space
- Doing a recap after each session and finding out what the residents would like to do the following week
- Giving motives for returning i.e. “you can try and beat Vera next week”

Ways we found to:

Make it competitive but failure free

- Arranging seating so that everyone could watch play
- Telling people their score after each go
- Writing scores on a board so people could see them as well
- Re-starting the scoring for each game so everyone had a chance of winning
- Introducing other competitive elements e.g. the best shot of the day
- Motivating those with low scores, “you have beaten your last score”
- Keeping it friendly and fun; encouraging clapping and cheering
- Offering the option for residents to play a match against each other or to solely record their own personal score, depending on what the individuals found most enjoyable.

Ways we found to:

Make it inclusive

- Explaining that do not need to attend each session, and you do not need to 'perform'.
- Making sure everyone who wanted to, could take part
- Assuming that everyone could play independently until proved otherwise – some people surprised us
- Finding adaptations, but not making a fuss about it
- For people living with cognitive impairments, such as Dementia, explaining things in lots of different ways.
- Normally, double-checking whether people who were not playing wanted to join in when the play came around to them again.
- Also realising that some people would rather watch than play.
- Ensuring that the equipment used was appropriate, e.g. providing ramps, and ball collectors for resident-led groups where people find it hard to bend down to pick up the balls.

Examples of adaptations

Playing seated, or holding onto the back of a chair

Throwing the ball palm down rather than palm up

Using a ramp, or chute

Using different words when people have dementia. For example, 'roll it to the mat', can be changed to 'roll it to me', or to 'roll it like this'.

Ways we found to:

Ensure it strengthened communities

- Making it clear to residents that it is their session, and you are there to facilitate. So, letting residents choose which activities to do, for example.
- Encouraging residents to help out where safe to do so, for example, setting up the room, collecting balls, adding up scores, making tea and coffee.
- Also, where safe to do so, encouraging residents to help others with accessibility issues, for example, moving a chair or a ramp to the, so that they are able to do this when there is not a staff member or facilitator to help
- Having a coffee break in the session
- Understanding that, while some sites already have an active social scene to build on, at other sites groups may be small. This is not a failure, it is a start.
- Understanding that we, as a delivery agency, are entering the resident's space, and to act in an appropriate manor when doing this. For example, leaving the communal lounge as we found it.
- Understanding the importance of the social aspect of sessions by being friendly and engaging.

Ways we found to:

Increase physical activity

- Understanding that even very small amounts of physical activity may be very difficult for some residents. Rather than setting generic goals, explaining the benefits of keeping active in a way that does not detract from the fun of taking part.
- Where safe, encouraging residents to progress, for example by standing up when bowling, or by reaching down to pick up their own bowls.
- Recognising small improvements and small changes in activity levels. For example, getting up and down out of a chair several times in a session, or walking to a session.
- Pointing out to residents how much activity or sport they have done in the session
- Educating staff about the benefits of physical activity, especially for conditions such as rheumatism.
- Giving residents examples and ideas of to how to include physical activity into their daily life. For example, chair-based exercises that can be performed in front of the television in an evening.

Boccia: can be played with a jack or a score mat. Very accessible and works on most surfaces

New Age Kurling: Suitable for most surfaces except thick carpet (in which case a vinyl mat can be put down). Pushers available for people who cannot bend down.

Short Mat Bowls: More technical as bowls have a 'bias'. Depending on the floor surface a mat may be needed, these can be heavy.

7.5.4. Outcomes

The principal outcome identified by stakeholders was that Mobile Me reduced social isolation, particularly in sheltered housing sites where accommodation is self-contained; some of these sites are also situated in quiet locations, away from facilities and shops:

One gentleman said he is lonely, he doesn't see anyone. (O)

Social isolation, loneliness, it's a horrible to have to experience, and it's quite prevalent within some of the schemes. You have people who rarely leave their flats, rarely engaging with any other person...it creates a community feel, a lot of laughter, it's something that quickly becomes something for people to look forward to every week. (AN)

Social isolation could be addressed even where residents did not take part:

We have people who come down, and don't really take part, but want to sit there and enjoy what goes on in front of them (AC)

Mobile Me was also felt to alter residents' perceptions of what they, and others, could do:

The confidence factor is a barrier, some don't think they can do it any more, they underestimate what they can do, when they see people doing it, sometimes it brings out their competitive spirit. It makes them aware of what others can do. (AC)

Interpersonal difficulties at sites, for example, between groups of residents, was reported to be a barrier to take-up of Mobile Me in some instances, however, Mobile Me also led to such difficulties being resolved in at least one case:

...there was a falling out. We had to have two coffee mornings. When Mobile Me came along, they all got back together again as one scheme. It was brilliant for us. (AC)

A number of respondents observed increased mobility or physical confidence:

When they were bowling on a regular basis, they were up and out of the chair before they even thought about it, and the sticks were being left behind, and those that had pushers, and were holding pushers, the pushers get pushed to one side... (AC)

Small improvements were found to be big steps for some residents who were very inactive, frail or disabled:

I don't know if the coordinators [Active Norfolk staff] actually picked this up, even though they were helping to do it, but there was a lady in a wheelchair, who, her grip was weak, and they were putting the ball in her hand, and she wasn't really

interested, she wasn't paying attention, and they did it with her, and all of a sudden she picked it up and did it herself, and it was something really little, that made me go 'yes', it's worth that...It started with the lady not able to do it, and then she was able to do it. (AC)

People are very open about telling us how it has helped their problems, so it enables you to get a real understanding of how it is needed and how it has helped. It is important because the actual activities that we do, from a layman's perspective, may seem very light touch... but actually, the range of movement you are getting someone to do, if they have been doing nothing, and sitting down for 14 hours a day, to stretching, picking up slightly weighted bowls... Then if you can move someone from being seated at the start, to standing and delivering a bowl, you can see the physical side of the process. And then, if they actually talk to you about isolation, you can actually see that wellbeing side of the process as well. (AN)

Interviewees were asked to identify how bowling differs from other types of activities typically offered in supported accommodation sites (which may also be very beneficial). The main outcome identified by respondents for Mobile Me was social interaction. Bowling is a 'whole-group' social event where there is a focus for conversation and opportunity to offer support to fellow players. Competition can also draw people into the group and motivate participants to improve their skills and scores:

Bingo, you can chat at the start and at the end, it's not really inclusive. This [Mobile Me] you have a joke, it's a laugh, it gets everyone together, and you are moving and not realising it'. (AN)

Bowling is also highly accessible to people with different levels of ability and mobility. Those that cannot participate can spectate:

...the main successes in terms of delivery are how inclusive the sessions are...it doesn't matter what the ability or disability, people are able to participate in it against their peers. (AN)

...it's getting people together...people with quite severe stages of dementia, we can work with them to try and play Boccia, but even if it's difficult, it's getting together and having tea. It's social and rehydration. It's those things as well. (AC)

Bowling does not normally result in moderate physical activity; rather it encourages gentle movement such as rising and returning to a chair and stooping to collect balls. Positioning Mobile Me as enjoyable and social, rather than as a health or self-improvement activity was a conscious decision by Active Norfolk. However, methods of progressing residents into

increased activity levels are still being explored and consolidated post-delivery:

The biggest engagement tool is to put on something that's fun with the premise that every bit counts. We didn't want to preach, as we have learnt that this results in negative feedback...On the other side, knowledge and awareness of being active does need increasing. How we've tried to do it is working with partners...and upskilling the workforce. (AN)

One respondent, when asked about outcomes, felt that Mobile Me had made little difference to residents, as it had not 'taken off' in their sites. This respondent, who managed housing support staff, had not attended Mobile Me sessions and was not therefore commenting on outcomes from the sessions themselves, rather, on uptake and sustainability. One issue with delivery within their sites, the respondent felt, was the mix of residents, some of whom were relatively young and still active or working and therefore not interested in activities such as Mobile Me. Another factor influencing the respondent's views was that, although the intervention was delivered in sixteen sites with this provider, another four sites had cancelled due to reported dissatisfaction with the length of the wait between control and intervention. Attendance at these schemes, in fact, was similar to others, but there were low rates of sustainability. The levels of warden support within these schemes were low, and this may have affected sustainability. Mobile Me staff found that there were less active residents at these schemes willing to organise activities, possibly because of the demographic, which was more socially disadvantaged. While some sites in this scheme did successfully sustain, there were also indications that some aspects of centralised policy may deter, rather than encourage, local autonomy. For example, rules around collecting money (contributions to event) and decisions about communal spaces. The respondent was supportive of Mobile Me in principal and recognised the importance of encouraging physical activity with residents; many of points raised by the respondent around issues delivery and sustainability in these sites were shared by the Mobile Me team when reflected back to them.

7.5.5. Sustainability

Information received from Active Norfolk in August 2018 indicated that, overall, 52% of sites regularly sustained Mobile Me, and 16% sporadically sustained Mobile Me (Table 24). When sub-categorised according to whether they are local authority run or not; less local authority sites sustained Mobile Me.

Table 24: Sites sustaining Mobile Me activities based on report from Active Norfolk, August 2018

	Not sustained		Sporadically sustained		Regularly sustained	
	%	N	%	N	%	N
Care Home	0%	0	0%	0	100%	9
Sheltered	26%	6	17%	4	57%	13
Sheltered (LA)	63%	10	25%	4	13%	2
Other*	0%	0	0%	0	100%	2
All sites	32%	16	16%	8	52%	26

*Day care centre and community group

At sheltered housing sites, Mobile Me has been sustained almost entirely by resident volunteers, in some cases with support from staff. This model is reliant on the presence of residents who are willing and able to take on the role, and on an adequate body of other residents who wish to sustain the programme; probably also, support and encouragement from the supported housing provider. Sustaining the programme through onsite volunteers is an economical model that appears to work well in many cases. As residents move on and circumstances change, however, in order to maintain sustainability in the longer term, it is likely that some continued support and input is needed, whether from the housing provider or from an external organisation.

Another sustainability model explored for sheltered housing sites was through the facilitation of sessions by external volunteers, in this case recruited and managed through Age UK Norwich's 'Agewise' project. This took place four local-authority sheltered housing schemes from summer 2017, selected because they had the least number of hours of warden support, and because residents were understood to have lower socio-economic backgrounds than other sites in Mobile Me. One year on, one of these sites is supported by a volunteer and another site is running Mobile Me activities independently. Age UK plan to reinvigorate Mobile Me at a third site, as this had previously been running successfully until the volunteer became ill. The fourth scheme had not wished to continue Mobile Me, but a number of residents were referred to an external activity class managed by Age UK Norwich and run by volunteers at a leisure centre. The latter was established the help of Mobile Me. Transport for participants is paid for through 'Agewise'. Thus, while residents at all four schemes were continuing to receive support form Age UK, maintaining external volunteers does not appear to have been easy in this case, as there have been a number of changes

since Summer 2017, and at one point Age UK staff were covering sessions.

At care sites, sustainability is in the hands of the institution and staff rather than with residents, as the latter are generally not physically independent enough to be able to organise sessions. One operator is responsible for all the care homes that has received Mobile Me. It has effectively mainstreamed the project and rolled it out across the county, while bowling is not necessarily sustained on a weekly basis at all sites, it takes place regularly at most. The organisation has taken the following actions:

- Purchased bowling equipment for a further 35 sites, including ramps
- Provided support and training to Activity Assistants
- Built physical activity into each site's 'health and wellbeing lifestyle plan'
- Successfully sought funding for a Physical Activity Coordinator

Mobile Me helped catalyse the physical activity programme with the provider through acting a demonstration project and because the Mobile Me staff proactively sought routes to sustainability, for example by attending a number of management meetings, and providing training for staff:

I think it [Mobile Me] has given it a kick-start, seeing how tenants love it. (AC)

These actions are partly due to Mobile Me, but also to a growing awareness of the importance of healthy lifestyles for older people, and due to the interest and engagement of the management staff:

One goal this year is around making sure we increase activity...to keep people healthy. (AC)

This model of sustainability has been effective with this provider and may provide a transferable model for other organisations; although it is not yet clear if this will work elsewhere.

Where Mobile Me is being sustained, events such as the Mobile Me Festival probably have had a role in maintaining the motivation of residents and staff and thus facilitating sustainability.

Three approaches to sustainability were thus identified. A top-down approach to physical activity, where it is embedded in an organisation's strategy and where physical activity is delivered by staff. An approach that relies on a resident-organiser, with organisation support. And a partnership with a third-party organisation who provide volunteers and offsite provision. Each may be suitable for different circumstances, for example, the level of staffing at a site, and the level of independence its residents. Underpinning this is the

support offered through organisations such as Active Norfolk in raising the profile of physical activity for older people. Whatever model is adopted, sustainability in the long term is most probably dependent on organisational buy-in and culture change:

...we are trying to build physical activity as part of a culture, it could be any physical activity that is happening regularly. It's about realising the benefit and importance of physical activity when older. If a culture has been built up, then it [Mobile Me] has been successful in the long-term. (AN)

A legacy of Mobile Me within Active Norfolk is an increased emphasis on supporting older people to engage in physical activity along with a network of relationships that have been developed across the country:

This one project which started three years ago has influenced our whole outlook in working with older people in Norfolk to be more active...It has moved to being not on our radar, to being at the forefront of what we do. (AN)

In the short-term, Active Norfolk have also rolled out Mobile Me by creating a support package for organisations wishing to deliver bowling. This includes grants for equipment and training for staff. The training is built on the lessons learnt in Mobile Me.

7.5.6. Summary: interviews with stakeholders

Stakeholders reported that some residents found joining Mobile Me difficult due to a lack of confidence, or an assumption that 'this is not for me'. This may be a particular barrier to residents who are socially isolated and inactive. The best method to recruit residents is through personal contact and support; for example, through a warden, a volunteer, or other residents.

Delivery differed in care settings and sheltered housing. In the latter the emphasis was on creating a fun, social event that resident would want to self-sustain after the delivery phase. Sheltered housing residents were more physically independent and physically able than those in care settings.

The sport coaches derived satisfaction from delivering Mobile Me to the most challenged of residents, particularly care settings. Learnings from this have been drafted into best practice guidance to be used for training.

MobileMe activities are sociable, engaging and highly inclusive, but need to be kept fresh

through variety and competition. The main outcome reported for Mobile Me is reduced social isolation. There were also reports of health benefits such as increase mobility. While three different models of sustainability were found for Mobile Me, key to its continuation is organisational buy-in.

7.6. Observation study and development of best practice for individuals lacking the capacity to consent

7.6.1. Introduction

Observations studies were carried out over three days in October 2017 using Dementia Care Mapping (DCM) and semi-structure observation. The results from the observation studies were written up by the observers (rather than UEA evaluators). The findings from the observations were reflected on at a workshop of stakeholders in January 2018 and then used along with the Mobile Me qualitative evaluation findings in order to develop best practice guidance on delivering bowling, or similar physical activities, to individuals living with moderate to severe dementia. For further information, see the methods section of this report.

7.6.2. Findings

c. Key observations from DCM mapper

- This is an important physical activity that raised well-being. The benefits of these sessions were clear for everyone involved. Mood and engagement were high, and interactions increased in all three sessions.
- The skills and abilities of the Sports Coaches transformed the sessions from a leisure activity to a therapeutic opportunity for all to join in, despite cognitive and physical disabilities
- The sports coaches enabled the most disabled members of the group to take part in the activity using verbal and non-verbal prompts to encourage people to 'have a go'.
- The use of praise and the reinforcing of participants' sense of achievement was important. Keeping the activity failure-free and fun was important for all.
- First names were reinforced verbally and written on the board, which supported individuals' identity within the group activity.
- The Sports Coaches were reliant on the presence of the care staff to support participants with care needs, and to raise the sociability around the circle; the success of the sessions relied on this close partnership between the sports coaches and the care staff.

- Some participants needed one-to-one support (from care staff) to play the game, to great benefit to the individual.
- Staff playing alongside participants reduced the social embarrassment and the hesitation that was sometimes expressed when people were invited in to play.
- The most vulnerable and quiet members of the group can sometimes be overlooked in the busyness of these sessions and may not attract as much support as more 'popular' residents.
- The third session, a 50-minute morning session, became the 'gold standard'. Everyone in the room was involved, with care staff strategically placed around the circle allowing them to support individuals to play the game. The participants observed in the third session had the highest percentage of the time engaged with the game (32%).
- Pre-group planning can help to identify those participants in most need of support and for all to be aware of what type of support was needed for each person.
- After each session, the post-group review was a valuable way of reinforcing good practice and identifying future modifications to the group.

d. Recommendations from the semi-structured observer

- Be aware of where people are in the room so that they can engage with the game even if they aren't playing. i.e. move out of the way so they can see what's happening
- Short sessions with fewer people are better
- Use all means possible to communicate the game i.e. gestures, language, demonstrations, to indicate to people where to throw the ball
- Move the target map so scoring is relative to a person's ability
- Don't make assumptions about who is 'able' and who is not i.e. so the 'able' people get less encouragement than the less able people.
- Watch out for favouritism of those who are charming and likeable to the exclusion of those who are less attractive as personalities (e.g. Mr Charisma or Mr Quiet).
- People may need to see other people having a go before they join in themselves so that they see what is involved.
- People may have got into the habit of saying 'no' when asked as a way of avoiding embarrassment about finding themselves in a situation they don't understand or that they anticipate they won't be able to manage. Gentle encouragement at this stage can help a great deal. Don't press people if they really don't want to try. Your knowledge of people will help you gauge how much encouragement a person needs

or can tolerate.

- When friends sit together they can chat in between and help each other with the balls – passing them to each other. Making comments about turn taking and encouraging this can help social interaction.
- Give people the chance to anticipate the cup of tea/break by giving them notice at a point before the break
- Whatever comes is good. Go with the good stuff; the easy flow of conversation and activity. Try not to control the outcome but create a space where people can have a pleasant experience
- Avoid sexism (men deemed to be more competitive at game than women)
- Encourage everyone to have a go including care staff and facilitators
- Encourage people to add up the scores
- Have the session in the morning in a room people are familiar with.
- Make sure that the chairs don't overlap so that everyone can play, and everyone can see

e. Key points from stakeholder meeting

Possible audiences for guide

- In addition to care staff, volunteers and sport professionals, the guide could inform the training of OTs and others.
- Possibly two guides, one for organisations (describing the benefits), the other on how to deliver.
- Visits can be difficult for the friends and relatives of people with moderate to severe dementia. These activities might give them an opportunity for meaningful interaction.

Media/format

- Video as the main medium for the guide, it is easier to 'show how' and illustrate 'golden moments'.
- Should go on a stand-alone, branded website. This could be a micro-site on Active Norfolk's website, especially as they have web/coms capacity in-house.

Messages and content

- State that the skills described in the guide are transferable to other area/activities
- Convey that joining activities should be part of the job for staff. At an organisational level, aim for PA being part of the daily routine for staff to deliver and part of their duties
- The activity can be branded as 'Failure-free fun'.

- A section on adaptations should be included e.g. different texture or weight balls, ramp.
- In the 'FAQ' section, include guidance on what to do if someone says 'no'
- Residents don't have to join in, they can watch, or participate in another way, for example, by adding up the scores.
- Use the opportunity for other types of health promotion. Suggest a healthy snack and drink. Tea or water. Fruit, yogurt, banana or granola (not cakes or biscuits)
- Link the best practice to other evidenced non-pharmacological therapies for dementia such as reminiscence.

7.6.3. Summary: Observation study

The observers in this study reported positive outcomes for those participating in the physical activities, such as high levels of engagement and well-being. Some of these outcomes were contingent on the manner in which the activities were delivered, for example, effective communication, attention to each individual, and making the activity fun and failure free. The DCM observer reported that, in her opinion, the input from the coaches had transformed the sessions from a leisure activity into a therapeutic opportunity. This leads to the conclusion that the way such activities are delivered is highly relevant to their qualities in provoking positive outcomes for those participating. It also emphasises the need for the evaluation of such activities in order that lessons can be learnt and passed on, as has been the aim with this study.

8. Findings: economic evaluation

8.1. Introduction

A cost effectiveness analysis was carried out using the Sport England MOVES (version 2) tool [55]. This is based on evidence about how physical activity reduces the prevalence of a seven long-term health conditions, including cardiovascular disease and diabetes, along with hip-fracture. The tool estimates the reduction in the risk of these conditions occurring due to taking part in physical activity and calculates the financial savings that results in terms of reduced health treatment costs.

Caveats:

- The MOVES 2 tool does not yet estimate savings on social care, which is an important potential return on investment for people living in sheltered housing (i.e. preventing a move to residential care or preventing an increase in home care costs by improving physical function and independence).
- Cost savings are estimated over a time-span; this is because the health benefits of taking part in physical activity may not be realised for a number of years. When dealing with an older population, there is less time to realise the return on investment due to the lower life expectancy.
- The calculations are based on physical activity resulting directly from the intervention, in this case, two hours of bowls a week. However, an intervention such as Mobile Me may change behaviour and lead to the participant taking part in other physical activity outside of this.
- MOVES is modelled on the health profile of the population of the age group in question (61+) and is not designed for populations that may have higher levels of pre-existing conditions, for example, people living in residential care who comprise around 13% of the analysis sample. Because of this, MOVES may over-estimate the cost-effectiveness for Mobile Me.

8.1. Model parameters

The MOVES 2 package requires a number of inputs in order to set parameters from which it runs a simulation. Four simulations were run with different parameters, the details of each of these can be seen in the Table 26. The notes below explain what these parameters are, and what values were inputted.

a. Average physical activity level:

The average physical activity level was categorised as 'moderate' at baseline using findings from this evaluation for self-reported levels of moderate and vigorous activity (not including walking). Together, this was on average 109 minutes per week for the intervention group, comprising mostly of moderate physical activity (as reports of vigorous physical activity were relatively rare). A 'Moderate' baseline level of activity is defined by MOVES as *'Reported 60-149 minutes per week of moderate physical activity, 30-74 minutes per week of vigorous physical activity or an equivalent combination of these'*.

b. The start and finish number of participants:

This was estimated in two ways:

- The number starting (595) and the number completing 4 or more sessions (**350**)
- The number starting (595) and 52% of number of participants, as 52% of sites sustained Mobile Me regularly (**182**).

c. Activity intensity, duration and frequency:

On average, there was an increase of 37.9 minutes per week of self-reported physical activity measured through the IPAQ from baseline to final follow-up in the intervention. This is an increase on average of 3.9 MET hours. While walking is the main type of physical activity recorded on the IPAQ for the Mobile Me cohort, most of the increase was in moderate or vigorous physical activity (an increase of 35.6 minutes). In addition to the IPAQ, a separate question collected self-reported minutes sport a week, where there was an average increase of 63.9 minutes. A high proportion of this sport is likely to be bowls, which is light activity as it does not normally raise the breathing rate; light activity is not recorded by the IPAQ. This explains why the increase in minutes in sporting activity is higher than the increase in minutes total activity measured through IPAQ. Bowls and Boccia are categorised by the MOVES model as resulting in 2.5 MET hours per week. If all minutes sporting activity were bowls, the increase would be around 2.5 MET hours. If the increase in METS due to other activity is added to this (3.9 METS), it results in an average increase in physical activity of just under 6.5 MET hours. However, it is likely that there is some overlap in both methods of recording physical activity (i.e. some of the sport was also moderate to vigorous activity) and so this would be an over-estimate. As a compromise, five MET hours, or two hours of bowls was used. Frequency was entered as once per week, and duration as two hours per session.

d. Age category and gender:

The relevant age category in MOVES is 61+, therefore this figure was used. A figure of 24% male was entered, as this was the percentage of males at baseline in the intervention group.

e. Median years of ongoing participation in the intervention:

The intervention started in October 2015, three years from the time of this report and ended in December 2017. On average, at the time of writing, participants had already been in the intervention around 1.25 years; several sites had sustained for three years. Five years and ten years were selected for median years of ongoing participation in the intervention. This parameter assumes an annual drop off in participation at the following rates: 10 years estimates a 6.7% drop-off of participants per year, and 5 years a 12.9% drop off per year.

f. Time horizon

This allows the benefits of the intervention to be calculated for different time periods: after one year, five years and then in five-year interval up to 25 years. As most of the health-conditions used in MOVES are chronic illnesses which present over a long period, the longer the time horizon, the larger the potential gains. However, Mobile Me participants are already of advanced age, and a 25-year time-period would not be realistic; time horizons of 5 and 10 years were selected.

g. Programme costs:

The total cost of the programme, minus direct evaluation costs for UEA, were £272,808 (figure supplied by Active Norfolk on 03.10.2018). However, this figure includes indirect costs for evaluation i.e. running sessions to collect follow-up and control data. The method used to exclude these indirect costs was to calculate the total number of sessions, and from this calculate the percentage that were part of the 10-week intervention (Table 25); this percentage was applied to the total costs of £272,808. Although it is recognised that data collection took place within the first and last intervention session, as these were part of the 10-week intervention programme, they were included

Table 25 : Number of sessions run for intervention and for evaluation

	No. of sessions	No. of sites	Total
Intervention sessions	10	51	510
Post intervention data collection	2	46*	92
Control data collection	24	3	72
All sessions			674

* Follow up did not take place for one round as this fell well beyond the evaluation period

Using the figures in Table 25, sessions run for the intervention were 75.7% of the total number of sessions i.e. 510/674. As a percentage of the total costs of running Mobile Me, 75.7% is £206,242 or **£347** per participant starting the programme (n=595).

h. Whether costs are one-off costs or ongoing:

Although selecting the option of ‘ongoing’ costs is generally recommended by the MOVES guidance, ‘one-off’ was selected since one of the specific aims of the intervention was that it was sustained. In sheltered housing sites this was largely by residents, and in care settings by staff. In the latter case it has been assumed that this is part of their normal duties (with a change in emphasis on physical activity).

i. Willingness to pay per QALY

The willingness to pay threshold represents the price that the health system is willing to pay for a unit of health, in this case a QALY (Quality Adjusted Life Year). A QALY provides a method of assessing the extent of the benefits gained through an intervention. It is related to both increased survival and quality of life; so, one QALY can either equate to one year of life in perfect health or a number of years in less than perfect health. NICE generally recommends a value of £20,000 for one QALY gained, and this is the default value set within MOVES. This value has been retained.

8.2. Model results

Table 26 shows the parameters of the four scenarios selected. Row one is the number of participants completing the course (see ‘*The start and finish number of participants*’ parameter above). The second row estimates how long participants will continue to participate (see ‘*Median years of ongoing participation in the intervention*’). The third row is at what point the cost savings due to the physical activity should be calculated (‘*Time*

horizon' parameter'). The final row is the results of the modelling.; this shows the cost of the intervention per QALY **gained** ('Willingness to pay per QALY').

Table 26: Cost per QALY gained of four scenarios calculated using MOVES

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Participant completing:	350	350	350	182
Ongoing participation	5 years	10 years	5 years	10 years
Time horizon	10 years	10 years	5 years	10 years
Cost per QALY gained	£5,876	£3,987	£23,236	£14,445

Three of these models meet the £20,000 'willingness to pay' threshold. The third model, whereby participation is for 5 years and where the time horizon is 5 years, is over this threshold. However, as previously explained however, the MOVES model does not currently include costs avoided for social care, which may be an important factor for the Mobile Me target audience. However, MOVES may also over-estimate cost effectiveness where individuals have pre-existing conditions.

The approach taken to assigning parameters was to be realistic about the audience and therefore somewhat conservative. For example, the use of relatively short time horizons due to the age of the participants. The exception was the use of one-off rather than ongoing costs. If ongoing costs are used in the model (i.e. participants continue to receive the same level of input for the time they are participating) the programme becomes very expensive. As an illustration, taking the most cost-effective scenario, Scenario 2, the cost per QALY would be £71,490. This figure is reported to give an idea of the importance of the sustainability element of the project.

Given the relevance of disability to increased social care costs. Results for the four scenarios are also shown for DALYs (Table 27). A DALY is years lost due to ill health, disability or early death. The cost per DALY is calculated in the same manner as the cost per QALY, however the benefits are measured in terms of disability adjusted life years that are **avoided** because of people participating in a sport or physical activity. As with the QALY, this is health care costs, rather than social care costs such as the cost of home care or residential care due to ill health or disability. It is likely to over-estimate cost-effectiveness for individuals with pre-existing health conditions. The cost per DALY is slightly less in each instance than the cost per QALY.

Table 27: Cost per DALY **avoided** of four scenarios calculated using MOVES

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Participant completing:	350	350	350	182
Ongoing participation	5 years	10 years	5 years	10 years
Time horizon	10 years	10 years	5 years	10 years
Cost per DALY avoided	£5,267	£3,581	£20,720	£12,995

9. Findings: Methodological lessons

9.1.1. General findings

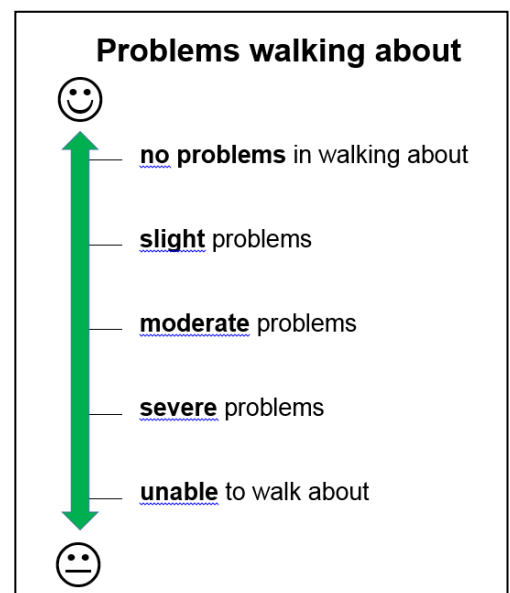
Many of the participants in this evaluation had health conditions, disabilities (including sensory impairment) and/or impaired cognition. This is particularly evident in care settings but also (to a lesser degree) in sheltered housing. When developing the evaluation, data collection tools were selected with this audience in mind. For example, the use of the IPAQ-E which was developed for older people. The questionnaire was also in large print as standard, and in development, was tested with sheltered housing residents. Objective methods were used for a sub-sample of residents, and these were selected on the basis that they would be appropriate for the target demographic. Despite this, it was found that some residents had difficulties with aspects of data collection, especially residents within care settings. For example, some felt unable to complete functional fitness tests and some were unable to stand on the force balance platform (which is a static platform, centimetres off the ground). However, some of these same residents progressed from not feeling able to carry out these tests, to being able to carry them out. This may indicate an improvement in physical functioning or confidence, however, this improvement was not captured in the analysis, which relies on a baseline reading.

9.1.2. Questionnaire

Questionnaires were generally administered by staff; either sports coaches or accommodation setting staff. While generally acceptable to participants, the questionnaire was felt to be long.

Some participants, although capable of consenting to the evaluation, found completing some aspects of the questionnaire difficult, for example, the IPAQ-E which is cognitively demanding and relies heavily on memory.

An alternative version of the questionnaire was created with only one question per sheet. This was done after consultation with a specialist in the field⁷ to reduce cognitive load and enable residents who are not able to write or to speak or point to the relevant answers. Responses were presented as visual analogue scales with facial symbols in addition to textual responses (see



⁷ Dementia research nurse

example to the right). The amount of text in each question was reduced where possible. These adaptations did require some changes to validated scales, however this was felt, on balance, to be necessary to ensure an inclusive evaluation, and changes were kept to a minimum. In addition, questions were re-ordered by level of difficulty to ensure that respondents able at least to complete some of the questionnaire (not being put off by difficult questions at the start). Hence, the IPAQ was moved to the end of the questionnaire due to the degree of cognitive processing and levels of recall required. The EQ-5D, on the other hand, was placed at the start of the questionnaire because it requires minimal processing and recall (it asks about health states 'today').

A protocol was also developed to assist staff in dealing with some of the challenges in carrying out data collection. This included suggested wording for collecting data for the IPAQ-E through interviewing techniques (developed by Active Norfolk) and further guidance on assessing residents on the capacity to consent.

Feedback from Active Norfolk was that using the modified questionnaire offered some benefit for those individuals who were cognitively impaired) but not appropriate for individuals with severe impairment). The interviewing techniques were successful in better facilitating the IPAQ sitting question.

9.1.3. The measurement of light physical activity

It was found that an increase in minutes engaged in sporting activity did not reflect an increase in minutes engaged in moderate activity as recorded by the IPAQ-E. Moderate activity is defined in the IPAQ-E as activity makes you 'breathe somewhat harder than normal'. It is unlikely that the activities undertaken as part of this project, for example bowling, would have this effect. Self-reported time in 'light' activity is not collected by the IPAQ, although it is collected by other physical activity questionnaires specifically designed for older people such as the RAPA and PACE [61], [62]. However, the addition of a separate question asking about minutes spend in sport did enable participation in Mobile Me activities to be recorded in this instance.

9.1.4. Accelerometers

The accelerometers were found to have very good battery life. However, of all the measurement methods, reports from Active Norfolk were that this was the one with least acceptance from participants, particularly at follow-up. One reason for this was the strap which holds the accelerometer chip. This is constructed of black silicone and was felt by

some participants to give the appearance of an electronic tag; the end of the strap was also found to work loose from the strap keeper and get in the way. A number of strap keepers broke and, while Axivity sent free replacements, these were not always available in the field, and in some case elastic bands were used, which may not have been comfortable. Some participants also reported that the straps irritated their skin. It may be that these issues are particularly pertinent to older, frail individuals whose skin may be more sensitive, as the AX3 is widely used in studies.

A logistic issue when using accelerometers in this evaluation was that, while self-reported physical activity was for the week prior to baseline i.e. 'in the past seven days', the accelerometers were issued at the first session and recorded the subsequent seven days (i.e. the first week of the intervention). This happened as issuing accelerometers the week before would have require a further session with potential participants; it was not certain at the start of the project that this would greatly affect results, but baseline accelerometer readings for the intervention group were higher than the control group, indicating it may have been an issue.

9.1.5. Waiting-list control

Feedback from one housing provider was that some residents were dissatisfied with the wait between baseline control (where they found out about the programme) and eventual delivery (one year later). This is unavoidable where waiting-list controls are used and could have been a misunderstanding about the reason for the wait for these residents. The number of follow-up for controls and intervention were unequal, this mean that some follow-up points had very few participants in the control group.

9.1.6. Functional fitness tests

While some residents found some of the functional fitness tests difficult. The sport coaches enjoyed delivery the tests and reported that residents enjoyed doing them. In retrospect, not all the tests needed to be carried out as some were unlikely to be affected by Mobile Me e.g. 'back scratch'.

9.1.7. MOVES

The use of the Sport England MOVES tool presents problems in older individual with pre-existing conditions as it assumes a healthy population to start and the prevention of health conditions. It is likely to over-estimate cost-effectiveness in this population. Additionally, MOVES does not account for a reduction in social care costs, which is relevant to this group.

9.1.8. Methodological issues: conclusion

The approach to evaluating this programme, with a relatively small funding pot, has been ambitious. The evaluation included a waiting list control group which involved additional work and coordination for all those involved, however, not attempting to measure the counterfactual in a population where physical and mental decline would be expected would be a serious limitation. The evaluation has also made use of a range of data collection methods, some of them innovative. Having a number of approaches to gathering data enabled the benefits and challenges of each with this participant group to be identified.

While evaluating the programme has presented challenges due to the high proportion of participants with ill health, disability, frailty or cognitive impairment, these challenges have been used as a springboard for developing and adapting tools with the aim of being inclusive. Along with such modifications, there were several other successes in the evaluation of the programme, in particular the good initial take-up of the questionnaire and the participants' enjoyment of taking part in the 'hands-on' element of the evaluation (the functional fitness tests).

Critical success factors were having deliverers (Active Norfolk) who were committed to gathering data; and who were flexible and skilled in working with the client group.

10. Discussion

10.1. Introduction

This section brings together the different sections of this report to discuss five facets of Mobile Me: recruitment, delivery, outcomes, sustainability, and legacy, as well as the evaluation itself. This is done using both the qualitative and quantitative findings, as well as relevant academic literature. Using multiple data sources in this manner enables the triangulation of findings (i.e. do results from different data sources support each other, and if so, why not), and can help facilitate the interpretation of results.

10.2. Recruitment and retention

Active Norfolk records show that, in total, 595 individuals attended at least one session of Mobile Me; the intervention group attended, on average, 6.4 sessions. It has been difficult to find a benchmark with which to compare these results; a review of research on physical activity interventions and older people by Chase et al. [23] comments on the paucity of information regarding the frequency of interventions, and gives no information about adherence. Another of Active Norfolk's programme, 'Fun and Fit', had mean attendance of 5.8 (out of 10) sessions. However, direct comparisons between these two programmes is problematic as Mobile Me participants, in effect, 'register' at the first session by completing the baseline evaluation questionnaire and are all included in analysis. Participants in Fun and Fit registered prior to the first session, and where those that registered but did not attend any sessions were included, average attendance was 4.8 sessions. Fun and fit was aimed at participants of all ages, and activity sessions took place in the community. Mobile Me took place with older people and national data shows that older people are less likely to take part in sport and physical activity. For Mobile Me sessions were delivered on the participants' doorsteps with the expectation that it would encourage participation, and in fact, many of those attending had mobility problems which would have made travel difficult. On balance, it appeared that Mobile Me was successful in recruiting and retraining participants, particularly as it is estimated that around 28% of residents in the intervention sites participated.

Mobile Me aimed to address barriers to participation in sport for older people. It did this by offering free, local, and highly accessible activity sessions developed following some consultation with residents. The Active Norfolk team delivering Mobile Me consciously avoided presenting it as a sporting intervention aimed at increasing physical activity in the

belief that this would deter participation. This is in keeping with evidence that older people value social contact and enjoyment when participating in physical activity [21] and that cognitive-behaviour change approaches such as goal-setting may not be the best approach in this group [23]. The approach taken by Active Norfolk is reflected in feedback from both stakeholder and residents who overwhelmingly described Mobile Me as sociable, and fun.

Active Norfolk's approach to recruiting residents was to build relationships, and an understanding of the project, with accommodation staff. This often appears to have worked well. For example, some sheltered housing wardens reported that they reminded residents about Mobile Me sessions on morning rounds. However, not all supported housing staff were equally engaged for a mixture of reasons, such as low levels of staffing at some sites, a lack of personal interest, and possibly physical activity delivery not fitting with higher-level organisational priorities. It is best that accommodation staff have a suitable knowledge base to enable them to support residents in becoming physically active, as there are understandable anxieties about encouraging physical activity in individuals with health conditions. A training session for staff, arranged partway through the project, was enthusiastically received and enabled staff to allay the fears of residents about doing gentle physical activity when they had conditions such as arthritis.

Feedback suggest that many sheltered housing residents attending Mobile Me were already participating in other activities at their respective sites, and that it could be difficult to attract 'new people' to these activities. Engaging with those who are already socially active is a positive outcome, as activities on offer at sites did not often include physical activity, and because activities are more likely to sustain where there is critical mass of participants. Feedback also suggests that Mobile Me was successful in attracting individuals who were socially isolated. However, residents reported that were some people that did not take part in any activities. It is not clear whether this is because these individuals do not wish to take part, or whether they need additional support to do so.

Professional stakeholders identified a number of emotional and perceptual barriers to residents taking part in physical activities, for example, perceptions that it was risky, that physical activity was not for older people, and a fear of embarrassment. However, feedback from some residents revealed that they were already motivated and ready to be active but faced tangible barriers to being so, particularly ill health and disability. These findings are supported by a review of the qualitative literature on participation in physical activity by older people (Franco et al. 2015) which identified two groups, one that believes that

physical activity is unnecessary or even potentially harmful, the other that recognises the benefits of physical activity but faces barriers to participation such as ill health.

10.3. Outcomes

a. Sedentary behaviour and physical activity

The principal outcome for Mobile Me was reduced sedentary behaviour. Using self-report measures, Mobile Me lowered sitting time at follow-up for those in the intervention compared to the control. Self-reported physical activity also increased in the intervention group. For this analysis all types of physical activity were combined (walking, moderate activity and vigorous activity) and converted to METS (Metabolic Equivalents) using the IPAQ protocol. This was because of the high number of participants recording zero minute's activity at baseline in any one of these measures.

Intervention participants also increased self-reported minutes taking part in sport when compared to control participants. This was a separate measure from IPAQ-E on the Mobile Me questionnaire. The difference in minutes taking part in sport reduced between the control and intervention across follow-ups, however, there was still a statistically significant difference at twelve months. The main type of sport delivered through Mobile Me was bowls which typically results in 2.5 METS [55], this is light physical activity.

No difference for minutes in physical activity categories (sedentary, light, moderate and vigorous) between intervention and control were found at follow-up in the analysis of accelerometer readings. These readings took place within a small sub-group of participants. The decision about which sites to allocated to this sub-group was taken by Active Norfolk, based on practical considerations. No accelerometers were handed out at residential care settings where there were fewer residents with the capacity to take part in the evaluation and given the issues they had experienced with other data collection in the care settings. One possible explanation for the difference in accelerometer and self-report results in terms of change in activity at follow-up is that the accelerometers were handed out at the first t intervention session and therefore recorded physical activity a week from this point, whereas self-report was for the seven days prior to the start of the intervention. In other words, the accelerometers did not record a true baseline. This is supported by the fact that the intervention group had higher baseline readings than the control group. Another explanation is that the accelerometer sub-group were not representative of the sample that completed the questionnaire. The AX3 accelerometers were the measurement tool with the least user-acceptance within this study.

These findings therefore indicate that Mobile Me increased physical activity and participation in sport; the increase in sport is likely to be in Mobile Me activities, which are predominantly light physical activity such as bowls. While government recommendations are for a target number of minutes of moderate and/or vigorous activity, government guidance also stresses that some activity is better than none in older people and recognises the implications of ill health and disability in this group [9]. Sparling et al. [11] also argue for a focus away from the 150 minutes moderate activity recommendation for individuals who cannot, or do not wish to, meet it, in order that these individuals are not deterred from undertaking some activity, whatever the intensity. However, where it is possible to progress individuals towards government recommendations without deterring them from physical activity, this should be done, as there are greater potential health benefits when the recommendations are met [9]. There were some attempts within Mobile Me to progress individuals to higher intensity sports, for example, to table tennis, and it appears that this took place more often as the sports coaches' confidence increased later in the project. However, this was never an explicit aim of the project. A question for the future is whether a more structured plan to enable some individuals to engage in higher intensity activity could, or should, be put in place. Equally, while there was a decrease in sitting time in the intervention group, participants still sat for a long time each day, and there was no emphasis in the project on breaking up sedentary time as per government guidance. Whether this could be addressed through a project such as Mobile Me is a further question for the future.

b. Social isolation and mental wellbeing

Feedback from professional stakeholders and residents alike was that the principal characteristic of Mobile Me was that it brought people together and that it was social and fun. Because Mobile Me activities are highly accessible, those with disabilities can play alongside their peers, also making it highly inclusive. While Mobile Me was considered in qualitative feedback to have reduced social isolation, a loneliness scale in the Mobile Me questionnaire showed no difference in change between control and intervention groups. However, as this scale has only three options, it may not have been sensitive enough to register change. The Warwick Edinburgh Wellbeing Scale has an item measuring social isolation as well as other aspects of wellbeing. The intervention group scored more positively on this scale on average across follow-ups, however, as this was not a statistically significant result this difference may be due to chance.

An observation study to evaluate Mobile Me with people living with moderate to severe dementia showed that Mobile Me sport coaches were able to use their skills and experience to transform sessions from a leisure activity into a therapeutic opportunity, and that Mobile Me was able to raise well-being. The use of activity sessions to promote well-being is one of the NICE recommendations for the non-pharmacological care and support for people living with dementia [19]. Harmer & Orrell [20] also reported that people living with dementia considered 'meaningful' activities to be those that are social and fun, and that this, in turn, is related to the quality of the experience.

While qualitative responses were that Mobile Me reduces social isolation, this is not clearly shown through quantitative methods. This may be due for a number of reasons, including possible limitations of the quantitative method; the social isolation question used in the questionnaire contained the term 'loneliness' and some individuals may find this stigmatising. Indeed, Active Norfolk staff observed that it was sometimes the case that an individual spoke of being socially isolated, yet this was not reflected in their questionnaire response. Interviews with participants also suggest that the effect of Mobile Me is dependent on context. Where an individual is already socially connected and active, they may consider that Mobile Me has made little difference to them, apart from being something fun to do. Where an individual is socially isolated, or inactive, Mobile Me may make a difference to that individual's quality of life. It is also possible that Mobile Me had a 'micro' effect in that it enabled social interaction during sessions, but that this did not translate into a change in an individual's overall feelings about their lives.

c. Health, physical functioning and balance

EQ-5D DL measures self-reported, health-related, quality of life, this includes mobility, pain, depression, self-care and ability to carry out activities of daily living. While the intervention group scored more positively than the control group across follow-ups, this difference was not statistically significant so may be due to chance. A significant association, however, was found with the number of Mobile Me sessions attended and improved EQ-5D DL scores. No difference was found for EQ-5D, VAS which measures self-reported general health on a scale of zero to a hundred.

Qualitative feedback from accommodation setting staff, sports coaches and residents suggests that physical functioning improved in some individual as a result of taking part in Mobile Me. Six functional fitness tests were performed by a sub-group of participants. Whiles score on all tests were better for the intervention when compared to the control at

follow-up, only two of these reached statistical significance, the arm-curl and the timed 'up and go', however the latter only reached statistical significance after a number of outliers were removed. The improvement in the number of arm curls might be expected given the nature of the intervention. Improvements in the up and go test were also found by Chase et al. [23] in a meta-analysis on the effects on physical functioning after physical activity interventions in older adults. Discussions with a physiotherapist involved in research at the UEA indicate that these two tests are likely to most replicate the activities involved in bowling.

There is some evidence that standing balance is a predictor of fall-risk and that change in standing balance is associated with physical activity. Piirtola & Era, for example found associations between standing balance and in five out of nine studies reviewed and suggest therefore that force platform data may be a predictor for subsequent falls. However, this is with the caveat that the small number of studies make it difficult to draw definitive conclusions about using this measurement method. In this study there was no difference in the force plate readings between control and intervention at follow-up; this could be because there was no reduction in fall-risk due to the programme, or due to the measurement method. Self-reported fear of falling however was less on average at follow-up for the intervention than the control and this scale, in validity-testing [63], was found to be significantly associated with a history of more than one fall. There is therefore mixed evidence about the effect of Mobile Me on fall-risk.

d. Outcomes: conclusion

While physical activity interventions for older people have been found to result in an increase in physical activity and in other outcomes, for example improved health and physical functioning [23], [28], [29], the interventions described in the literature are predominantly moderate-intensity, structured programmes which are overtly about improved health outcomes, and often appear to be delivered more than once a week. Mobile Me took place for two hours per week and involved light physical activity in a programme that focussed predominantly on enjoyment and social wellbeing. Despite this, there were improvements in some of the outcomes measured, including the primary outcome of reduced sedentary behaviour, along with increased physical activity, a reduction in a fear of falling, and a possible improvement in the timed up and go. It is also evident from the literature that, where it is measured, any increase in physical activity resulting from such interventions, normally drops off over the longer term [27][29] and in this evaluation, there was a statistically significant decrease in the amount of sports in the intervention group compared

to the control group over the follow-up period. This decrease was evident in other outcomes, although the results were not statistically significant. Mobile Me provides an example of a different approach to engaging older people in physical activity; the next steps are to identify the possibilities for increased intensity physical activity within the ethos of the programme, and to explore methods for ensuring there is not a drop-off in activity over time.

10.4. Delivery

Within sheltered housing coaches adopted the role of facilitators rather than proactive instructors, conscious they were entering a shared home. The instructors consciously aimed to generate a positive, fun and inclusive atmosphere, for example, using humour and banter. Like all groups of people, residents in group-homes have complex, interpersonal relationships and may have norms and boundaries that are not understood by others. In a very few sites, this led to initial resistance to receiving Mobile Me by influential resident. However, at site visits it was evident that there were high levels of warmth, support and humour between residents, and between residents and coaches.

Bowls activities enable a whole-group, social experience, where there is a focus for conversation and the motivating element of competition. When well delivered, they can be highly accessible to people of all levels of abilities. Several lessons were learnt about facilitating the sessions, and these have been drawn up into the best practice guidance with the aim of promoting inclusivity, engagement and wellbeing during delivery. Additional guidance was produced for facilitating sessions with people living with moderate to severe dementia, as this was found to require particular techniques and approaches not included in the general guidance. For example, the need to ensure that this group do not become disoriented by having to move to, and from, their seats. This guidance is being disseminated through the production of materials in different media, including a video.

Those living in care homes were often frail, disabled, in ill health and/or cognitively impaired. This resulted in a requirement for the sport coaches to be patient, persistent and adaptable. As a result of working with this group, the sports coaches reported redefining their concept of 'success', for example, a resident being able to pick up a ball who was previously unable to do so. They found working with frailer and more disabled individuals highly professionally rewarding.

Active Norfolk has a learning culture and its approach to delivery appears to have been

listening, flexible and adaptive; for example, the programme was altered to include more variety after feedback from residents. The programme logo was also chosen by a group of residents. There has also been a focus on partnership working through work with the steering group and through the relationships developed with the care provider on the programme. These are important aspects of project delivery that are easy to overlook when evaluating programmes where the emphasis may be placed on tangible elements of programme design.

10.5. Economic evaluation

Economic evaluation was carried out using Sport England's MOVES tool [55]. This is based on evidence about how physical activity reduces the prevalence of certain health conditions, and on the health-care savings that result because of this. This enables the financial savings due to an intervention to be assessed using the cost per Quality Adjusted Life Year (QALY) gained, and the cost per Disability Adjusted Life Year (DALY) avoided. Four scenarios were tested using a different combination of the following parameters: the number of participants completing the programme, ongoing participation in the project, and the time at which benefits would be realised. NICE generally use a 'Willingness-to-pay' per QALY gained value of £20,000 and this is a recommended threshold for judging the cost effectiveness of interventions using the MOVES programme. Three of four scenarios tested were cost effective per QALY; the most cost effective was £3,987. This scenario used the higher number of participants, the longer participation period, and the longer time to realise benefits (or 'time horizon'). The scenario that was not cost-effective was the one using resulted years to accrue benefits (£23,236 per QALY gained). When using the cost per DALY, figures were similar but slightly lower, ranging from £5,267 to £20,720. One assumption of the scenarios used was that Mobile Me costs were one-off, this was because the aim of the programme was that it became sustainable after initial delivery; if costs were not one-off, none of the models would be cost effective. One important caveat about using the MOVES tool for Mobile Me is that it does not take into account savings in social care costs, for example, the savings that may accrue from avoiding additional care in the home or a move to residential care. Another caveat is that MOVES is modelled on the health profile of the population of the age group in question (61+) and is not designed for populations that may have higher levels of pre-existing conditions. Because of this, MOVES may not estimate the cost-effectiveness for Mobile Me as well as with a general population sample.

Active Norfolk are currently testing a model of Mobile Me whereby care staff are trained to deliver activities from the start, rather than Active Norfolk delivering 10 sessions at the

outset. This is a more economical approach, however, while this has the potential to be effective in residential care sites, it may not be suitable for sheltered housing accommodation where there is not normally the capacity for staff to deliver activities.

10.6. Sustainability

Three approaches to sustainability were adopted for Mobile Me. At sheltered housing sites resident-volunteers were encouraged to organise sessions. These 'resident-organisers' did not necessarily have an interest in bowling or physical activity, but rather an interest in running activities, whether this was for personal fulfilment or for the common good. These residents often appeared to have a high level of skill and experience in running activities; they knew their audience, and some had been running activities for many years. This approach was successful in housing association run sites but has been less successful in local authority run sites, where there is less staff presence and possibly less social capital. However, even where Mobile Me is sustained in this way, it is likely that some continued support is needed as residents move on and circumstances change, whether this is from the housing provider or from an external organisation.

In another approach, a partnership with a third-sector provider, Age UK Norwich, was developed. The latter provided support in running Mobile Me activities for four local authority run sheltered housing sites with some success. However, it does not appear to have been easy to achieve consistent volunteer cover. Age UK's activities sessions at a leisure centre, also run by volunteers, has successfully recruited from Mobile Me sites, providing an alternative conduit to sustainability. This model may not, however, be suitable for less mobile residents, or where there are limited transport options.

Active Norfolk's partnership with the residential care setting partner on this project has resulted in physical activity being embedded in strategy, and its delivery mainstreamed across its Mobile Me sites and beyond to the rest of Norfolk. For example, the care provider has purchased bowls equipment for a further 35 of its sites in Norfolk and recruited a physical activity coordinator. This presents a potential model to test in other similar organisations.

Planning sustainability routes into programmes such as Mobile Me can be difficult because of the changeable nature of supported housing provision [6] and the volatility of social programmes and policy (Rossi et al. 2004) For example, during the delivery of Mobile Me, the local authority in Norfolk announced the withdrawal of its funding for housing support staff in sheltered housing. Any model of sustainability should therefore focus on how to

embed resilience through promoting culture change within organisations that provide support to older people, including supported housing providers.

10.7. Legacy

As an extension to Mobile Me, training for staff and grants for equipment was made available to supported housing organisations in Norfolk wishing to deliver sports to older people. The lessons from Mobile Me and best practice guidance developed from it has contributed to this stream of work.

Mobile Me has contributed to a culture change in Active Norfolk through an increased focus on provision for older people across its programmes. Through Mobile Me, it has also built relationships with organisations working with, or representing, older people across Norfolk. These partnerships are acting as a platform for new programmes of work promoting physical activity for older people; for example, the EU SAIL programme (European Union Staying Active and Independent for Longer, funded through 'Two Seas' Interreg programme).

10.8. Evaluation

This was a complex evaluation involving different data collection methods with sub-groups and a waiting-list control group. Further, the evaluation was of a complex project, with delivery taking place in different settings, in stages, and over two to three years. A monthly catch-up between the UEA and Active Norfolk was arranged after the first few months, and this assisted with communication. The researcher also undertook site visits to observe evaluation measures in use and discuss their implementation with Active Norfolk. However, managing the evaluation and data collection took considerable effort from both Active Norfolk and UEA.

The multifaceted approach adopted, however, while burdensome was useful in terms of testing out approaches, and the lessons of learnt can help inform future evaluations. For example, in retrospect, the number of functional fitness tests could have been reduced, as it was unlikely that Mobile Me participation would impact some of the tests, such as the 'back scratch'. Equally, the number of questions on the Mobile Me questionnaire could have been reduced. Other examples are issues identified with use-acceptability with the accelerometers where simple changes to the wristbands may improve take-up.

For very frail or disabled residents Mobile Me sometimes brought about changes that may

not be evident or measurable in the evaluation. Some participants who were unable to perform functional fitness tests at baseline felt confident enough to do so at follow-up; this is an improvement that is not captured in the statistical analysis, as a baseline reading is required. The MOVES tool for economic analysis has limitation when applied to specific populations that may have a health profile that differs significantly from the general population. The IPAQ-E, although designed for an elderly population, does not capture light physical activity that may result from Mobile Me activities such as bowls.

The residential care home population was found to have higher levels of frailty, ill health and disability than sheltered housing settings, and this created challenges when collecting data. The Mobile Me questionnaire was adapted for those with mild to moderate cognitive impairment and was successfully used in this group. However, those who were more severely impaired were not able to take part in the main evaluation due to their limited capacity. For this group of individuals living with moderate to severe dementia a separate evaluation in the form of an observation study, was developed. As these individuals did not have the capacity to consent, this required approval from a national research ethics committee in addition to approval from a consultee for each participant (i.e. a relative or friend). This process required considerable additional input and commitment from Active Norfolk, the care setting involved, and UEA. For these reasons, this type of evaluation is not often undertaken. However, the belief of those involved was that it is important to evaluate with these individuals to ensure that they get the best services possible and in order to share both the evaluation method and its findings to others working in the field.

Due to loss to follow-up, sample numbers are low for objective measures (which took place with sub-groups) and smaller sample sizes reduce the power of statistical tests to detect statistically significant results. Control sites in this evaluation also had one less follow-up than intervention sites; this has led to low numbers on some occasions; in future evaluations this should be avoided if possible.

The close joint working that developed between Norfolk and UEA over the course of the project has the potential to influence the evaluation findings, however, Active Norfolk have kept distance from the analysis and report writing process, and the UEA team have been careful to reflect on this issue to mitigate its effect, insofar as this is possible.

Finally, Mobile Me took place largely in three housing providers in Norfolk. While they represent a good range of housing types, they may not be representative of housing

providers more generally, or of housing providers in other areas of the country, particularly as they were also all relatively large organisations.

11. Key findings and recommendations

11.1. Key findings:

- Mobile Me programme design was in line with recommendations in the literature about the drivers for older people taking part in physical activity; it is social and fun.
- Mobile Me successfully recruited older people in supported housing accommodation, and a high proportion attended most sessions.
- Mobile Me activities were highly accessible, but some knowledge of adaptations is required. Information about this and other aspects of delivering Mobile Me have been drawn up into best practice guidance.
- Housing support staff had a role in encouraging participation; a training day helped them to do this by motivating them and giving them the appropriate knowledge. Staff also need the time to do this, and support from their lead organisation.
- Sedentary behaviour in the intervention group reduced, which was the primary outcome for the programme. Physical activity and sport also increased, although it is likely that a proportion of this was light physical activity, this may be all that is possible for some individuals.
- The arm curl improved in the intervention group when compared to the control. There is also some evidence for an improvement in another test, the 'timed up-and-go'. There were anecdotal reports of improved functioning from residents and professional stakeholders.
- Self-reported fear of falling reduced. However, an objective measure did not record any improvement in standing balance, which has been found to be related to fall risk in some studies.
- Qualitative feedback from professional stakeholders and residents suggest that residents felt less socially isolated due to Mobile Me, although scores on a loneliness scale did not improve. It is possible that this scale may not have been responsive enough to register change. While scores on a wellbeing scale improved, these were borderline non-statistically significant.
- An observation study indicated that those with moderate to severe dementia experience increased well-being during Mobile Me sessions; to achieve this, sessions should be inclusive, failure-free and fun. NICE guidance for non-pharmacological interventions for

this group recommends activities that increase wellbeing.

- Interviews with participants suggest that the perceived benefits of Mobile Me depend on individual circumstances. Those already socially connected and active may not find any benefit other than enjoyment; individuals who are socially isolated or inactive may feel that Mobile Me has brought about positive outcomes.
- Mobile Me differs from many other physical activity programmes described in the literature as it is unstructured and low-intensity. Despite this, there were improvement in some of the outcomes measured. Mobile Me provides an example of a different approach to engaging older people in physical activity.
- It is also evident from the literature that, where it is measured, any increase in physical activity resulting from interventions, normally drops off over the longer term, and this also appeared to be the case in Mobile Me.
- Mobile Me was sustained in a high proportion of sheltered housing sites, and in all care settings. Mobile Me sustained better where there was organisational buy-in. Resident-volunteers are an important component of sustainability in sheltered housing sites.
- While off-site provision of physical activity successfully attracted residents, it may not be suitable for those without the means or confidence to travel.
- Mobile Me was cost effective in three out of four scenarios tested using the Sport England MOVES model. However, this model does not account for reduced social care costs, which may be an important economic outcome for projects such as Mobile Me. The MOVES model may also over-estimate cost-effectiveness where the population have pre-existing health conditions. A new approach to delivering Mobile Me, whereby Active Norfolk train and equip care staff to deliver activities is being tested. This may be more cost-effective, but it has yet to be evaluated for efficacy and it may not be appropriate for sheltered housing settings where staffing levels are lower.
- It was found that even evaluation tools developed for older adults were not always suitable for those living in supported housing due to the high levels of ill health, disability and frailty. For example, the IPAQ-E (for the elderly) does not measure light physical activity.

11.2. Recommendations:

- Continue using the Mobile Me model of fun, accessible, social activity as a gateway into physical activity for older, inactive people.
- Consider how, and whether, some individuals can be progressed to higher levels of activity and towards meeting government guidelines, without losing the ethos of the programme.

- Consider how residents can be encouraged to break up sedentary time.
- Continue working with organisations to raise awareness of the benefits of physical activity for older people, and provide practical help supporting these organisations to embed physical activity within their services.
- Resident-volunteers within sheltered housing sites have skills and experience in delivery activities to their peer; consider whether they can be further supported and encouraged to maintain, or extend, the programme.
- Think about how the programme can be kept fresh to avoid drop-off, for example, through the Mobile Me Festival, through intra-site competitions, or similar approaches.
- Consider how different elements of the programme, for example, the Mobile Me Festival, might be funded in the long term.

12. Conclusion

Active Norfolk's Mobile Me aimed to break down the barriers to older, inactive people taking part in physical activity and sport. Stakeholders and participants reported that the programme's defining characteristic was that it was fun and sociable; these are two of the key ingredients identified in the literature as being drivers for participation in physical activity by older people.

A high proportion of those taking part were disabled or in bad health. Mobile Me activities were highly accessible and enabled these individuals to take part in sport along with their peers. While these participants are unlikely to be able to meet the government recommended activity levels, the guidance acknowledges the need to take account of individual circumstance and recognises that any activity is better than none. For some participants, however, a programme such as Mobile Me could be a gateway to higher levels of activity; the next steps might be to investigate whether and how a more structured programme of progression could be embedded to enable this but without losing the ethos of the programme.

Mobile Me activities were sustained successfully in a high proportion of housing sites. Three models of sustainability were tested, but the success of any of these were essentially predicated on the host organisations being convinced of, and committed to, encouraging physical activity among their tenants. For consideration in future is how the programme can

continue to be sustained and extended working with the host organisations to bring about culture change around the importance of physical activity for older people.

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14. Appendices

14.1. Appendix A: Roll-out of Mobile Me

Status: C=Cancelled (after control phase), A=additional

Control?	Status	Site code	Tranche	Time	Type
		pg	Oct 2015	am	Sheltered
		ab	Oct 2015	pm	Sheltered
		dc	Oct 2015	am	Sheltered
		mg	Oct 2015	pm	Sheltered
		li	Oct 2015	am	Sheltered
		jgc	Oct 2015	pm	Sheltered
		cc	Jan 2016	am	Sheltered
		hnc	Jan 2016	pm	Sheltered
		mac	Jan 2016	am	Sheltered
		tw	Jan 2016	pm	Sheltered
		ec	Jan 2016	am	Sheltered
		bv	Jan 2016	pm	Sheltered
		bc	April 2016	am	Care home
		drc	April 2016	pm	Care home
		rv	April 2016	am	Care home
		e	April 2016	pm	Care home
		bcv	April 2016	am	Care home
		bcv	April 2016	pm	Care home
		anc	July 2016	am	Sheltered
		fc	July 2016	pm	Sheltered
		ac	July 2016	am	Sheltered
		b	July 2016	am	Sheltered
		gcc	July 2016	pm	Sheltered
	C	dpc	Cancelled		Sheltered
X		hc	Oct 2016	am	Sheltered
X		wvr	Oct 2016	pm	Sheltered
X		mc	Oct 2016	am	Sheltered
X		wa	Oct 2016	pm	Sheltered

	A	w	Oct 2016	am	Community group
X	C	jc	Cancelled		Sheltered
X	C	hac	Cancelled		Care home
X		dh	Feb 2017	pm	Sheltered
X		glv	Feb 2017	am	Care home
X		sd	Feb 2017	pm	Care home
X		sh	Feb 2017	am	Care home
X		fr	Feb 2017	pm	Sheltered
	A	lc	Feb 2017	pm	Sheltered
X	C	hpc	Cancelled		Sheltered
	A	abc	April 2017	pm	Sheltered
X		ms	April 2017	am	Sheltered
X		fec	April 2017	am	Sheltered
X		ml	April 2017	pm	Sheltered
		mr	April 2017	am	Day centre
X		mec	April 2017	pm	Sheltered
X	C	lbc	Cancelled		Sheltered
X	C	sc	Cancelled		Sheltered
		bkc	July 2017	pm	Sheltered
X		sj	July 2017	am	Sheltered
X		si	July 2017	pm	Sheltered
X		rc	July 2017	am	Sheltered
X		wc	July 2017	am	Sheltered
X		sr	July 2017	pm	Sheltered
X	C	sbc	Cancelled		Sheltered
	A	awc	Oct 2017	am	Sheltered
		hac	Oct 2017	am	Care Home
	A	dgh	Oct 2017	pm	Sheltered
	A	vec	Oct 2017	pm	Sheltered
	A	hdc	Oct 2017	pm	Sheltered

14.2. Appendix B: Mobile Me questionnaire



Mobile Me: Questionnaire (V4)

Activity reference: _____

Location reference: _____

Date: _____

Notes: _____

This questionnaire is to help us evaluate the activity sessions run by Active Norfolk through 'Mobile Me'. Your details will not be used for any other reason.

1. Your contact details

First name: _____ Last name: _____

Address: _____

Postcode: _____

Phone or email: *(optional)* _____

2. About you

Date of birth: __ / __ / 19 __

Gender: Male Female

Ethnic group: White Mixed/Multiple Ethnic Groups
 Asian/Asian British Black/African/Caribbean/Black British
 Other Ethnic Group Rather not say

3. Your medical conditions and disabilities

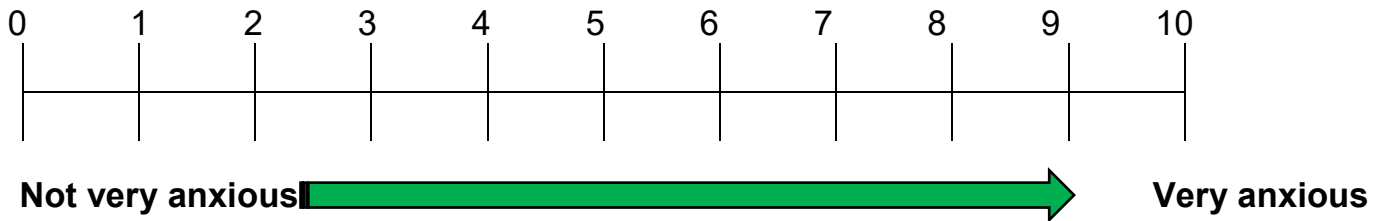
Do you have any medical conditions or disabilities?

No I don't know Yes (please write them below)

Please list any medical conditions or disabilities below:

4. Your fear of falling

Please mark with a cross (X) on the scale to tell us how **worried** you are about **falling over and injuring yourself**



5. Your physical activity

5a. 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 and from places, but should not include housework or physical activity that is part of your job.

Please tick one box: 0 1 2 3 4 5 6 7

5b. What sporting activities are you doing **where you live now**?

- Any of type bowling e.g. carpet bowls, new age curling, boccia
- Table tennis
- Seated exercise
- Dance
- Other: _____
- None

5c. What sporting activities are you doing **elsewhere**?

- Any of type bowling e.g. carpet bowls, new age curling, boccia
- Table tennis
- Seated exercise
- Dance
- Other: _____
- None

6. More about your physical activity

On the next page we are going to ask you some more questions about physical activity, please read these notes first:

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives.

- The questions will ask you about the time you spent being physically active in the last 7 days.
- Please answer each question even if you do not consider yourself to be an active person.
- To describe the intensity of the physical activity, two terms (Moderate and Vigorous) are used:

Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal.

6a. The first question is about the time you spent sitting during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

During the last 7 days, how much time did you spend sitting during a day?

____ **hours** ____ **minutes**

6b. Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

During the last 7 days, on how many days did you **walk for at least 10 minutes** at a time?

____ **Days** **No days**

How much time did you usually spend walking on one of those days?

____ **hours** ____ **minutes**

6c. During the last 7 days, on how many days **did you do moderate physical activities** (explanation above) like gardening, cleaning, bicycling at a regular pace, swimming or other fitness activities.

Think *only* about those physical activities that you did for at least 10 minutes at a time. Do not include walking.

____ **Days** **No days**

How much time did you usually spend doing moderate physical activities on one of those days?

____ **hours** ____ **minutes**

6d. During the last 7 days, on how many days did you do **vigorous physical activities** (explanation above) like heavy lifting, heavier garden or construction work, aerobics, jogging/running or fast bicycling?

Think *only* about those physical activities that you did for at least 10 minutes at a time.

____ **Days** **No days**

How much time did you usually spend doing vigorous physical activities on one of those days?

____ **hours** ____ **minutes**

7. How you feel

7a. How often do you feel lonely?

(1) Hardly ever or never

(2) Some of the time

(3) Often

7b. 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 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been feeling useful	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been feeling relaxed	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been dealing with problems well	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been thinking clearly	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been feeling close to other people	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>
I've been able to make up my own mind about things	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)

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8. Taking part in sport

We would like you to think about any sport that you have done in the last 7 days. By sport we mean any competitive or non-competitive sporting activity, including sessions of deliberate exercise such as running or jogging. Think only about those sports or exercises that you did for at least 10 minutes at a time.

During the last 7 days, on how many days did you **take part in any sport**?

_____ Days No days

How much time did you usually spend doing sport on one of those days?

_____ hours ____ minutes

9. Your health today

By placing a tick in one box in each group below, please indicate which statements best describe your own health state **today**.

Mobility

- (1) I have no problems in walking about
- (2) I have slight problems in walking about
- (3) I have moderate problems in walking about
- (4) I have severe problems in walking about
- (5) I am unable to walk about

Self-Care

- (1) I have no problems washing or dressing myself
- (2) I have slight problems washing or dressing myself
- (3) I have moderate problems washing or dressing myself
- (4) I have severe problems washing or dressing myself
- (5) I am unable to wash or dress myself

Usual Activities (e.g. work, study, housework, family or leisure activities)

- (1) I have no problems doing my usual activities
- (2) I have slight problems doing my usual activities
- (3) I have moderate problems doing my usual activities
- (4) I have severe problems performing my usual activities
- (5) I am unable to do my usual activities

Pain / Discomfort

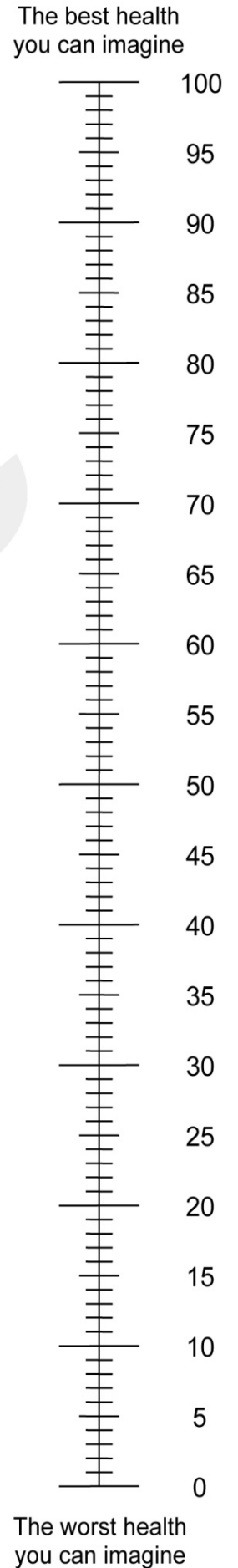
- (1) I have no pain or discomfort
- (2) I have slight pain or discomfort
- (3) I have moderate pain or discomfort
- (4) I have severe pain or discomfort
- (5) I have extreme pain or discomfort

Anxiety and depression

- (1) I am not anxious or depressed
- (2) I am slightly anxious or depressed
- (3) I am moderately anxious or depressed
- (4) I am severely anxious or depressed
- (5) I am extremely anxious or depressed

- We would like to know how good or bad your health is **TODAY**.
- This scale is numbered from 0 to 100.
- 100 means the best health you can imagine.
0 means the worst health you can imagine.
- Mark an X on the scale to indicate how your health is **TODAY**.
- Now, please write the number you marked on the scale in the box below.

YOUR HEALTH TODAY =



10. Your thoughts about the *Mobile Me* activities:

The next questions ask what you felt about the *Mobile Me* activity sessions.

10a. How satisfied were you with the *Mobile Me* sessions you attended?

- (5) Very satisfied
- (4) Somewhat satisfied
- (3) Neither satisfied nor dissatisfied
- (2) Somewhat dissatisfied
- (1) Very dissatisfied

10b. What did you **like** about the *Mobile Me* activities?

10c. What **didn't you like**? What are **your ideas** for making the activities better?

10e. Has taking part in the activity sessions made **any difference to you**? If so in what way? e.g. For example, has it helped with your daily activity, social life, or confidence?

10f. Will you be **continuing the activity sessions**?

- Yes: doing the same activity
- Yes: doing a similar activity (What is this: _____)
- No
- Not sure

If you answered 'No' or 'Not sure', can you tell us why?

Thank you very much for your time