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# Dance to Health 'Phase 1 roll-out [test and learn]' evaluation

## *Final report*

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## **EXECUTIVE SUMMARY**

### **Background**

Dance to Health is a nationwide pioneering falls prevention dance programme for older people. The programme was designed with the intention of addressing older people's falls and problems with existing services. It targets health, artistic and social benefits plus health savings.

### **Aim**

To conduct a thorough review of the programme, in order to understand the impact as well as the success of the programme. There were two clear objectives:

- Evaluate whether Dance to Health provides the health system with an effective and cost-effective means to address the issue of older people's falls; and
- Evaluate whether Dance to Health helps older people in danger of falling overcome lost confidence, reduced independence and increased isolation.

### **Method**

A mixed methods approach was adopted that included quantitative, qualitative and econometric research. At the time of the research, all participants that were taking part in Dance to Health sessions across 6 geographical regions were eligible to take part. Primary outcome measures included the impact on falls, positive side-effects (mentally and physically), patient pull, attendance & adherence, fidelity to existing falls prevention programmes and cost effectiveness.

### **Results**

Findings from the research show that Dance to Health is helping older people in danger of falling overcome lost confidence, reduced independence and increased isolation. There was a 58% reduction in the number of falls, positive improvements in participants' physical and mental wellbeing, including improved Timed Up and Go (TUG) times (an average reduction in time of 20%), a reduced fear of falling (over 10% improvement in the percentage of individuals classed as "low concern") and a small improvement in Patient Activation Measure (PAM) scores (an increase of over one point, from a score of 71.1 to a follow-up average score of 72.3). Additionally, based on the analysis conducted, there is a potential cost saving of over £196m over a 2 year period, of which £158m is a potential cost saving for the NHS. Dance to Health's fidelity to existing physiotherapy programmes was also confirmed.

### **Conclusion**

The evidence within this report outlines that Dance to Health offers the health system an effective and cost-effective means to address the issue of older people's falls.

# 1. INTRODUCTION

## 1.1 Current falls programmes and literature

### The impact of falls

In the context of existing evidence around falls amongst older people, which shows that one third of people aged 65 plus, and half of people aged 80 plus, fall at least once per year<sup>1</sup>, we recognise and support the importance of falls prevention programmes to help to reduce the frequency of falls and subsequently improve both the quality of life of older people and the financial burden on the NHS. Falls are a major challenge for the health system, costing the NHS £2.3 billion per year<sup>1</sup>. Broken down further, in terms of annual activity and costs, some key statistics that help demonstrate the impact of falls can be seen below:

- Falls represent the most frequent and serious type of accident in people aged 65 and over<sup>2</sup>
- In 2016-17 there were 316,669 hospital admissions in England of people aged 65 and over because of falling; the equivalent of more than 867 each day across the country<sup>3</sup>
- Fractures from falls account for over 4 million hospital bed days each year in England alone in people aged 65 and over<sup>4</sup>
- It is estimated the average cost of simply being an inpatient following a fall is £2600, whilst falls that result in moderate or severe harm will lead to much greater costs for hospitals<sup>5</sup>
- Unaddressed falls hazards in the home are estimated to cost the NHS in England £435m<sup>6</sup>
- The total cost of fragility fractures to the UK has been estimated at £4.4bn, which includes £1.1bn for social care<sup>7</sup>
- The vast majority of hip fractures (more than 95%) are caused by falling<sup>8</sup>
- Falls in hospitals are the most commonly reported patient safety incident, with more than 240,000 reported in acute hospitals and mental health trusts in England and Wales<sup>9</sup>

In addition to being a major cause of pain and injury, they are traumatic for older people, destroying confidence, increasing isolation and reducing independence. The Help the Aged Spotlight Report

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<sup>1</sup> NICE. 2013. *Falls in older people: assessing risk and prevention*. URL: <https://www.nice.org.uk/guidance/cg161>

<sup>2</sup> Age UK. 2010. *Stop falling: start saving lives and money*. London: Age UK

<sup>3</sup> The Royal Society for the Prevention of Accidents. 2018. *Help older people stay safe with new initiative*. URL: <https://www.rospa.com/media-centre/press-office/press-releases/detail/?id=1592>

<sup>4</sup> Royal College of Physicians. 2011. *Falling Standards, broken promises: report of the national audit of falls and bone health in older people 2010*. URL: <https://www.rcplondon.ac.uk/projects/outputs/falling-standards-broken-promises-report-national-audit-falls-and-bone-health>

<sup>5</sup> Oxford Academic Health Science Network. 2018. *Musculoskeletal, Falls, Fractures & Frailty A summary of projects from across the AHSN network*. URL: <http://www.oxfordahsn.org/wp-content/uploads/2018/02/MSK-Falls-Fractures-Frailty-AHSN-summary-cover-with-text.pdf>

<sup>6</sup> Nicol S, Roys M, Garrett H, BRE. 2011. *The cost of poor housing to the NHS*. URL: [www.bre.co.uk/filelibrary/pdf/87741-Cost-of-Poor-Housing-Briefing-Paper-v3.pdf](http://www.bre.co.uk/filelibrary/pdf/87741-Cost-of-Poor-Housing-Briefing-Paper-v3.pdf)

<sup>7</sup> Svedbom A, et al. 2013. Osteoporosis in the European Union: a compendium of country specific reports. *Arch Osteoporos*, 8, 1-2. URL: [www.ncbi.nlm.nih.gov/pmc/articles/PMC3880492/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3880492/)

<sup>8</sup> Parkkari J, et al. 1999. Majority of hip fractures occur as a result of a fall and impact on the greater trochanter of the femur: a prospective controlled hip fracture study with 206 consecutive patients. *Calcif Tissue Int*; 65:183-7.

<sup>9</sup> Royal College of Physicians. 2015. *National audit of inpatient falls report 2015*. URL: [www.rcplondon.ac.uk/projects/outputs/naif-audit-report-2015](http://www.rcplondon.ac.uk/projects/outputs/naif-audit-report-2015)

(2008)<sup>10</sup> describes that one in ten people who fall become afraid to leave their homes in case they fall again, whilst after a fall an older person has a 50% probability of having their mobility seriously impaired and a 10% probability of dying within a year.<sup>11</sup> However, falls are not an inevitable part of ageing.<sup>2</sup> <sup>12</sup> There is a mass of evidence (including findings related to the benefits of Dance to Health detailed within this report) that exercise programmes designed to improve strength and balance can lead to a reduction in falls.

### Fall rates and healthy ageing

Thirty percent of people aged 65 and over and 50% of those aged 80 and over are likely to fall at least once a year, whilst in the last two years more than a quarter (26.3%) of adults over the age of 60 and nearly four in ten (38%) adults over the age of 80 reported a fall.<sup>13</sup>

It is forecast that within two years nearly 1,000 elderly people every day will be taken into hospital after suffering a fall.<sup>14</sup> This is in part because we are living longer. The number of people aged 65 and over is projected to rise by over 40% in the next 17 years to more than 16 million, meaning that the threats posed by elderly falls and the demands placed on public healthcare will only increase.<sup>15</sup> Arts participation is a vital part of healthy ageing.<sup>16</sup>

The NHS intends to focus on working on falls and fracture prevention, where we know that a 50% improvement in the delivery of evidence-based care could deliver £100 million in savings.<sup>17</sup> Additionally, it is imperative to acknowledge that the importance of falls prevention has been widely recognised by Public Health England in particular. In turn, key resources have been produced that have helped to shape our knowledge, understanding and learning on the topic of falls. In terms of this research, two key resources in particular have been utilised to help shape this evaluation:

- Public Health England. 2017. Falls and fracture consensus statement supporting commissioning for prevention; and
- Public Health England. 2018. A Return on Investment Tool for the Assessment of Falls Prevention Programmes for Older People Living in the Community.

### The importance of staying active

Lots of organisations describe the benefits of staying active in order to reduce the risk of falling. For example, Public Health England states that "*older adults at risk of falls should incorporate physical*

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<sup>10</sup> Help the Aged. 2008. *Spotlight Report - Spotlight on older people in the UK*. URL: [http://www.ageuk.org.uk/documents/en-gb/professionals/government-and-society/id7236\\_spotlight\\_report\\_2008\\_pro.pdf?dtrk=true](http://www.ageuk.org.uk/documents/en-gb/professionals/government-and-society/id7236_spotlight_report_2008_pro.pdf?dtrk=true)

<sup>11</sup> Help the Aged. 2008. *Towards Common Ground. The Help the Aged manifesto for lifetime neighbourhoods*. London: Help the Aged.

<sup>12</sup> Age UK. 2019. *Improving Later Life*. London: Age UK

<sup>13</sup> The Institute for Fiscal Studies. 2016. *Wave 7. The Dynamics of Ageing: Evidence from the English Longitudinal Study of Ageing 2002-15*. London: The Institute for Fiscal Studies.

<sup>14</sup> Dalton, J. 2018. *Within two years nearly 1,000 elderly people a day will be taken into hospital after a fall, council chiefs warn*. The Independent.

<sup>15</sup> Office for National Statistics. 2015. *National population projections for the UK, 2014-based*. URL:

[www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2015-10-29](http://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2015-10-29)

<sup>16</sup> All-Party Parliamentary Group on Arts, Health and Wellbeing. 2017. *Creative Health: The Arts for Health and Wellbeing: The Short Report*. URL: [http://www.artshealthandwellbeing.org.uk/appg-inquiry/Publications/Creative\\_Health\\_The\\_Short\\_Report.pdf](http://www.artshealthandwellbeing.org.uk/appg-inquiry/Publications/Creative_Health_The_Short_Report.pdf)

<sup>17</sup> NHS. 2019. *The NHS Long Term Plan*. London: NHS.

activity to improve balance and coordination on at least two days a week".<sup>18</sup> The Centre for Ageing Better calls for the government to more widely promote the benefits of physical activity for older people and support more people to maintain physical activity, in order to delay frailty and reduce falls (in their document *Priority Actions for Better Later Lives - General Election May 2017*).<sup>19</sup> NICE Guidelines (2013) on the prevention of falls recommends muscle-strengthening and balance training programmes.<sup>1</sup> Existing evidence around falls prevention exercise programmes demonstrates the potential of these programmes to improve quality of life and achieve significant cost savings.<sup>20</sup> By offering a programme of activity in order to improve their health and prevent falls, it gives individuals the capability to manage their own health and wellbeing in order to reduce the risk of falls, rather than facing the consequences of falls once they have occurred - the meaningful involvement of older people in falls prevention will increase its likelihood of success.<sup>12</sup>

The evidence reported by Age UK suggests that falls prevention exercise programmes must be the correct type, duration and intensity, in order to be successful.<sup>12</sup> <sup>20</sup> This was reconfirmed by Public Health England in 2017.<sup>21</sup> In terms of the type of programmes, they must include exercises which aim to counter the effects of muscle deterioration in those muscle groups that help people to keep upright and to walk without swaying.<sup>21</sup> Additionally, therapeutic exercise is a very effective intervention in terms of reducing falls, as balance impairment and muscle weakness caused by ageing and disuse are the most prevalent modifiable risk factors for falls.<sup>21</sup> In addition, whilst programmes aimed at both primary prevention (the prevention of fall-related injuries involving reducing the occurrence of falls<sup>22</sup>) and secondary prevention (the prevention of fall-related injuries involving preventing injuries when falls occur<sup>22</sup>) should focus on building strength and balance, they may need to vary in the support provided in that secondary prevention programmes may need more targeted support in order to meet individual needs.<sup>21</sup>

Despite the huge potential exercise programmes hold in helping to make dramatic improvements in quality of life and achieve significant cost savings, older people continue to have limited access to evidence-based falls prevention programmes.<sup>20</sup> Where these programmes are available, the vast majority are altered or scaled down to an average duration of 12 weeks or less<sup>23</sup>, yet we know that a 'dose' of at least 50 hours is necessary to reduce falls.<sup>24</sup> Ongoing commitment to staying active (maintaining/sustaining activity) is also required, as there is evidence that suggests that any improvements from physical activity can wear off within 12 months if the activity ceases.<sup>25</sup> Ageing muscle can still be trained – in other words, it is never too late to get active. It is therefore essential

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<sup>18</sup> Public Health England. 2014. *Everybody active, every day. An evidence based approach to physical activity*. URL: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/374914/Framework\\_13.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/374914/Framework_13.pdf)

<sup>19</sup> Centre for Ageing Better. 2017. *Priority Actions for Better Later Lives - General Election May 2017*. URL: <https://16881-presscdn-0-15-pagely.netdna-ssl.com/wp-content/uploads/2017/05/Manifesto.pdf>

<sup>20</sup> Charters, A. 2013. *Falls prevention exercise - following the evidence*. URL: [http://www.ageuk.org.uk/Documents/EN-GB/For-professionals/Research/Falls\\_Prevention\\_Guide\\_2013.pdf?dtrk=true](http://www.ageuk.org.uk/Documents/EN-GB/For-professionals/Research/Falls_Prevention_Guide_2013.pdf?dtrk=true)

<sup>21</sup> Public Health England. 2017. *Falls and fracture consensus statement supporting commissioning for prevention*. London: Public Health England.

<sup>22</sup> World Health Organization. 2006. *Falls Prevention for Older Persons*. URL: <https://www.who.int/ageing/projects/EMRO.pdf>

<sup>23</sup> Royal College of Physicians. 2011. *National audit of falls and bone health in older people*. London: Royal College of Physicians.

<sup>24</sup> Sherrington et al. 2011. 'Exercise to prevent falls in older adults: an updated meta-analysis and best practice recommendations.' *New South Wales Public Health Bulletin*.

<sup>25</sup> Wolf, B. et al. 2001. Effect of a physical therapeutic intervention for balance problems in the elderly: a single-blind, randomized, controlled multicentre trial. *Clinical Rehabilitation*, 15 (624-636)

to encourage and support the commissioning of services which reduce risk of falls and fragility fracture.<sup>21</sup>

### **1.1.1 Evidence-based exercise programmes**

#### Current programme provision

Dance to Health uses two evidence-based prevention programmes; these are the Otago Exercise Programme (OEP, herein referred to as Otago) and the Falls Management Exercise programme (herein referred to as FaME). Through a partnership with Later Life Training, which trains exercise professionals to work with older people, dancers have been trained in Otago and FaME to offer a fun, sociable and creative way for older people to participate in falls-prevention exercise. These programmes have been shown to be effective for both primary and secondary prevention of falls and non-vertebral fractures in older people, but with greater efficacy in those who have a history of recurrent falls or who have a balance or gait deficit.<sup>21</sup>

#### Otago Exercise Programme (Otago)

A Cochrane review of falls prevention strategies<sup>26</sup> concluded that exercise programmes that target two or more components of strength, balance, flexibility or endurance, reduce the rate of falls and the number of people falling. One programme that encompasses all of these aspects is Otago. This is a home-exercise programme, combining strength and balance retraining exercises to prevent falls in older people.<sup>27</sup> The programme is the result of many years of research, first identifying risk factors for falls and then testing potential interventions.<sup>28</sup> The programme was designed specifically to prevent falls and consists of a set of leg muscle strengthening and balance retraining exercises progressing in difficulty, and a walking plan.<sup>28</sup> In essence, the exercises within the programme are individually prescribed and increase in difficulty during a series of five home visits by a trained instructor.<sup>28</sup> The exercises take about 30 minutes to complete, whilst participants are expected to exercise three times a week and go for a walk at least twice a week.<sup>28</sup> The programme has been evaluated in both research and routine healthcare services in 1,016 people aged 65 to 97 living at home. Overall the exercise programme was effective in reducing by 35% both the number of falls and the number of injuries resulting from falls, whilst it was equally effective in men and women.<sup>28</sup>

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<sup>26</sup> Gillespie, L. D et al. 2009. *Interventions for preventing falls in older people living in the community*. Cochrane Database of Systematic Reviews

<sup>27</sup> Gardner, M. M et al. 2001. Practical implementation of an exercise-based falls prevention programme. *Age Ageing*, 30

<sup>28</sup> ACC. 2003. *Otago Exercise Programme to prevent falls in older adults*. ACC

### Falls Management Exercise Programme (FaME)

FaME group classes are based on Otago, focussing on exercises for endurance and flexibility as well as floor exercises.<sup>29</sup> Class exercises are tailored to the abilities of the group and home exercises are tailored to each participant's needs and abilities, whilst all exercises become more challenging (increase in intensity or difficulty) as the program progresses.<sup>29</sup> Exercises focus on:

- Improving first static then dynamic balance
- Muscle and bone strength (e.g. Thera-Bands, free weights, low-impact side stepping and standing squats, etc.)
- Endurance (e.g. marching, side stepping)
- Flexibility of 5 major muscle groups
- Gait (e.g. side and backward walking)
- Functional skills (e.g. sit to stand)
- How to avoid falling (e.g. compensatory stepping)
- Functional floor exercises (e.g. crawling, rolling, back extensions, and side leg lifts)

## **1.2 The Dance to Health programme**

Dance to Health is a nationwide pioneering falls prevention dance programme for older people. The programme was designed with the intention of addressing older people's falls and problems with existing services. It targets health, artistic and social benefits plus health savings. Following a £350,000 evaluated pilot, the Phase 1 Roll-out 'Test & Learn' programme was established using a mixed funding model of earned income from the health sector and fundraising. This phase of Dance to Health began in April 2017 and ran until September 2019. It consisted of 40 Improvement Programmes (dance versions of the evidence-based falls prevention exercise programmes) and 22 'Maintenance to Sustainable' Programmes. These programmes spanned across 6 Health Partner regions and 4 Royal British Legion care homes in the UK, whilst the objective is that sustainable Dance to Health groups emerge from the 22 Maintenance to Sustainable Programmes. An overview of the timeline of the programme can be seen in Figure 1 below. It can be broken down into the following 3 phases:

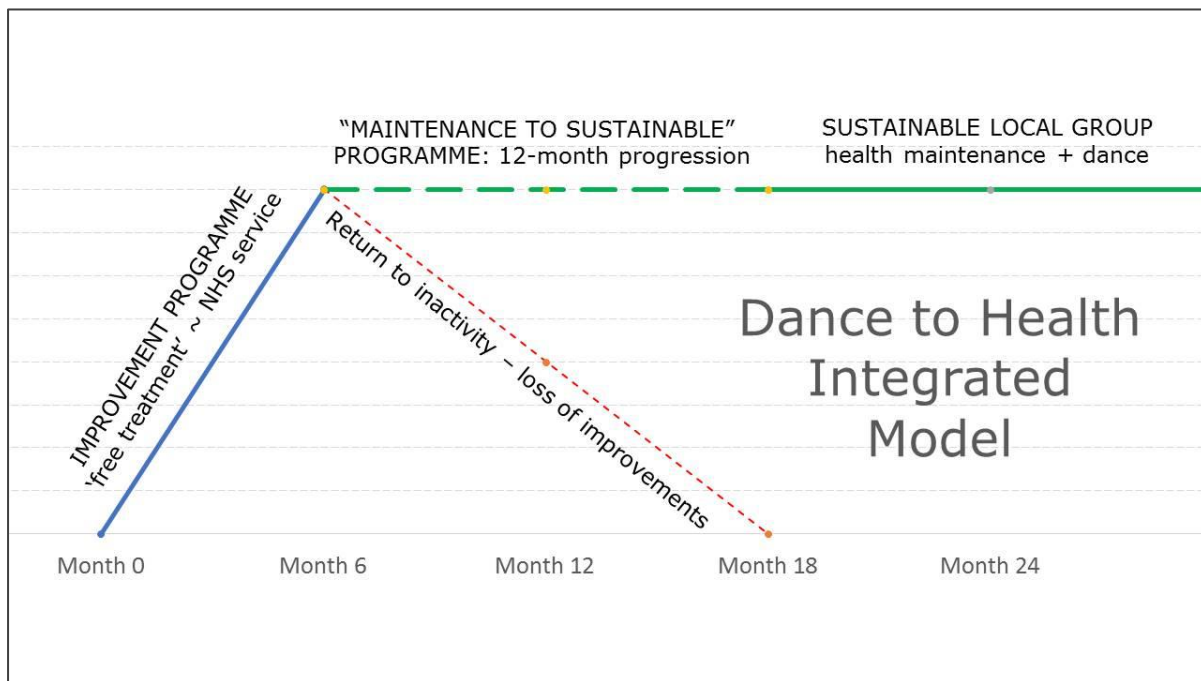
- **Improvement Programmes** – dance versions of Otago and FaME which could be commissioned by health, just as FaME and Otago are currently; leading to Maintenance to Sustainable Programmes.
- **Maintenance to Sustainable Programmes** – a 12-month transition to help older people maintain physical improvements and establish local Dance to Health groups; leading to self-run, financially sustainable Dance to Health groups.
- A national **Dance to Health family of self-run, financially sustainable groups** with central support.

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<sup>29</sup> Stevens, J, A. 2010. *A CDC Compendium of Effective Fall Interventions: What Works for Community-Dwelling Older Adults*. 2nd ed. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control



Figure 1: an integrated model of Dance to Health



How Dance to Health is tackling the challenges faced by existing provision

Despite the existence of evidence-based programmes such as Otago and FaME, many current falls-prevention exercise programmes that are being delivered face challenges: patchy provision<sup>21</sup>, low take-up and adherence (maintaining their attendance at sessions)<sup>30</sup>, poor fidelity in terms of delivery<sup>31</sup>, whilst only a minority are evidence-based.<sup>21</sup> Additionally, uptake and to exercise programmes can be disappointing, with many programmes considered to be dull and delivered over short periods, without consideration of sustaining activity levels or long-term ongoing programmes to maintain improvements.<sup>32</sup>

Evidence suggests that participation must be regular and frequent in order to have an impact, with a minimum dose of 50 hours over the duration of six months.<sup>21</sup> Dance to Health achieves this through a weekly two hour slot (a 90 minute activity session and 30 minutes of socialising time), plus a further 30 minutes (at least) of homework exercises and activities each week. Finally, programmes must be of the right intensity - being significantly challenging and progressive for individuals; NICE (2004)<sup>33</sup> recommends that practitioners involved in developing falls prevention programmes should ensure that programmes are flexible enough to accommodate participants' different needs and preferences and should promote the social value of such programmes. Both Otago and FaME were designed through research trials exploring the specific components of exercise that are effective in preventing falls and have been rigorously evaluated and proven to work in practice.

<sup>30</sup> Robinson, L et al. 2014. Self-management and adherence with exercise-based falls prevention programmes: a qualitative study to explore the views and experiences of older people and physiotherapists. *Disability and Rehabilitation*, 36 (5), 379-386

<sup>31</sup> Riglin, J. L. D., Buttery, A., Vasilakis N. 2012. *Older people's experiences of therapeutic exercise as part of a falls prevention service*. London, UK

<sup>32</sup> Lord, S. R and Close, J. C. T. 2018. New horizons in falls prevention. *Age and Ageing*, 47 (4), 492-498

<sup>33</sup> NICE. 2004. *Falls in older people: assessing risk and prevention*. URL: <https://www.nice.org.uk/guidance/cg161/chapter/5-The-Guideline-Development-Group-National-Collaborating-Centre-and-additional-assistance-2004>

### **1.3 The evaluation of Dance to Health**

In August 2017 The Sport Industry Research Centre (SIRC) at Sheffield Hallam University was commissioned by Aesop to conduct an evaluation of the Dance to Health 'Phase 1 roll-out [test and learn]'. The aim of the evaluation was to conduct a thorough review of the programme in order to understand the impact as well as the success of the programme. The evaluation had two clear objectives:

- Evaluate whether Dance to Health provides the health system with an effective and cost-effective means to address the issue of older people's falls; and
- Evaluate whether Dance to Health helps older people in danger of falling overcome lost confidence, reduced independence and increased isolation.

This work is crucial in order to further build on the evidence base for Aesop around the impact of Dance to Health on a variety of health, wellbeing, social and economic outcomes. Subsequently, the results of the evaluation have the potential to be used as a tool to demonstrate the capability of the arts to achieve better health outcomes more cost effectively. This report draws on the results of 40 completed Improvement Programmes, 22 Maintenance to Sustainable Programmes, plus an assessment of Dance to Health's fidelity to existing evidence-based falls prevention exercise programmes and its cost-effectiveness. It provides an overview of the findings from the Dance to Health 'Phase 1 roll-out [test and learn]' evaluation.

## 2. METHODOLOGY

In order to assess effectively whether Dance to Health is achieving the aims and objectives outlined in the introduction to this report, a mixed methods approach was adopted that included quantitative, qualitative and econometric research. At the time of the research, all participants that were taking part in Dance to Health sessions across all 6 geographical regions were eligible to take part. The following research methods were adopted:

- Collection of monitoring data
- Physical testing of participants (Timed Up and Go testing)
- Collection of data via paper-based surveys
- Analysis of the cost effectiveness of Dance to Health
- In-depth focus groups with participants and stakeholders
- Observational visits to assess Dance to Health's fidelity to Otago and FaME

A more detailed description of each is now outlined in sections 2.1-2.6.

### 2.1 Collection of monitoring data

SIRC designed a monitoring spreadsheet that was distributed to all programme leads in order to be able to capture monitoring data on a weekly basis. The monitoring data form captured the following information for each participant:

- Programme attendance
- Number of falls since last session
- Number of GP visits related to falls since last session
- Number of GP visits unrelated to falls since last session
- Number of hospitalisations related to falls since last session (as outpatient)
- Number of hospitalisations related to falls since last session (as inpatient) and if inpatient whether they had been discharged or whether there was any further treatment required
- Minutes of 'homework' they had completed since last session

This data was captured in order to better understand how successful the programme has been in terms of reducing falls and engaging & retaining participants, i.e. through analysing individuals' adherence to the programme. An individual was deemed to have adhered to the programme if they had attended  $\geq 70\%$  of Dance to Health sessions at their chosen class. Collection of the monitoring data also allowed for comparison of Dance to Health against other falls prevention programmes, namely FaME and Otago, including calculation of the cost-effectiveness of the programme in comparison to these other falls prevention programmes.

## 2.2 Physical testing of participants (Timed Up and Go testing)

Physical testing of participants took place in the form of the Timed Up and Go (TUG) test. The TUG test is a commonly used screening tool to assist clinicians to identify patients at risk of falling<sup>34</sup>, as it directly relates to the muscles used for balance and gait, whilst it is a simple and reliable method, making it ideal for assessing an individual's risk of falling.<sup>35</sup>

The TUG test was administered at both the baseline and follow-up stages of the Improvement phase, whilst a third round of TUG testing took place at the follow-up stage of the Maintenance to Sustainable phase. As part of the previous pilot evaluation, physical testing at baseline and follow-up points of the research to assess factors such as strength, balance and co-ordination was outlined as a recommendation by the Sidney De Haan Research Centre which has been incorporated into this research.

The objective of the TUG test is to help determine fall risk and measure the progress of balance, sit to stand, and walking in elderly participants. Essentially, the test involves the participant starting in a seated position; the participant then stands up upon command, walks 3 metres, turns around, walks back to the chair and sits down. The time stops when the participant is seated again.<sup>36</sup>

## 2.3 Collection of data via paper-based surveys

As part of a formative evaluation of Dance to Health, SIRC produced four questionnaires in order to help understand the impact of the programme; baseline and follow-up surveys at both the Improvement and Maintenance to Sustainable phases. The self-administered questionnaires were distributed to all participants that were in attendance at the programme and are able and willing to complete the surveys. They were designed to measure changes in participants' perceptions and incorporated questions relating to the following:

- Fear of falling (Short Falls Efficacy Scale International; Short FES-I)
- Patient Activation Measure (PAM)
- Current health at the time of survey (physical and mental)
- Aspirations for the programme
- Their perceptions of the programme (enjoyment, likes and dislikes, significant changes to happen as a result of taking part etc.)

### 2.3.1 Fear of falling (Short FES-I)

The Short FES-I is a measure of 'fear of falling' or, more accurately, 'concerns about falling'.<sup>37</sup> The tool was developed by the Prevention of Falls Network Europe (ProFaNE) project, following an intensive review of fear of falling, self-efficacy and balance confidence questionnaires.<sup>37</sup> The tool comprises of seven questions and has been demonstrated to have good reliability and validity and has been

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<sup>34</sup> Barry et al. 2014. Is the Timed Up and Go test a useful predictor of risk of falls in community dwelling older adults: a systematic review and meta- analysis. *BMC Geriatrics*

<sup>35</sup> Soubra,R., Chkeir, A. and Novella, J. (2019). A Systematic Review of Thirty-One Assessment Tests to Evaluate Mobility in Older Adults. *BioMed Research International*

<sup>36</sup> Podsiadlo, D. and Richardson, S. 1991. "The timed "Up & Go": a test of basic functional mobility for frail elderly persons." *J Am Geriatr Soc*, 39(2), 142-148

<sup>37</sup> University of Manchester. 2018. *Falls Efficacy Scale – International*. URL: <https://sites.manchester.ac.uk/fes-i/>

validated for use in older adults with cognitive impairment.<sup>38</sup> The seven items are as follows and are rated on a scale from 1 ("not at all concerned") to 4 ("very concerned").

- Taking a bath or shower
- Going up or down stairs
- Walking up or down a slope
- Getting dressed or undressed
- Getting in or out of a chair
- Reaching for something above your head or on the ground
- Going out to a social event

The minimum score is 7 (no concern about falling), whilst the maximum score is 28 (severe concern about falling).

### **2.3.2 Patient Activation Measure (PAM)**

At the invitation of NHS England, Patient Activation Measure (PAM) was introduced to the Maintenance to Sustainable participant surveys as part of the evaluation. Patient activation describes the knowledge, skills and confidence a person has in managing their own health and care.<sup>39</sup> The concept of patient activation links to all the principles of person-centred care, and enables the delivery of personalised care that supports people to recognise and develop their own strengths and abilities.<sup>39</sup> It underpins an asset-based approach that supports people to develop their capability to manage their own health and care by giving them information they can understand and act on, and providing them with support that is tailored to their needs.<sup>39</sup> By understanding a person's level of knowledge, skills and confidence (or activation level), NHS services can 'meet people where they are' and support them in the most appropriate way to manage their health or long term condition (LTC).<sup>39</sup> Evidence shows that this can lead to better outcomes, a better experience of care, healthier behaviours and fewer episodes of emergency care that leads to lower costs for the NHS.<sup>39</sup> The PAM is a validated, commercially licenced tool and has been extensively tested with reviewed findings from a large number of studies; it helps to measure the spectrum of skills, knowledge and confidence in patients and captures the extent to which people feel engaged and confident in taking care of their condition.<sup>39</sup>

## **2.4 Analysis of the cost effectiveness of Dance to Health**

Detailed analysis and modelling was conducted in order to be able to quantify the cost effectiveness of Dance to Health. This modelling was conducted using monitoring data from the evaluation of the Dance to Health programme, comprehensive financial information provided by Aesop, and Public Health England's "A return on investment tool for falls prevention programmes in older people based in the community".<sup>40</sup> Cost savings of the programme were calculated as Return on Investment (ROI).

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<sup>38</sup> Hauer, K. et al. 2010. Validation of the Falls Efficacy Scale and Falls Efficacy Scale International in geriatric patients with and without cognitive impairment: Results of self-report and interview-based questionnaires. *Gerontology*, 56, 190-199

<sup>39</sup> NHS. 2018. *Patient activation and PAM FAQs*. URL: <https://www.england.nhs.uk/ourwork/patient-participation/self-care/patient-activation/pa-faqs/>

<sup>40</sup> Public Health England. 2018. *A Return on Investment Tool for the Assessment of Falls Prevention Programmes for Older People Living in the Community*. London: Public Health England

SIRC's in-house econometrician used the Public Health England return on investment tool<sup>40</sup> to calculate the ROI of the programme.

## 2.5 In-depth focus groups with participants and stakeholders

In order to complement the quantitative data, qualitative evidence was collected through 6 focus groups across the different regions, as outlined in Table 1 overleaf. Five of the focus groups were with participants of Dance to Health sessions, whilst the remaining focus group (Focus group 3) was with stakeholders of Dance to Health.

*Table 1: focus groups*

Focus group	Region	Date	Venue
Focus group 1	Sheffield	13th Sept 2018	Balfour House - Sheffield
Focus group 2	Oxfordshire	28th Sept 2018	Windmill Community Centre - Oxfordshire
Focus group 3	Norfolk	24th October 2018	The Garage - Norfolk (with stakeholders)
Focus group 4	Cheshire	20th March 2019	St Johns Community Centre - Cheshire
Focus group 5	Norfolk	4th April 2019	Norman Centre - Norfolk
Focus group 6	South Wales	14th May 2019	Gorseinon Brighton Road Club - South Wales

The focus group schedule was designed and agreed with Aesop prior to the sessions taking place, focussing on the following areas:

- Benefits and general feedback related to the programme
- Recruitment, e.g. how they were recruited and engaged in the programme
- Delivery of the programme, e.g. suitability of sessions, whether it was the correct pitch in terms of intensity/progression, feedback on the instructors etc.
- What is it particularly about Dance to Health that works?
- What impact has the programme had on participants? E.g. reduced falls, personal and social factors, motivation, relationships and loneliness, mobility, confidence, physical and mental wellbeing etc.
- The impact of the programme on participants' families, carers, and friends
- How the programme/sessions can be improved for the future

## 2.6 Observational visits to assess Dance to Health's fidelity to Otago and FaME

In order to be able to assess the fidelity of Dance to Health in relation to Otago and FaME, SIRC devised two robust assessment forms; one to assess Dance to Health in relation to Otago and one to assess the programme against FaME. The forms themselves were completed during the observational visits which took place across seventeen programmes, as detailed in section 3.5.1.

Observational visits took place to assess whether both Otago and FaME were appropriately applied within the Dance to Health sessions, to make the therapeutic content on a par with standard falls prevention exercise. The assessor, from SIRC at Sheffield Hallam University, is a qualified practitioner in Otago and FaME.

## 2.7 Key dates

This particular phase of Dance to Health began in April 2017 and ran until September 2019. Below is a timeline of activity during this period (in bold) that also provides a timeline for the evaluation (in italics):

- **April to September 2017: programme preparation**
- **October 2017 to April 2018: Improvement programmes (wave 1)**
- *October 2017: evaluation commences*
- *October 2017 to August 2019: collection of monitoring data*
- *October 2017 to July April 2019: participant questionnaires distributed*
- *October 2017 to July April 2019: 18 observational fidelity visits across the 6 regions*
- **January to July 2018: Improvement programmes (wave 2)**
- *June 2018 to April 2019: 6 in depth focus groups with a mixture of stakeholders including participants, volunteers and Dance Artists*
- **April 2018 to April 2019: Maintenance to Sustainable programmes (wave 1)**
- *November 2018: cost-effectiveness analysis (based on data received to date)*
- **July 2018 to July 2019: Maintenance to Sustainable programmes (wave 2)**
- *March 2019: evaluation analysis and reporting (first report based on data received to date)*
- **From April 2019: Sustainable Dance to Health groups operating**
- *October 2019: final report of current evaluation*

To summarise, the research outlined within the methodology was conducted by SIRC across a 2 year period, from October 2017 to October 2019.

## 2.8 Research ethics, evaluation governance and funding, and conflict of interest declaration

The study was approved by Sheffield Hallam University research ethics board and all the participants provided informed consent before participation. They were informed of the purpose of the study, anonymity and confidentiality of the data, and of the right to withdraw from the study at any time.

Within the research team itself, Simon Goldsmith (Research Fellow at SIRC) was responsible for project management, the research design, data collection, reporting, and liaison with participants / stakeholders / deliverers / Aesop. Judy Stevenson (Consultant) was responsible for the observational visits, whilst also contributing to data collection and reporting. Themis Kokolakis (Reader at SIRC) was responsible for the analysis and reporting regarding the cost-effectiveness of Dance to Health. Wider members of SIRC also contributed to this research. None of the authors/research team had any conflict of interest.

The evaluation was funded by Aesop.

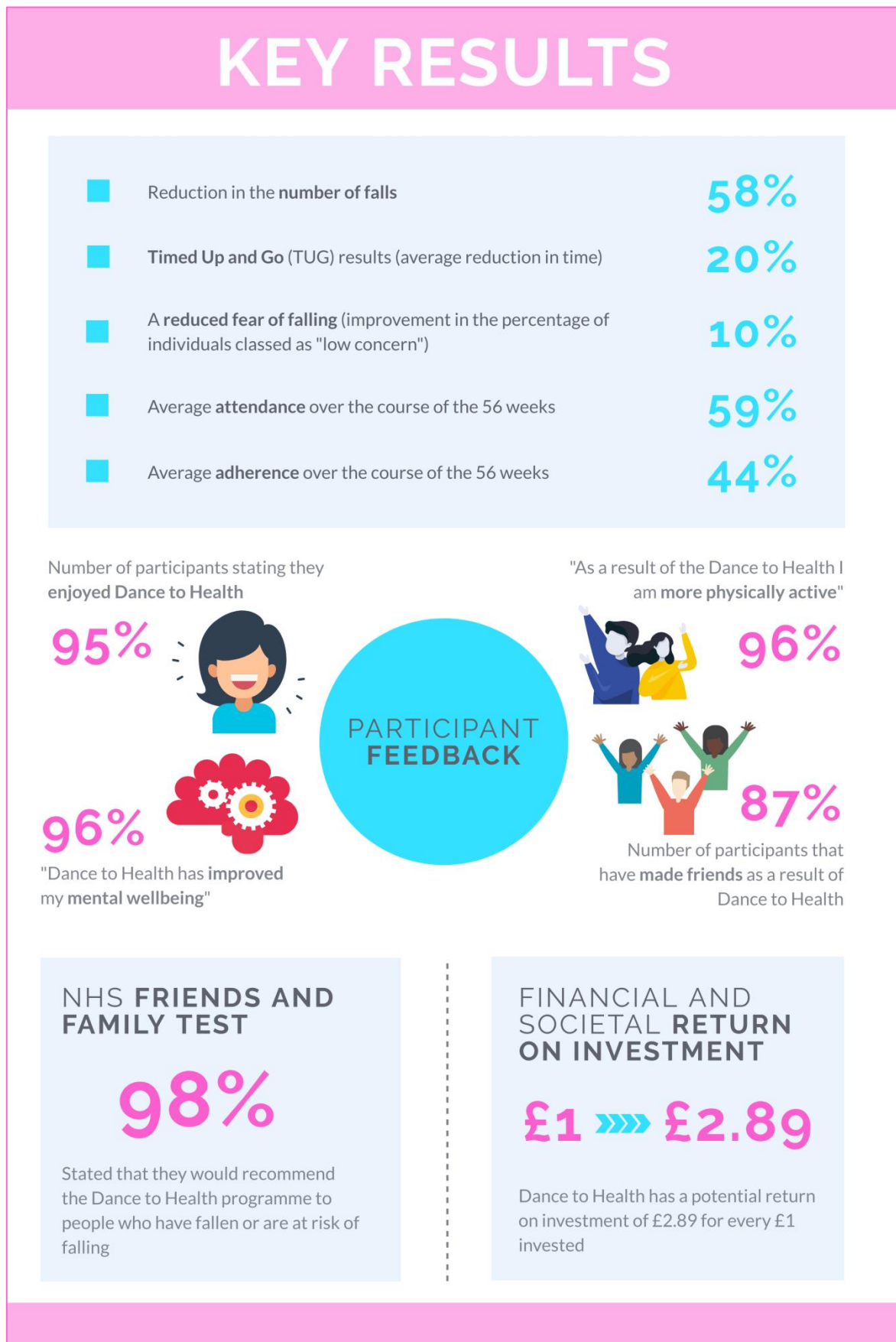
## **3. RESULTS**

### **3.1 Overall summary of results**

This section provides an overview of the findings from the Dance to Health 'Phase 1 roll-out [test and learn]' evaluation. Findings from the research show that Dance to Health is helping to reduce the number of falls occurring, whilst helping participants overcome lost confidence, reduced independence and increased isolation. Additionally, based on the analysis conducted, there is a potential cost saving of over £196m over a 2 year period, of which £158m is a potential cost saving for the NHS. Figure 2 overleaf highlights some of the key results from the evaluation.



Figure 2: a summary of the key results



### 3.2 Programme attendance and adherence

Table 2 below provides a breakdown of overall weekly attendance, by region, across both the 26 week Improvement and the 30 week Maintenance to Sustainable phases of the programme. Whilst the attendance of the programme fluctuated slightly, average attendance over the course of the 56 weeks was just under 60%, with this figure based on the number of participants registered with each course.

*Table 2: overall programme attendance by region*

Dance to Health region	Average attendance		
	Improvement phase (26 weeks)	Maintenance to Sustainable phase (30 weeks)	Overall across both phases (56 weeks)
Birmingham	56.0%	54.6%	55.2%
Cheshire	63.2%	58.9%	60.9%
Norfolk	58.9%	63.0%	61.1%
Oxfordshire & Kent	64.8%	64.1%	64.4%
Sheffield	54.5%	58.4%	56.6%
South Wales	55.9%	60.4%	58.3%
Dunkirk (1 Royal British Legion class)	53.6%	N/A - classes still ongoing	N/A
<b>Across all regions</b>	<b>58.1%</b>	<b>59.9%</b>	<b>59.4%</b>

In addition to the attendance figures provide in Table 2, adherence from the programmes was calculated based on each individual participant's session attendance. Of this cohort, the adherence rate was 48% at the Improvement phase whilst overall adherence to the programme (across 56 weeks) was 44%.

### 3.3 The impact of Dance to Health on participants

#### 3.3.1 A reduction in falls

Participants initially provided a retrospective report of falls in questionnaires that were completed at the baseline Improvement phase stage. Following this, prospective weekly falls diaries were maintained across the course of the programme (56 weeks across the Improvement and Maintenance to Sustainable phases).

Focusing on the monitoring of participants that could recall falls in the previous 12 months, based on overall data across both phases (a 56 week period); there was a reduction in falls of 58%. This is a key statistic that indicates the effectiveness in the model. In comparison to FaME and Otago, studies have shown a reduction in falls for these programmes of 54%<sup>41</sup> and 35%<sup>42</sup> respectively. It is important to note that the research design between these studies differed; reductions shown within these studies were based on a comparison between an exercise programme group and control group, as opposed to a reduction in falls within the exercise group, as is shown within this study. Additionally, different data collection/falls diaries methods were used to collect the data.

Furthermore, the number of fall-related hospital admissions as a percentage of A&E admissions is 35%<sup>40</sup> in the general case. I.e. of recorded falls, 20% are classed as serious falls, and of these serious falls 80% require admission to A&E, of which 35% of these A&E admissions require admission as an inpatient.<sup>40</sup> Whereas Dance to Health monitoring data collected as part of this evaluation showed that only 13% of admissions to A&E required admission as an inpatient. This equates to a significant cost saving not only in terms of front-line costs for the NHS but also in terms of reduced social care costs.

### **3.3.2 Participants' physical wellbeing: the Timed Up and Go (TUG) test**

During the course of the evaluation, the TUG test was administered on three occasions: at the beginning of the Improvement phase (baseline), at the end of the Improvement phase (Follow-up 1) and at the end of the Maintenance to Sustainable phase (Follow-up 2). The total sample of respondents that completed the baseline TUG test was 563, whilst 245 completed the Improvement follow-up 1 TUG test. There were then 59 participants whom completed a TUG test at the Follow-up 2 point that had previously completed the baseline TUG test.

Table 3 (overleaf) shows the results of the TUG tests across the three different time points. In line with previous studies, a TUG score of greater than or equal to 13.5 seconds has been used to identify the percentage of respondents that are at a higher risk of falling.<sup>43</sup>

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<sup>41</sup> Skelton, D, et al. 2005. Tailored group exercise (Falls Management Exercise - FaME) reduces falls in community-dwelling older frequent fallers (an RCT), *Age and Ageing*, Nov 34(6), 636-9

<sup>42</sup> Robertson, M.C. et al. 2002. Preventing Injuries in Older People by Preventing Falls: A Meta-Analysis of Individual-Level Data. *Journal of the American Geriatrics Society*, 50, 905-911

<sup>43</sup> Barry, E, et al. 2014. Is the Timed Up and Go test a useful predictor of risk of falls in community dwelling older adults: a systematic review and meta- analysis. *BMC Geriatrics*, 14 (14)

*Table 3: Timed Up and Go results*

Follow-up points	Individuals at higher risk of falling (A TUG score of $\geq 13.5$ seconds)
Follow-up 1 (Baseline - Improvement phase follow-up) n=245	
Baseline survey	25.3%
Follow-up 1 (Baseline - Improvement phase follow-up)	17.5%
Difference	7.8%
Follow-up 2 (Baseline - Maintenance to Sustainable phase follow-up) n=59	
Baseline survey	20.3%
Follow-up 2 (Maintenance to Sustainable phase follow-up)	13.5%
Difference	6.8%

In terms of improvements in results, at the Follow-up 1 and Follow-up 2 stages the average TUG time reduced by 16% (an average decrease of 2.08 seconds) and 20% (an average decrease of 2.40 seconds) respectively. These results would suggest that longer term adherence to the programme would mean greater physical improvements.

The largest improvement (decrease) in TUG times was from a participant that completed all three TUG tests, recording an improvement of 44.91 seconds (from a baseline time of 55 seconds to a score of 10.09 seconds at follow-up 1 followed by a slight increase to 11.19 seconds at follow-up 2). This equated to an 81.7% reduction in their time (based on their follow-up 1 score). This individual in question is aged 82 and had a very high adherence rate, attending 23 of 26 Improvement Programme sessions and 29 of 30 Maintenance to Sustainable sessions.

### **3.3.3 Further positive improvements in participants' physical wellbeing**

The total sample of respondents that completed the Improvement phase baseline survey was 512, whilst 210 of these participants completed the follow-up Improvement phase survey. A further 59 were identified as having completed the baseline survey and the end of Maintenance to Sustainable survey (over 12 months on from the start of the Improvement phase). This matched pair's analysis allows their data to be matched for comparison.

Aside from the 'Timed Up and Go' physical testing, 96% of respondents at the end of the Maintenance to Sustainable phase stated that as a result of the Dance to Health programme they feel they are more physically active.

Additionally, further improvements have been witnessed in terms of the mean results regarding physical improvements (Table 4 below). Table 4 shows that participants indicated that their health has improved, in particular there was a greater improvement witnessed in the Follow-up 1 results (i.e. after 26 weeks of Improvement phase). At both the Follow-up 1 and Follow-up 2 stages, the results show that the percentage of participants who claimed they have felt full of energy showed the greatest improvement (an increase of over 16.5% in both instances).

*Table 4: improvements in physical wellbeing*

	How much has physical pain interfered with your normal life? (None or a little of the time)	How much of the time have you accomplished less than you would have liked as a result of your physical health? (None or a little of the time)	"My health is (described as either 'excellent' or 'good')"	"Generally, in terms of my mobility I have (no problems)"	How often have you felt like you have been full of energy? (All or most of the time)
Follow-up 1 (Baseline - Improvement phase follow-up) n=210					
Baseline survey	62.3%	59.3%	46.4%	39.1%	15.8%
Follow-up 1 (Baseline - Improvement phase follow-up)	69.1%	65.4%	54.1%	47.1%	32.4%
Difference	6.9%	6.1%	7.7%	8.0%	16.5%
Follow-up 2 (Baseline - Maintenance to Sustainable phase follow-up) n=59					
Baseline survey	63.2%	66.7%	47.5%	39.0%	14.3%
Follow-up 2 (Maintenance to Sustainable phase follow-up)	61.4%	53.4%	49.2%	40.7%	31.0%
Difference	-1.8%	-13.3%	1.7%	1.7%	16.7%

### 3.3.4 Fear of falling (Short FES-I): Reduction in participants' fear of falling

During the course of the evaluation, the Short FES-I (fear of falling) questions were asked at three different time points: at the beginning of the Improvement phase (baseline), at the end of the Improvement phase (Follow-up 1) and at the end of the Maintenance to Sustainable phase (Follow-up 2). The total sample of respondents that completed the baseline questions was 512, whilst 202 completed the Improvement Follow-up 1 questions. There were then 85 participants that completed a Short FES-I at the Follow-up 2 point that had previously completed the baseline questions.

Table 5 below shows the results of the Short FES-I shown as the percentage of individuals classified as low, moderate or high concern (concern/fear of falling). Follow-up 1 data indicates that at the end of the Improvement phase there had been a statistically significant reduction in participants' fear of falling. This is shown by a 12.4% increase in the percentage of individuals that derived a score of 7-8 and are therefore classed as "low concern", meaning there has been a statistically significant reduction in those individuals from the sample that are afraid or worried about falling, which could be due to their experience as part of the Dance to Health programme. The same result at Follow-up 2 was not statistically significant; however this is most likely due to the smaller sample size for this cohort.

*Table 5: fear of falling cut-off points<sup>44</sup>*

Short FES-I cut off points:	Low concern (a score of 7-8)	Moderate concern (a score of 9-13)	High concern (a score of 14-28)
Follow-up 1 (Baseline - Improvement phase follow-up) n=202			
Baseline survey	26.2%	46.0%	27.7%
Follow-up 1 (Baseline - Improvement phase follow-up)	38.6%	38.1%	23.3%
Difference	<b>+12.4% (p&lt;0.05)</b>	-7.9%	-4.4%
Follow-up 2 (Baseline - Maintenance to Sustainable phase follow-up) n=85			
Baseline survey	32.9%	47.1%	20.0%
Follow-up 2 (Maintenance to Sustainable phase follow-up)	43.5%	43.5%	13.0%
Difference	+10.6%	-3.6%	-7%

<sup>44</sup> Delbaere, K, et al. 2010. The Falls Efficacy Scale International (FES-I). A comprehensive longitudinal validation study. *Age & Ageing*, 39, 2

When participants were asked at the baseline stage what it was about Dance to Health that appealed to them, two of the top three answers related to their mental wellbeing; "meeting new people" (71.3%) and "the enjoyment you get from dancing" (62.1%) being second and third choice, with "an opportunity to be more physically active" (88.9%) being the most common reason for engaging with the programme. Follow-up feedback from participants suggests the programme provided these opportunities, with 95% stating that they have enjoyed taking part in the Dance to Health programme, whilst 87% said they have made new friends as a result of taking part in the Dance to Health programme.

### **3.3.5 Patient Activation Measure (PAM)**

#### *Patient Activation Measure in more detail*<sup>45</sup>

Individuals are more likely to make good decisions and take more action to promote their own health if they are engaged, informed, and feel confident they can take care of themselves. Those who have the skills and confidence to take on their personal health challenges experience fewer health crises and can slow or prevent functional declines, translating to better health and more effective and efficient use of healthcare resources. The PAM survey measures an individual's knowledge, skills and confidence to manage his/her health.

An individual's activation is measured through the completion of the PAM survey instrument. The PAM survey provides two metrics for consideration: 1) a score, and 2) a level. The activation score is based on a 0-100 point scale, with most individuals having activation scores between 30 and 90. Scores outside of this range are unlikely and generally result from individuals responding "Disagree Strongly" or "Agree Strongly" to each survey item.

The activation score can be used to segment individuals into one of four progressively higher levels of activation. Each level provides insight into an array of health-related attitudes and the performance of a wide range of behaviours. The level is an indicator of an individual's competency to take on new behaviours; and as an individual's level increases, so does his/her self-management capability.

Figure 3 (overleaf) shows a breakdown of the activation levels (level 1 is the lowest level of activation and level 4 is the highest level of activation), individual behaviours and appropriate, self-management needs.

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<sup>45</sup> Insignia Health. 2016. *Patient Activation Measure® (PAM®) Practice Manual*. Insignia Health.

*Figure 3: patient activation characteristics by level*



*PAM results: a breakdown of PAM levels and scores*

As part of the evaluation, Patient Activation Measure (PAM) was introduced to the Maintenance to Sustainable participant surveys, therefore the PAM survey questions were administered twice, once at the beginning of the Maintenance to Sustainable phase and once at the end of the phase. In total, 182 participants completed the first set of questions, whilst 76 of these participants completed the second survey, allowing their responses to be analysed to assess any change in their PAM score. Firstly, Figure 4 overleaf shows the breakdown by PAM level for all individuals that completed the first survey (n=182), providing an initial insight into the patient activation levels of participants. The results by PAM level at the beginning and end of the Maintenance to Sustainable phase, i.e. individuals that completed both surveys (n=76) are then shown in Figure 5.



Figure 4: baseline PAM levels by percentage (n=182)

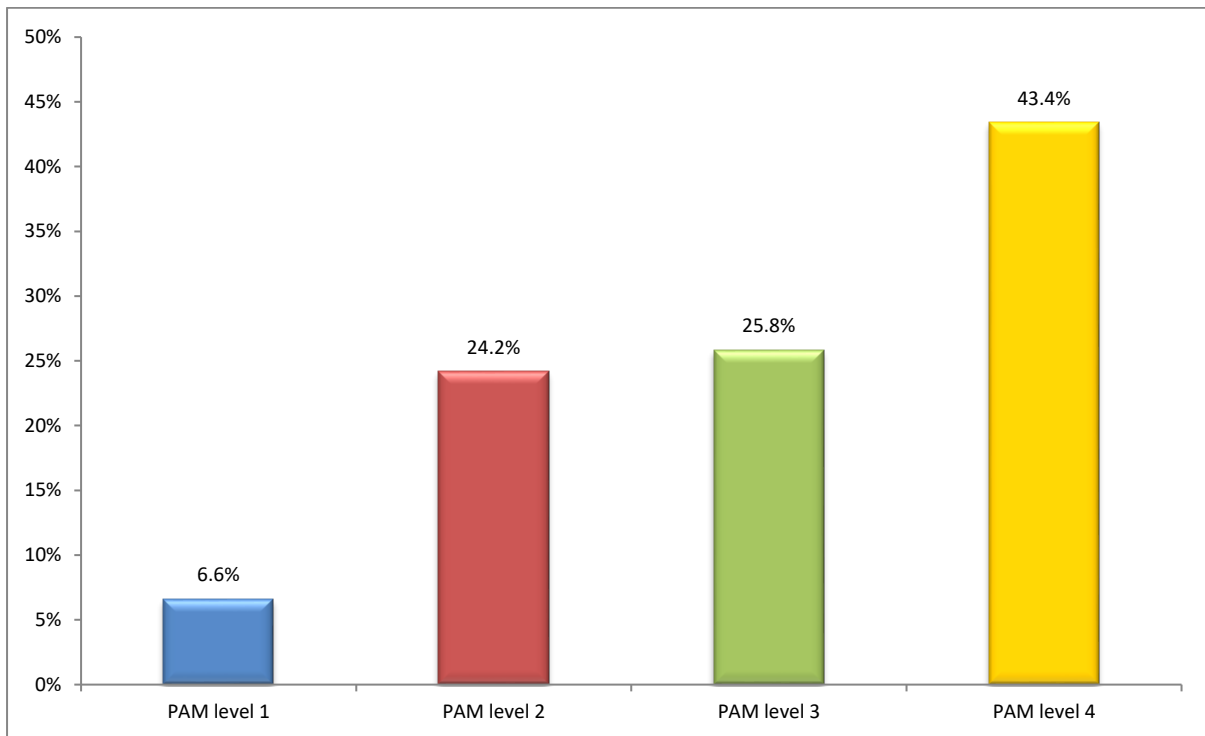


Figure 4 shows that the majority of respondents (69%) are at Levels 3 and 4. This indicates that the sample of respondents have a good understanding regarding the facts about their health and are taking action and responsibility for maintaining and improving their health.

Figure 5: PAM levels of participants: baseline and follow-up stages (n=76)

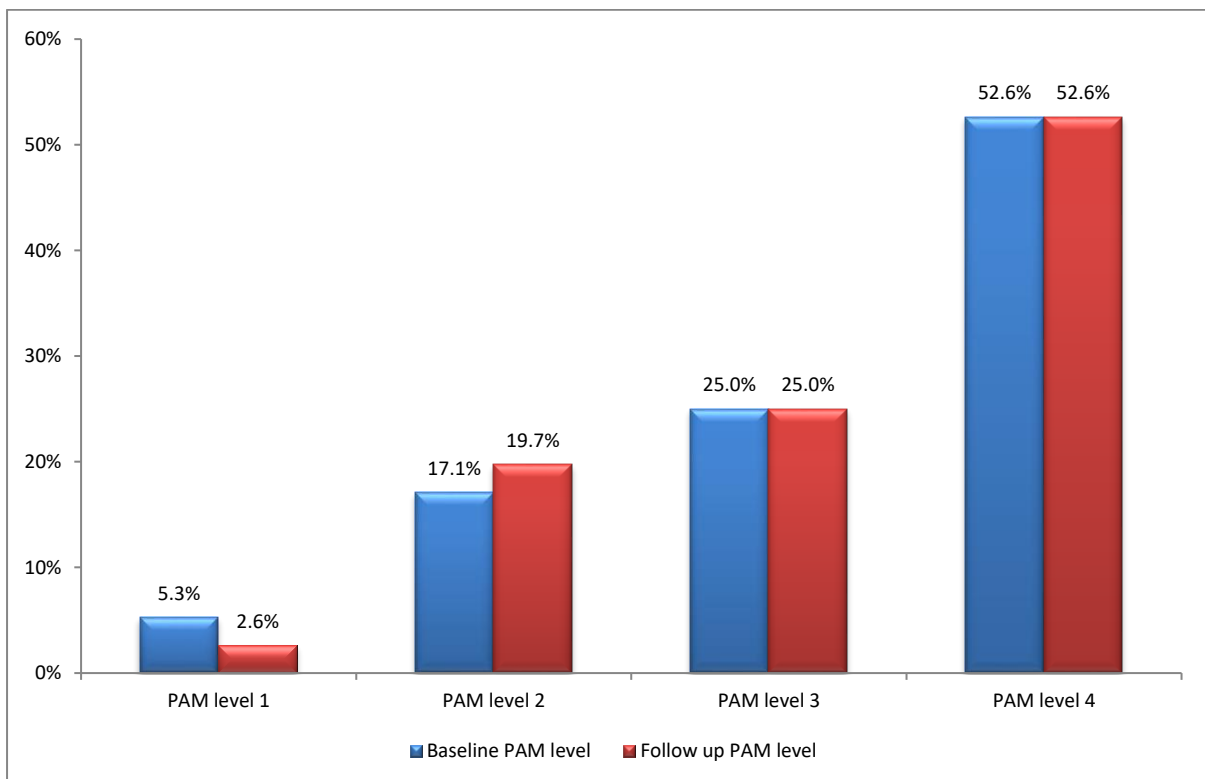


Figure 5 shows that there has been little change in PAM levels between the beginning and end of the Maintenance phase. This is not out of the ordinary, as PAM levels are not easily interchangeable, but can improve over time. Instead, the PAM activation score provides a more precise measure (as compared to the level of activation) to track individual progress over time. The average score across individuals that completed both surveys (n=76) did increase by over one point, from a score of 71.1 to a follow-up average score of 72.3. Even a gain in activation score of just a few points is meaningful; as this much change is associated with the difference between engaging and not engaging in particular behaviours.<sup>45</sup>

### **3.3.6 Further positive improvements in participants' mental wellbeing**

In terms of participants' mental wellbeing, over 96% of respondents at the follow-up Maintenance to Sustainable phase stated that they felt Dance to Health has improved their mental wellbeing. Table 6 overleaf highlights four areas that showed a statistically significant improvement at the end of the Improvement phase (Follow-up 1), which were:

- Feeling calm & relaxed;
- Feeling confident;
- Feeling a reduced sense of loneliness & isolation; and
- Feeling an increased sense of independence

There were improvements in all four of these areas in the Follow-up 2 sample too, however the sample size would need to be larger in order to assess whether improvements were of statistical significance.

*Table 6: improvements in mental wellbeing*

	How often have you felt relaxed and/or calm and peaceful? (All or most of the time)	How often have you felt confident? (All or most of the time)	How often have you felt a sense of loneliness/isolation? (None or a little of the time)	How often have you felt a sense of independence? (All or most of the time)
Follow-up 1 (Baseline - Improvement phase follow-up) n=210 <b>Statistically significant improvements across all four areas</b>				
Baseline survey	47.8%	54.2%	65.4%	65.7%
Follow-up 1 (Baseline - Improvement phase follow-up)	64.7%	68.9%	76.6%	76.6%
Difference	16.9%	14.7%	11.2%	10.9%
Follow-up 2 (Baseline - Maintenance to Sustainable phase follow-up) n=59 <b>Improvements, but not statistically significant due to sample size</b>				
Baseline survey	51.7%	49.1%	43.1%	67.2%
Follow-up 2 (Maintenance to Sustainable phase follow-up)	64.3%	64.3%	50.0%	75.9%
Difference	12.6%	15.2%	6.9%	8.7%

### 3.3.7 Participant perceptions of the Dance to Health programme

Overall, participants were overwhelmingly positive regarding Dance to Health. Based on the NHS Friends and Family Test (FFT) utilised within the survey, the results indicated that over 98% of respondents at the follow-up Maintenance to Sustainable phase stated that they would recommend the Dance to Health programme to people who have fallen or are at risk of falling. Below are some positive comments on the programme from participants that help emphasise the impact the programme has had on their daily lives:

*"It's the best thing that has happened to me and I want other people to experience it. I really do appreciate what Dance to Health does."*

*"Having been alone since my wife died of Alzheimer's I had become rather isolated. Dance to Health has been very helpful to get me back on track."*

*"At one time I couldn't even lift a cup of tea with my right arm. Now I can lift the teapot to pour the tea out... it's all due to the exercise I do now."*

*"When I leave here I feel elated – it sort of uplifts you. It gives you a lovely feeling. I can come in depressed and go out feeling on top of the world."*

*"Quite a few of us have been surprised at what we can do now that we couldn't do when we started."*

*"Now I walk more upright than used to; I don't walk looking at ground anymore. I've got more confidence to walk on the road."*

*"I feel much stronger physically and no longer need regular use of my walking stick as an aid."*

*"I have more balance. I am no longer scared to cross the road, my joints are less painful and I'm more mobile."*

*"It is really doing me a lot of good. I walked into town last week for the first time in months."*

*"I was hanging washing out in the garden and I tripped. I managed to save myself to my surprise, and then I realised I had done a lunge without thinking about it. We do lunges in class, so obviously my body had remembered how to do it and I was strong enough to stop me from falling."*

*"We all admitted (those of us that had been involved with physiotherapy) that it does wear off in the end; it is the sense of isolation and repetitive boredom... whereas this [Dance to Health], because it moves forward and is a social thing, is much easier to keep on doing. Quite a few of us have been surprised at what we can do now that we couldn't do when we started."*

Only a very small minority of respondents (16 individuals) gave a response when asked "is there anything you don't enjoy about the programme?" These comments were minor issues based on personal preference of the individuals, so can be considerations for future improvement of the classes, but are not reason enough to suggest changes to the programme. Nor did the issues listed below prevent the respondents from taking part and enjoying Dance to Health, including the following:

- Creative elements of the sessions: dressing up, type of dancing (preferring either structured, sequenced movements or free form dancing) (6 respondents);
- Other individuals within their session: "bossy" fellow participants, a dislike of physical contact with others, being paired with someone of the opposite sex, having to perform individually in front of the rest of the group (4 respondents);
- A dislike of floor work (2 respondents);
- Sessions can be a little slow/are too long in duration (2 respondents); and

- Difficulty keeping up with the instructions from the Dance Artist (2 respondents).

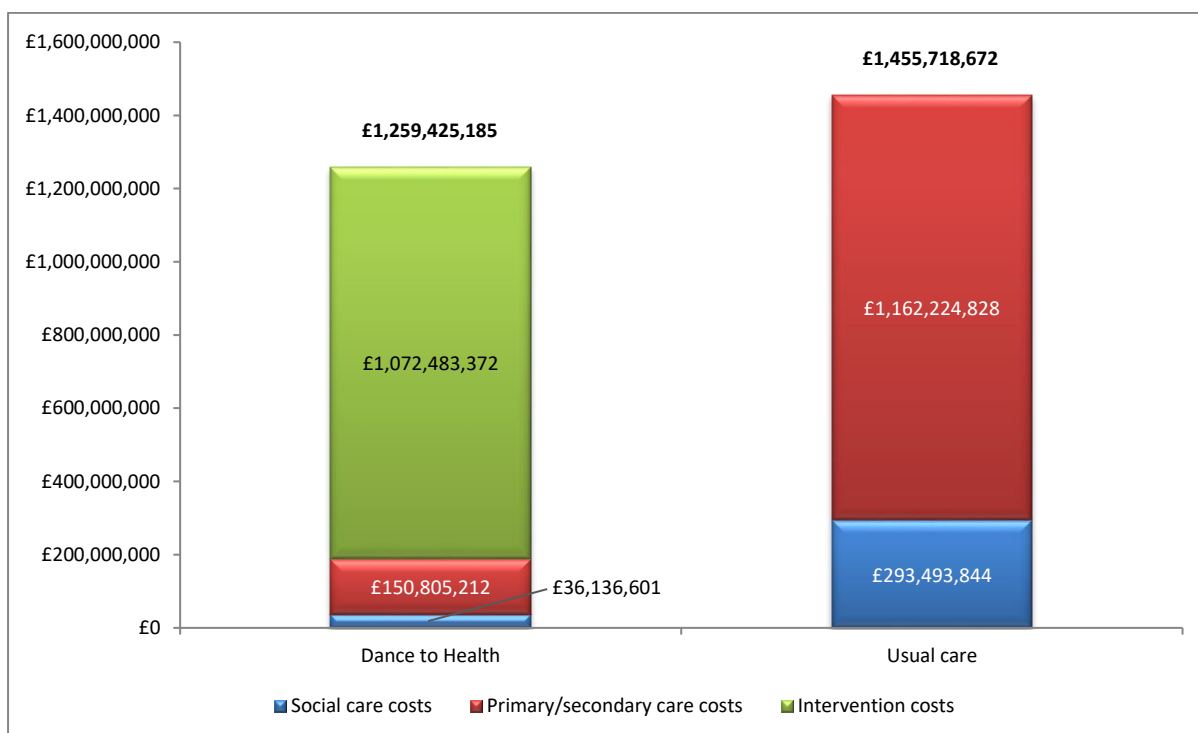
### 3.4 The cost-effectiveness of Dance to Health

#### 3.4.1 Cost savings from the programme

Based on the analysis conducted, there is a potential cost saving of over £196m (£196,293,487) over a 2 year period, of which £158m (£158,088,714) is a potential cost saving for the NHS. This is based on NHS England as a representative area to inform the results. Within England there are 9,711,572 people aged 65 and over (based on 2015 figures provided in the model by Public Health England, 2017). When adjusting for the proportion of the population deemed at risk of a fall (34%) and those willing to take part in falls prevention programmes (38%) the final population included in the analysis is 1,254,735 people.

The cost of implementing Dance to Health in England (demonstrating a saving of over £196m) is shown in Figure 6 below.

*Figure 6: Dance to Health costs for the total population*



#### 3.4.2 Return on Investment

Cost savings of the programme have been calculated as Return on Investment (ROI), the results of which can be seen in Table 7 overleaf, alongside results from Public Health England's analysis of Otago and FaME. Whilst these comparisons are a good indicator, it is important to note that Public Health England suggest that due to potential differences in clinical trials or research that informs the analysis that considerations of validity can should be taken into account when making direct comparisons between the programmes.<sup>40</sup>

*Table 7: ROI and Net Monetary Benefit (NMB) of Dance to Health, Otago and FaME*

Intervention	Financial ROI	Societal ROI	Incremental Net Monetary Benefit
Dance to Health	£1.18 : £1.00	£2.89 : £1.00	£1,615.93
Otago	£0.95 : £1.00	£2.42 : £1.00	£627.79
FaME	£0.99 : £1.00	£2.52 : £1.00	£334.64

In terms of realised cost savings, the financial ROI is £1.18, i.e. for every £1 invested in Dance to Health there is a positive return of £1.18.

For the societal ROI, the benefits include both savings (financial ROI) *and* the value of any improved quality of life, as measured by Quality-Adjusted Life Years (QALYs). QALYs are calculated using cost ratios and translated into a monetary value; each additional QALY generated by an intervention is valued at £70,800 based on guidance from the Department of Health.<sup>46</sup>

Taking into account societal ROI, Dance to Health has a potential ROI of £2.89 for every £1 invested, indicating there is a positive return of £1.89.

Table 7 also shows a Net Monetary Benefit (NMB) of Dance to Health of £1,615.93 per person. The NMB is a statistic commonly used by econometricians that is derived by calculating the difference in both financial cost and QALYs for Dance to Health against the financial cost and QALYs of usual care (no intervention). It is a summary statistic that represents the value of an intervention in monetary terms. Essentially, a positive NMB (as is shown here) means that the intervention is cost-effective.

<sup>46</sup> Glover, D. 2010. *Quantifying health impacts of government policies: A how-to guide to quantifying the health impacts of government policies*. URL: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/216003/dh\\_120108.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216003/dh_120108.pdf)

### 3.5 Dance to Health's fidelity to existing physiotherapy programmes

#### 3.5.1 Observational visits to assess Dance to Health's fidelity to Otago and FaME

Seventeen fidelity observations took place across a sample of both the Improvement phase and Maintenance to Sustainable phase sessions. Table 8 (below) provides an overview of the sessions.

*Table 8: fidelity observation visits*

Date	Venue	Programme type
18 <sup>th</sup> June 2018	Stocksbridge Community Leisure Centre - Sheffield	FaME
20 <sup>th</sup> June 2018	Lozells Methodist Church - Birmingham	Otago
21 <sup>st</sup> June 2018	Crewe Lifestyle Centre - Cheshire	FaME
25 <sup>th</sup> June 2018	CORE (Church of the Resurrection Community) - Cheshire	FaME
2 <sup>nd</sup> July 2018	Bob Carter Centre - Norfolk	Otago
4 <sup>th</sup> July 2018	Saint Augustine's Church - Sheffield	FaME
5 <sup>th</sup> July 2018	Galanos House - Oxfordshire	Otago
6 <sup>th</sup> July 2018	Ladywood CC - Birmingham	FaME
9 <sup>th</sup> July 2018	Gorseinon WMC - South Wales	Otago
10 <sup>th</sup> July 2018	Pontarddulais Town Council - South Wales	FaME
30 <sup>th</sup> July 2018	Barton Neighbourhood Centre - Oxfordshire	FaME
25 <sup>th</sup> February 2019	St Andrews Sports and Community Centre - Birmingham	FaME
20 <sup>th</sup> March 2019	St Johns Community Centre - Cheshire	FaME
21 <sup>st</sup> March 2019	Fir Vale Community Hub - Sheffield	FaME
3 <sup>rd</sup> April 2019	Harford Centre - Norfolk	FaME
4 <sup>th</sup> April 2019	Norman Centre - Norfolk	Otago
14 <sup>th</sup> May 2019	Gorseinon Brighton Road Club - South Wales	Otago

#### 3.5.2 Overview of findings from the observational visits

Overall there were excellent examples of the components of Otago and FaME throughout all observed sessions. Clear progression was seen from 'skilling up' through to the Maintenance to Sustainable phase. Sometimes there was not always clear delineation between programme components but this did not affect overall inclusion of key elements of Otago or FaME. Observed sessions showed excellent examples of how Dance Artists were able to blend the exercises within a dance session that was both motivating and achievable.

The following section gives examples of the dance blended exercise sessions with key components of FaME and Otago.

All the groups started their sessions seated in a circle. Most sessions started with a posture check, with reminders of sitting tall in the chair and focus on breathing, before moving into range of movement (ROM) and mobility.

Some beautiful interpretations of the music were observed, engaging participants in a range of movements including; curling up and unfurling like flowers, climbing walls like a lizard, writing names

in the air with noses, and drawing circles with toes. Spinal rotation is difficult for some participants to achieve, some tending to turn their neck and not the trunk, but clever use of music and storytelling enabled participants to understand what was required and focus on the rotation through visualisation. Other ideas used to warm up saw participants rubbing joints and muscles and continuing until all of the body was warmed up. Hip circling can also be problematic, but creative walking with hip swings and circles enabled freer hip movement and mobilisation. When seated, balls were used to mobilise and encourage spinal rotation, with participants passing the ball around their body and onto other participants.

*Example: describing the foot sticking to the floor with 'toffee or tar' enabled the participants to mobilise ankles, lifting their feet and prising them from the floor.*

A variety of methods were employed to encourage pulse raising and increased movement. In some cases, props (both real and imagined) were used, for example scarves were employed to encourage high and low movement with directional change, encouraging movement away from chairs and into the circle to move around with other participants. Another idea utilised the metaphor of 'cleaning', encouraging movements to clean windows and skirting boards, with change of direction, levels of movement and travel.

*Example: participants being 'lost in the moment', being self-aware, exploring space, interacting, moving with confidence.*

A sequence used during an Otago session incorporated a tea party theme (Mad Hatters tea party), using movement of raising cups, reaching for strawberries, eating and rubbing their stomach, waving to friends, sitting to stand, and walking across to another participant to chat and then repeat. Another example used a Fourth of July celebrations cowboy theme. Participants had been encouraged to wear cowboy boots and bring a hat. The pulse raiser included movements with the hats and paper fireworks, which encouraged movement out of chairs where possible. In some cases, the pulse raise was a blend of ROM and mobility and pulse raise. A further example used sequences from Swan Lake, with the Dance Artist including choreographed moves to tell the story as part of the pulse raise. Using storytelling and props (hats or capes), Dance Artists encouraged participants to copy movements, encouraging travel and using larger movements to increase heart rate.

Confidence in participants visibly increased and participants moved further away from chairs and participated with others in the centre space. A range of actions were encouraged with different walking stride and pace, reaching low and high, challenging them to bend low when walking, moving into lunging movements for leg strength. Progressive duration and intensity of exercise was observed during visits.

Some imaginative choreography and music enabled a range of challenging balance activities. Examples included participants being encouraged to move around and then pose like statues or walk like models on a catwalk, often working in pairs and small groups, using each other for support and challenging balance.

*Example: sideways walking ending with a one leg pose. Most could do this without chair.*



Other examples included working in pairs and creating a square by moving forwards, backwards and sideways, challenging cognition, balance and spatial awareness. Chairs were utilised to encourage a figure of eight movement around the chairs, adding arm movements to leg movements, incorporating turns with balance poses. This was creative and demanding but was stimulating and achievable for participants.

*Example: movements such as tandem walking using the analogy of tight rope walking, encouraging participants to look ahead and avoid looking down.*

Dance Artists effectively demonstrated and encouraged participants to engage in a variety of other balance activity including lunging, heel raises and toe lifts moving into dynamic balance of tandem walking and heel and toe walking, cleverly blended with excellent choice of music. Keeping chairs to hand and encouraging balance without touching the chair enabled confidence to increase.

*Example: participants focused on posture and technique - participants were asked to walk around 'Pac Man' style, carrying a tray in straight lines and change direction. This focused the participants' posture and challenged self and spatial awareness whilst continuing to challenge aerobic function.*

Well thought-out use of bands for strengthening exercises was observed, and others were creative in their use of equipment and pairing of participants for this activity. This included working in pairs in rows, using scarfs or long circular bands for all the participants to engage together. Activity included participants 'resisting' partners in building upper body strength.

### **3.5.3 Backward chaining and functional floor**

Backward chaining is an element of the FaME programme which is probably one of the most difficult elements for Dance Artists (DA) and Assistant Dance Artists (ADA) to manage, mainly because of the numbers of participants and their level of ability. At most sessions the participants were divided into two groups, those who were able or wished to attempt backward chaining and those who could not or did not feel able at that time. Generally, the DA led the backward chaining and the ADA focused on those remaining seated and engaged in further strengthening activity and practice of lunge toward chair with the aim of completing getting to the floor. It was clear that some participants were very capable of getting to the floor unaided, having conducted the move several times. For others the move was more difficult, and some participants experience pain when bending the knee or had restricted movement or did not feel confident. On these occasions it is preferable that the DA and ADA support one individual, but this is not always possible as they are then unable to observe other participants or engage everyone in activity. Given the challenges of this activity the DAs, ADAs and volunteers did well to engage most participants. Only one group with very large numbers of participants were unable to engage in backward chaining because of limited space and support to engage in it safely.

Functional floor work was observed, with many able to move from seated to side lying, prone lying and reverse to the opposite side. Side leg extensions need close attention to avoid the participant rolling their hips backward or forward and to avoid lifting the leg too high. Lower back extension also proved to be a difficult move for participants and can result in them lifting elbows off the floor and hyperextending the lower back. Bone loading through wrists was observed in a couple of the sessions

but could be encouraged more. Counting the leg lifts for participants keeps them together and avoids swinging the leg instead of a lifting technique.

Despite the complexity and difficulty of backward chaining, more participants completed it than those who did not. It was remarkable to see the agility of movement, confidence and joy in achieving the challenge. It was clear that some participants did not expect to be able to complete the activity and for one participant in particular it was an emotional experience. Anecdotal feedback from participants suggested that they no longer felt afraid if they were to fall at home as they know they can do something about it. One participant fell outside her home and used her experience of backward chaining to enable her to get up safely on her own. Another participant stated that they had tripped but believed that the leg exercises had made her legs stronger and she had managed to maintain balance and not fall.

Storytelling was again used effectively for cool down and flexibility. Lots of imagination and creativity was used, including visualising places or experiences. For example, being at the sea side and enacting movements of the sea, or sea creatures, enabling participants to relax and stretch. Tai Chi was incorporated into some but not all sessions and for the training gain sessions, stretches could be held for longer. Some of the stretches were challenging for participants, particularly hamstring stretches, with participants locking the knee on occasion and/or leaning too far forward.

#### **3.5.4 Music and the blend of exercises & dance**

A range of music was used at the various sessions, which in all cases was relevant to the story telling and was up lifting and appropriate for the element of activity. The music genres included rock, pop and country as well as war time songs, classical, reggae and jazz.

*Very little instruction is given; the participants are absorbed in the storytelling and watching the Dance Artist.*

It was clear that at points in time some participants were 'lost' in the music, and appeared to grow in confidence, moving around with self-assurance and joy. Great examples of innovative use of music to create story telling through movement was evident in all sessions, enabling participants to visually 'see' the movement required. The music encouraged movement and gave confidence to get up and move around, participants 'almost forgetting' that they had a mobility limitation.

#### **3.5.5 Summary**

Dance Artists should be applauded for their skill in creating an engaging exercise activity whilst adhering to core Otago and FaME components, without compromise to the ethos of Dance. Co-design and co-production of sessions was evident with DAs including participants in the development of routines and choice of music. Ideas were adapted to meet the needs of all participants, some with limited mobility, using wheelchairs or Zimmer frames and cognitive impairments.

The artistry used by DAs cannot be underestimated. It had the ability to support good technique, for example, standing and 'holding a tray of drinks', immediately engaged participants to stand tall, focus on core and then to move around, holding the correct posture. Creative combinations of steps saw participants develop their skill in dance and confidence to move freely, without inhibition and develop

self-efficacy – the ‘can do’ attitude was evident. In some cases, it was evident that the participants had ‘forgotten’ their limitations and fear of falling. It was very common for participants to praise the DAs, ADAs and volunteers, with one in particular stating her thoughts on a particular DA.

*"Mark her out of 10... I'll give her 35!" - Participant rating of the Dance Artist*

It should be noted that the sessions could not run without the support of at least an ADA and in some cases for the backward chaining element more support is required. Some sessions were lucky enough to have extra volunteers like ‘community champions’ in South Wales. This group in particular has been determined to ensure that participants were made aware of sessions, encouraged them to attend and supported them with transport and provide refreshments for the end of sessions.

Furthermore, it was obvious from the observations that rapport and trust had developed within the participant group and with the DAs, ADAs, mentors and volunteers. The tea and chat at the end of sessions had enabled friendships to be created, with participants supporting each other with travel to sessions, attending other physical activity sessions together and engaging in social activity. Overall there were excellent examples of elements of FaME and Otago within the sessions and examples of best practice.

### 3.5.6 Lessons learned

One in four people experience mental health issues each year<sup>47</sup> and of those it is estimated that 40% of older people in GP clinics have a mental health problem.<sup>48</sup> Depression is the most common mental health problem among older adults, affecting 22% of men and 28% of women aged 65+.<sup>49</sup> Every Mind Matters is a new resource and campaign aimed at supporting individuals with their mental wellness.<sup>50</sup>

Evidence suggests that there are five ways that we can improve our mental health by *connecting* with others, *being active*, *continuing to learn*, *giving to others* and *being mindful*.<sup>51</sup> It is evident from the observations and feedback from participants that improvements in mental health of participants have been a common outcome for Dance to Health. The most striking of these is the connection to the music and dance and with each other.

Participants were absorbed in the music and dance routine, they were *mindful* of their own movements, space and others.

*Example: Tai Chi moves concluded the session with a focus on breathing, creating a bubble and letting it float away.*

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<sup>47</sup> Mental Health England. 2019. *Mental Health Statistics*. URL: <https://mhfaengland.org/mhfa-centre/research-and-evaluation/mental-health-statistics/>

<sup>48</sup> Age UK. 2019. *Later Life in the United Kingdom 2019*. URL: [https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/late\\_life\\_uk\\_factsheet.pdf](https://www.ageuk.org.uk/globalassets/age-uk/documents/reports-and-publications/late_life_uk_factsheet.pdf)

<sup>49</sup> Royal College of Psychiatrists. 2018. *Suffering in silence: age inequality in older people's mental health care*. URL: <https://www.rcpsych.ac.uk/improving-care/campaigning-for-better-mental-health-policy/college-reports/2018-college-reports/cr221>

<sup>50</sup> NHS. 2019. *Every Mind Matters*. URL: [https://www.nhs.uk/oneyou/every-mind-matters/your-mind-plan-quiz/?WT.tsrc=Search&WT.mc\\_id=Brand&gclid=EAlalQobChMIIn5Gaylem5QIVyrHtCh0xAgIrEAAAYASAAEgIOVfD\\_BwE](https://www.nhs.uk/oneyou/every-mind-matters/your-mind-plan-quiz/?WT.tsrc=Search&WT.mc_id=Brand&gclid=EAlalQobChMIIn5Gaylem5QIVyrHtCh0xAgIrEAAAYASAAEgIOVfD_BwE)

<sup>51</sup> NHS. 2019. *Five steps to mental wellbeing*. URL: <https://www.nhsinform.scot/healthy-living/mental-wellbeing/five-steps-to-mental-wellbeing>

*Example: focusing the participants to consider their posture and breathing, encouraging control and to be in the 'here and now', thinking about what your body is doing, how it moves.*

Participants *interacted* with each other, sometimes as partners or simply by moving around each other.

They *supported* each other, not only during the dance but afterwards with a cup of tea and a chat, friendships have been formed and they look out for each other, often arranging travel for each other and organising other social events or going to other physical activity opportunities.

*Example: a male arrived with a Zimmer frame. He was supported one to one by the volunteer, encouraging sit to stand and squats. This gentleman had needed a taxi previously to transport him to sessions, but he now caught the bus on his own to the sessions.*

*Example: one group's sessions reflected community spirit and unity in an area where there are many challenges for residents; a sense of friendship and togetherness.*

The sessions provide the opportunity *to learn or re-learn*. Many participants have danced previously, either ballroom or line dancing, but many have not taken part in contemporary dance.

Dance to Health has a role to play in improving and maintaining good mental health in older adults.

### Final thought

Key lessons can be learned by health, sport and physical activity practitioners from Dance to Health about the engagement of older adults into activity and the empowerment it gives them to overcome what they believed to be limitations in their abilities. Observations suggest that physical activity and sport professionals can learn from the power of music and dance. The use of music and storytelling empowered participants to engage in movement; they were encouraged to move limbs through range of movements and gain confidence to 'go further', reaching higher or bending lower, as they were embraced by the music and lost in the storytelling or memories. Participants have flourished as they have progressed and their enthusiasm in taking part was palpable. Dance to Health has not only provided an opportunity for older adults to reduce their risk of falls but it has improved confidence, self-efficacy and mental wellbeing. The lasting memory from the observations was the sheer joy of participants and their connection to the dance and music which in some cases was extremely moving.

## 4. DISCUSSION

The findings from this research demonstrate that Dance to Health has achieved a reduction in the number of falls experienced by participants, plus the vast majority of respondents stated they feel more physically active and have improved their mental wellbeing as a result of their participation in the programme. Long term adherence to the programme can ensure that a participant maximises the benefits that Dance to Health has to offer, as physical improvements (i.e. improved strength and balance) can take time to build up. However, positive improvements in mental wellbeing can be evident from the first session; forging new friendships, reduced social isolation, improved confidence and sense of agency to take control of their own health and wellbeing are evident.

Dance to Health's fidelity to existing exercise programmes was also confirmed, outlining that the programme is successfully incorporating all the necessary components of the evidence based falls prevention programmes of Otago and FaME.

Given the adherence to the programme, the high proportion of individuals that stated they would recommend the programme to family and friends that are at risk of falling, it is evident that the programme is attractive for people at risk of falling and that there is demand for Dance to Health.

### 4.1 Limitations and future research

There are some limitations in the present study. Whilst all programme participants were invited to participate in the study, those participants with dementia were in some cases unable to take part, therefore their feedback was not captured. Additionally, much of the data, including the surveys, focus groups and weekly registers, involved self-reported data; therefore there is the potential that the self-reported data could be biased. For example, there is the potential that participants chose to take part in the Dance to Health programme as they have a high affinity to dancing; therefore there is the possibility of cultural bias. Furthermore, not all participants from the overall Dance to Health participant cohort were able to provide both pre- and post-programme data; therefore there is an element of sampling bias within the results. Moreover, at the baseline stage of the study, participants were asked to recall previous falls; therefore there may be recall / selective memory bias in retrospective reporting of falls. Further research could incorporate prospective falls diaries, in which prospective participants could complete falls diaries prior to their participation in the Dance to Health classes.

The evidence outlined within this report is contributing to a wider evidence base, as a previous Dance to Health pilot programme was also evaluated. Following on from the pilot evaluation, this Phase 1 Roll-out 'Test & Learn' programme evaluation is helping to further demonstrate that Dance to Health can be a successful referral programme for the falls service provision, yet it is not the final stage. As the programme develops, further research could be conducted to better understand the impact of the programme; this could include conducting a Randomised Control Trial (RCT), something which is already in the planning stages. The results of this study are based on pre- and post-intervention measurements. Future research, such as an RCT, would incorporate a control group into the research design. This would yield more robust data. Future research should also consider in more depth suitable methods through which feedback from participants that may have dementia could be incorporated.

## **5. CONCLUSIONS**

The evidence within this report outlines that Dance to Health offers the health system an effective and cost-effective means to address the issue of older people's falls. It should be used to help support and encourage effective commissioning; the evidence should be used to help inform health care professionals, national and local organisations, stakeholders and decision makers of the demand for Dance to Health, the programme's success to date, and the impact the programme can have in reducing both falls and the associated costs.

The next phase for Dance to Health includes wider roll-out of the programme and building the evidence base for the programme. Looking ahead, Tim Joss, Chief Executive and Founder of Aesop and creator of the Dance to Health Programme, has stated: "Aesop is now preparing Phase 2 Roll-out of Dance to Health. The plan has three main elements: considerable expansion so that many more older people benefit from Dance to Health's power to reduce falls and achieve positive side-effects such as improved mental wellbeing, reduced loneliness and isolation and increased independence; further progress on Dance to Health's evidence journey, including a Randomised Controlled Trial and collaborating with NHS England on measuring patient activation; and establishing more partnerships with local organisations so that Dance to Health is embedded in local communities."

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