Sheffield Hallam University | Sport Industry Research Centre

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

First report

Submitted by the Sport Industry Research Centre to Aesop

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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 44% 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 18%) and reduced fear of falling (a 12% improvement in the percentage of individuals classed as "low concern"). Additionally, based on the analysis conducted, there is a potential cost saving of over £149m over a 2 year period, of which £120m 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 a more effective and cost-effective means to address the issue of older people's falls.

1. INTRODUCTION

1.1 Current falls programmes and literature

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[1], 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[1]. In addition to being a major cause of pain and injury, resulting in around 255,000 hospital admissions amongst people aged 65 plus in 2013-2014 (as shown by the Public Health Outcomes Framework[2]), they are traumatic for older people, destroying confidence, increasing isolation and reducing independence. The Help the Aged Spotlight Report (2008)[3] describes that one in ten people who fall become afraid to leave their homes in case they fall again.

It is important 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.

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 activity to improve balance and coordination on at least two days a week"*[4]. 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*)[5]. NICE Guidelines (2013) on the prevention of falls recommends muscle-strengthening and balance training programmes[1]. Existing evidence around falls prevention exercise programmes demonstrates the potential of these programmes to improve quality of life and achieve significant cost savings[6]. 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[6]. This was reconfirmed by Public Health England

[1] NICE. 2013. *Falls in older people: assessing risk and prevention.* URL: https://www.nice.org.uk/guidance/cg161
[2] Public Health England. 2016. *Public Health Outcomes Framework*. URL: http://www.phoutcomes.info/
[3] Help the Aged. 2008. *Spotlight Report - Spotlight on older people in the UK.* URL: http://www.ageuk.org.uk/documents/en-gb/for-professionals/government-and-society/id7236_spotlight_report_2008_pro.pdf?dtrk=true
[4] 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
[5] 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
[6] 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

in 2017.[7] 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[7]. In addition, whilst programmes aimed at both primary prevention (aimed to prevent falls occurring) and secondary prevention (to prevent further falls by those who have already fallen) 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[7].

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[7].

Otago Exercise Programme (Otago)

A Cochrane review of falls prevention strategies[8] 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[9]. The programme is the result of many years of research, first identifying risk factors for falls and then testing potential interventions[10]. 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[10]. 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[10]. 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[10]. 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[10].

[7] Public Health England. 2017. *Falls and fracture consensus statement Supporting commissioning for prevention*
[8] Gillespie, L. D et al. 2009. *Interventions for preventing falls in older people living in the community*. Cochrane Database of Systematic Reviews
[9] Gardner, M. M et al. 2001. Practical implementation of an exercise-based falls prevention programme. *Age Ageing*, 30
[10] 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[11]. 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[11]. 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 will run until September 2019. It consists of 40 Improvement Programmes (dance versions of the evidence-based falls prevention exercise programmes) and 22 'Maintenance to Sustainable' Programmes. These programmes span 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 overleaf. It can be broken down into the following 3 phases:

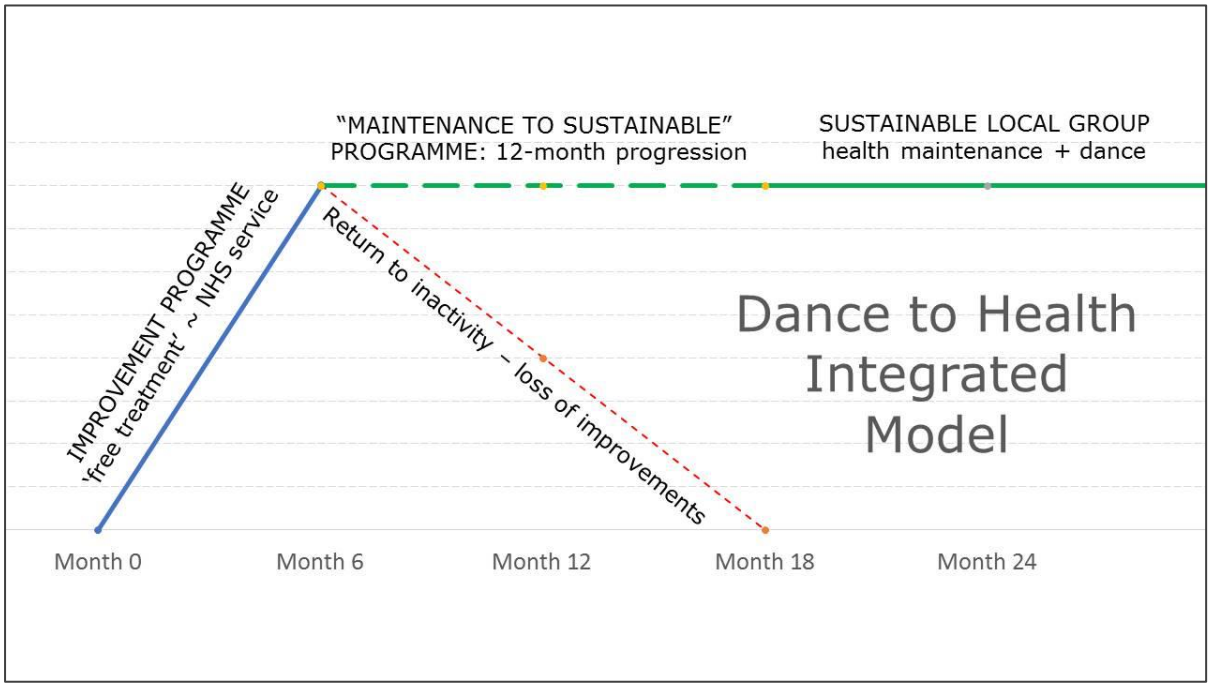
- **Improvement Programmes** – dance versions of Otago and FaME commissioned by health; leading to Maintenance to Sustainable Programmes.

- **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.

[11] 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[7], low take-up and adherence[12], whilst only a minority are evidence-based[7]. 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[7]. Dance to Health achieves this through a weekly 90 minute activity session plus at least 30 minutes of homework exercises and activities. Finally, programmes must be of the right intensity - being significantly challenging and progressive for individuals; NICE (2004)[13] 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. Otago and FaME programmes incorporating the correct type, duration and intensity elements as above have been shown to reduce falls by 54% and 35% respectively[3] [14].

[12] 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

[13] 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

[14] Campbell, A. J et al. 1997. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *British Medical Journal*, 315(7115), 1065-9

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 is to conduct a thorough review of the programme in order to understand the impact as well as the success of the programme. The evaluation has 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 first report draws on the results of 39 completed Improvement Programmes and 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 to date. The evaluation is ongoing, with evidence being collated across the course of the Maintenance to Sustainable phase, whilst final reporting on this current evaluation will be in September 2019.

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, whilst it also provided the required information to better calculate the cost-effectiveness of the programme in comparison to other falls prevention programmes.

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

Physical testing of participants has taken 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[15].

[15] 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*

The TUG test has been administered at both the baseline and follow-up stages of the Improvement phase, whilst a third round of TUG testing will take 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[16]. At the point of this interim report, some follow-up improvement phase TUG results are still being submitted to SIRC for analysis.

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. At the point of this first report, the Maintenance to Sustainable phase baseline questionnaire had just been distributed to the regional leads to disseminate to their respective programmes, whilst follow-up Improvement phase questionnaires are still being returned to SIRC for analysis. The self-administered questionnaires are distributed to all participants that are in attendance at the programme and are able and willing to complete the surveys. They are designed to measure changes in participants' perceptions and incorporate questions relating to the following:

- Fear of falling (Short Falls Efficacy Scale International; Short FES-I)
- Patient Activation Measure (PAM)
- Dance interest and ability
- 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'[17]. 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[17]. The tool comprises of seven questions and has been demonstrated to have good reliability and validity, and has been

[16] 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

[17] 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[18]. 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 can be 28 (severe concern about falling).

2.3.2 Patient Activation Measure (PAM)

As part of the evaluation, Patient Activation Measure (PAM) has been introduced to the Maintenance to Sustainable participant survey. Patient activation describes the knowledge, skills and confidence a person has in managing their own health and care[19]. 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[19]. 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[19]. 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)[19]. 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[19]. 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[19]. Findings from using this tool will be incorporated into the final report.

2.4 Analysis of the cost effectiveness of Dance to Health

Detailed analysis and modelling has been conducted in order to be able to quantify the cost effectiveness of Dance to Health. This modelling has been conducted using monitoring data from the evaluation of the Dance to Health programme, comprehensive financial information provided by

[18] 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

[19] NHS. 2018. *Patient activation and PAM FAQs*. URL: https://www.england.nhs.uk/ourwork/patient-participation/self-care/patient-activation/pa-faqs/

Aesop, and Public Health England's "A return on investment tool for falls prevention programmes in older people based in the community"[20].

Cost savings of the programme were calculated as Return on Investment (ROI). SIRC's in-house econometrician used the Public Health England return on investment tool[20] to calculate the ROI of the programme. At the time of first preliminary analysis, 29 Dance to Health programmes (73% of 40 programmes in operation) had completed the 26 week Improvement phase and were included in the analysis. This will of course be updated for the final report in September 2019 to incorporate all programmes.

2.5 In-depth focus groups with participants and stakeholders

In order to complement the quantitative data, qualitative evidence was collected via focus groups. At the time of producing this first report, two focus groups had been conducted with participants at Balfour House (Sheffield) and Windmill Community Centre (Oxfordshire). 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 your families, carers, and friends
- How the programme/sessions be improved for the future

An additional four focus groups are still to be conducted throughout the course of the Maintenance to Sustainable phase.

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, to date, have taken place across eleven programmes, as detailed in section 3.5.1. A further seven observational visits will be conducted across the 6 regions during the Maintenance to Sustainable phase of the programme.

Observational visits have taken place to assess whether both Otago and FaME have been

[20] Public Health England. 2018. *A Return on Investment Tool for the Assessment of Falls Prevention Programmes for Older People Living in the Community*

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 will run 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**
- *September 2019: final report of current evaluation*

To summarise, the research outlined within the methodology is ongoing and will be conducted by SIRC across a 2 year period, from October 2017 to September 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) is responsible for project management, the research design, data collection, reporting, and liaison with participants / stakeholders / deliverers / Aesop. Judy Stevenson (Consultant) is responsible for the observational visits, whilst also contributing to data collection and reporting. Themis Kokolakakis (Reader at SIRC) is responsible for the analysis and reporting regarding the cost-effectiveness of Dance to Health. Wider members of SIRC have also contributed to this research. None of the authors/research team had any conflict of interest.

The evaluation was funded by Aesop.

3. RESULTS

The total sample of respondents that completed the Improvement phase baseline survey was 512, whilst 285 participants completed the follow-up Improvement phase survey. Of this sample, 210 participants were identified as having completed both the baseline and follow-up surveys, allowing their data to be matched to determine any statistically significant change.

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 to date. As per both the summary table (Table 1 overleaf) and the more detailed findings within this results section, the evidence outlines that Dance to Health offers the health system a more effective and cost-effective means to address the issue of older people's falls. 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. Additionally, based on the analysis conducted, there is a potential cost saving of over £149m over a 2 year period, of which £120m is a potential cost saving for the NHS.

Table 1: results summary

Measure	Dance to Health[21]	Otago	FaME
FALLS			
Reduction in falls	44%	54%[22]*	35%[23]*
Falls-related A&E visits that require admission as an inpatient	15%	35%[24]	35%[24]
Timed up and go (TUG) test – average time improvement (reduction in time)	18%	NE**	NE**
Reduction in fear of falling (Short FES-I) (% increase in number of participants classed as "low concern")	12%	NE**	NE**
POSITIVE SIDE-EFFECTS			
% of participants reporting improvement in mental wellbeing	95%	NE**	NE**
% of participants reporting that they are more physically active	88%	NE**	NE**
Improvement in feeling calm and relaxed	17%	NE**	NE**
Improvement in feeling confident	15%	NE**	NE**
Reduced sense of loneliness and isolation	11%	NE**	NE**
Increased sense of independence	11%	NE**	NE**
PATIENT PULL			
NHS England Friends and Family Test	97%	NE**	NE**
Transition into Maintenance to Sustainable phase	68%	NE**	NE**
ATTENDANCE, ADHERENCE AND FIDELITY			
Average attendance across the Improvement Programme	58%	NE**	NE**
Adherence	50%	46%[25]	31%[25]
Fidelity	'confirmed'	'often poor'[26]	'often poor'[26]
COST-EFFECTIVENESS			
Financial return on investment	£1.11 : £1	£0.95 : £1[20]	£0.99 : £1[20]
Societal return on investment	£2.37 : £1	£2.20 : £1[20]	£2.28 : £1[20]
Incremental Net Monetary Benefit	£1,173.19	£528.58[20]	£283.07[20]

- **The figures of 54% for Otago and 35% for FaME assume fidelity, however, fidelity to these programmes has been cited as "often poor"[27].*
- ***NE - no evidence available. Based on a review of literature there was no evidence or specific data available about Otago and FaME to make a comparison with Dance to Health.*

[21] Sport Industry Research Centre (SIRC). 2018. *Dance to Health 'Phase 1 roll-out [test and learn]' evaluation First report.* Sheffield
[22] 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*, 34(6), 636-9
[23] Sherrington, C. et al. 2011. Exercise to prevent falls in older adults: an updated meta-analysis and best practice recommendations, *NSW Public Health Bulletin*, 22, 3–4, 78-83
[24] Craig J, et al. 2013. The high cost to health and social care of managing falls in older adults living in the community in Scotland. *Scott Med* J, 58(4), 198-203
[25] Iliffe, S. et al. 2014. Multicentre cluster randomised trial comparing a community group exercise programme and home-based exercise with usual care for people aged 65 years and over in primary care. *Health Technology Assessment, 18(49), 1-105*
[26] Riglin, J., Buttery, A., Vasilakis, N. 2012. *Older people's experiences of therapeutic exercise as part of a falls prevention service*. London
[27] Skelton, D. 2018. *Return on Investment – FaME (PSI) and Otago: Cost Effective Interventions for Falls*. URL: https://media2.laterlifetraining.co.uk/wp-content/uploads/2018/04/Skelton_LLT_FaME_OEP_RoI_Webinar_2018_narrated.pdf

3.2 Programme attendance and adherence

Table 2 (below) provides a detailed breakdown of overall weekly attendance, by region, across the 26 week Improvement phase of the programme. The average attendance on the course across the Improvement phase was 58%, with this figure based on the number of participants that has registered with each course. Attendance on the programme fluctuated by week, whilst the highest weekly attendance was recorded at week 10 (69.3%). Moreover, there are differences in attendance by region, with the Cheshire region recording the highest average weekly attendance (70.8%).

Table 2: overall programme attendance by region

Course name	Attendance each week (%)																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	TOTAL
Cheshire	47.4%	55.7%	67.0%	63.8%	76.4%	69.2%	81.7%	83.5%	76.3%	85.7%	77.1%	65.2%	75.8%	78.8%	66.5%	79.1%	76.9%	73.1%	72.2%	68.1%	64.6%	65.4%	68.4%	67.7%	60.1%	68.1%	**70.8%**
Oxfordshire	44.2%	63.2%	55.0%	63.6%	67.5%	68.3%	68.9%	66.1%	76.4%	73.7%	61.4%	72.0%	69.7%	68.9%	69.8%	70.8%	72.3%	52.6%	55.8%	58.1%	63.4%	65.4%	49.6%	60.6%	63.9%	70.8%	**64.3%**
Norfolk	56.5%	41.0%	54.5%	72.1%	67.9%	71.7%	51.0%	55.6%	70.4%	69.4%	57.3%	58.7%	48.8%	50.6%	55.9%	64.3%	60.0%	64.0%	58.1%	56.9%	50.8%	59.3%	59.9%	58.1%	57.4%	60.6%	**58.9%**
South Wales	34.8%	32.0%	49.9%	44.2%	54.6%	50.2%	66.2%	63.7%	50.0%	64.9%	68.9%	76.2%	64.0%	77.3%	60.0%	67.0%	68.5%	52.7%	49.6%	43.6%	57.8%	50.9%	40.6%	45.7%	51.9%	68.0%	**55.9%**
Birmingham	53.8%	50.6%	48.3%	55.0%	54.7%	51.4%	61.8%	46.9%	62.5%	62.2%	40.7%	64.1%	59.0%	57.2%	46.7%	56.9%	58.1%	59.6%	55.7%	58.9%	61.9%	51.5%	45.2%	58.9%	62.1%	62.2%	**55.5%**
Sheffield	15.2%	26.7%	29.0%	29.0%	45.6%	46.7%	43.9%	59.9%	43.0%	57.5%	50.7%	50.7%	53.5%	40.9%	49.4%	48.7%	52.0%	45.8%	43.9%	46.0%	48.0%	34.9%	42.9%	49.0%	50.9%	56.9%	**46.7%**
TOTAL	**43.1%**	**45.0%**	**50.5%**	**54.7%**	**61.6%**	**60.2%**	**61.6%**	**62.5%**	**63.1%**	**69.3%**	**59.1%**	**63.7%**	**60.8%**	**61.7%**	**57.6%**	**65.7%**	**64.0%**	**58.4%**	**55.9%**	**55.7%**	**57.7%**	**54.6%**	**51.6%**	**57.2%**	**58.1%**	**64.1%**	**58.3%**

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, adherence was just above 50% (50.2%). This adherence rate is more favourable in comparison to the Otago (46%) and FaME (31%) rates[25]. Adherence to the Maintenance to Sustainable Programme has also been high; of the data received to date at the time of reporting, 67.8% of participants have transitioned to the Maintenance to Sustainable Programme classes.

3.3 The impact of Dance to Health on participants

3.3.1 Falls reduction

Based on the monitoring of participants that could recall a fall in the previous 12 months, there was **a 44% reduction in the number of falls**. This is the first major statistic that indicates the effectiveness in the model. Additionally, the number of falls related admissions to A&E following a fall is 35%[20]. The monitoring data collected as part of the Improvement phase for Dance to Health showed that for the participants this percentage reduces to 15%. 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 Positive improvements in participants' physical wellbeing

The Timed Up and Go (TUG) test

The total sample of respondents that completed the Improvement phase baseline TUG test was 554, whilst 213 completed the follow-up TUG test. Therefore at this interim stage 213 participants were eligible to be included for analysis (at the time of production of these interim findings some follow-up Improvement phase TUG results are still being submitted to SIRC for analysis).

Table 3 (below) shows the cut-off times for the TUG test, highlighting that there has been **a statistically significant increase in the number of participants that are in the 'normal mobility' category**. In terms of improvements in results, **the average time reduced by 18%** (an average decrease of 2.31 seconds), from an average time of 12.99 seconds at the baseline stage to 10.68 seconds at the end-point stage.

Table 3: Timed Up and Go results[28]

Timed Up and Go cut-off points:	Normal mobility (regardless of age) (a score of 10 seconds or less)	Normal limits for frail elderly and/or disabled people (a score of 11-20 seconds)	A result suggesting the person needs assistance and indicates further support may be required (a score of greater than 20 seconds)
Baseline survey	39.4%	38.9%	21.6%
Follow-up	57.7%	30.0%	12.2%
Difference	**18.3% (p< 0.05)**	**8.9%**	**9.4%**

The largest improvement (decrease) in TUG times was 44.91 seconds, recorded by an individual that had a baseline time of 55 seconds, whilst their end-point time was 10.09 seconds. This equates to an

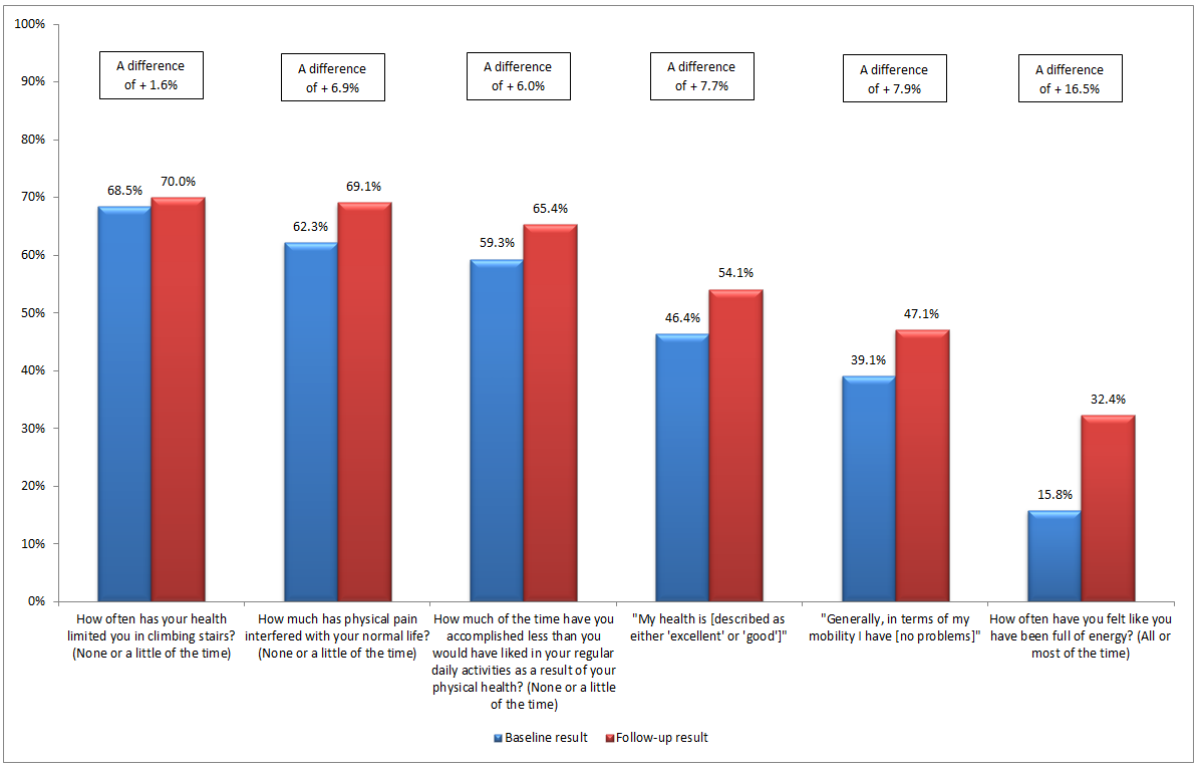
[28] Grieger J, et al. 2007. Anthropometric and biochemical markers for nutritional risk among residents within an Australian residential care facility. *Asia Pac J Clin Nutr*, 16(1), 178–86

81.7% reduction in their time. This individual in question had a very high adherence rate, attending 23 of 26 Improvement Programme sessions, which in addition to homework time this individual recorded over 59 hours of activity across the 6 month period.

Further improvements in physical wellbeing

Aside from the physical testing, **88.1% of participants stated that as a result of the Dance to Health programme they feel they are more physically active**. Additionally, further improvements have been witnessed across the board, in terms of the mean results across all 6 areas in Figure 2 (below). Figure 2 shows that participants indicated that their health has improved, in particular the percentage of participants who claimed they have felt full of energy (a 16.5% increase). Additionally, participants indicated that they have felt more mobile, whilst pain and their physical condition has been less of a deterrent or interference, allowing them to accomplish more in their daily lives.

Figure 2: improvements in physical wellbeing



Goal setting

All participants were asked whether they had a goal in mind that they aim to achieve by taking part in the Dance to Health programme, and if so, what it was. Of the responses, the top three related to physical improvements, as seen in Table 4 below.

Table 4: goal setting by theme

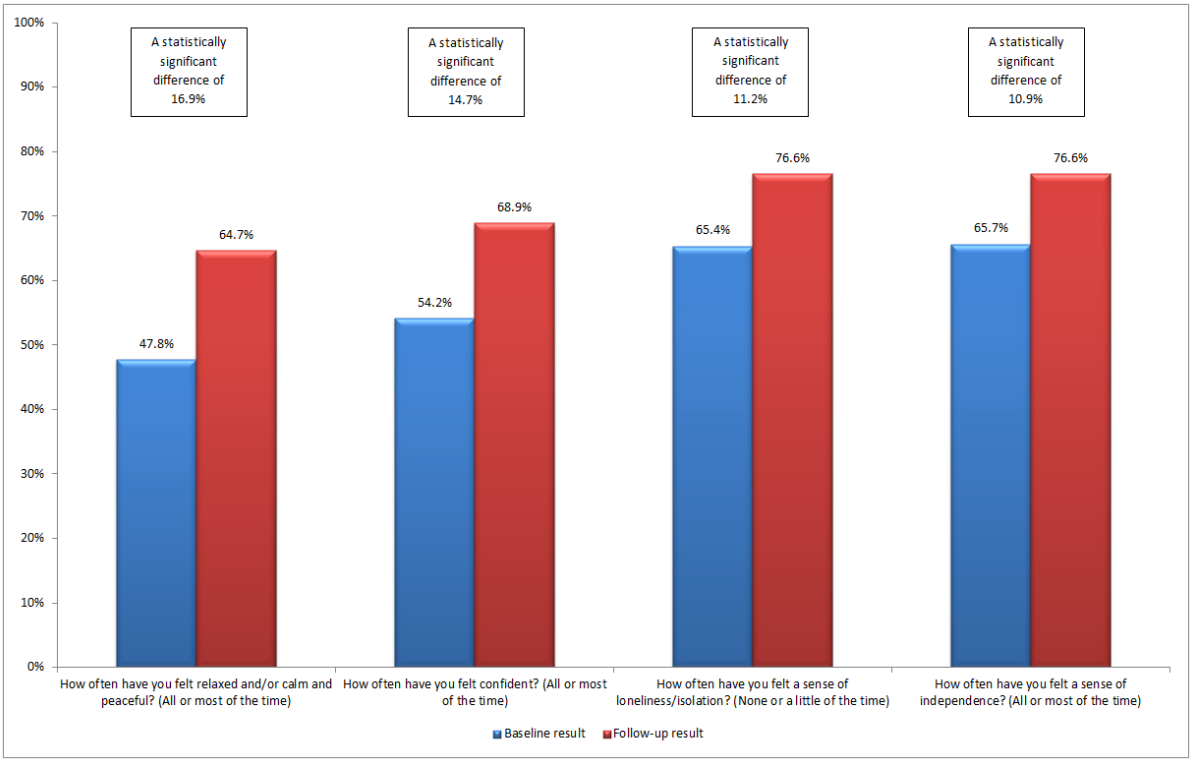
Goal	Frequency	%
Improve fitness and strength	181	40.2%
Improve mobility	150	33.3%
Improve balance	86	19.1%

3.3.3 Positive improvements in participants' mental wellbeing

In terms of participants' mental wellbeing, at the follow-up stage **94.7% stated that they felt Dance to Health has improved their mental wellbeing**. Additionally, there were five areas in which a statistically significant change was derived. Figure 3 overleaf highlights the first four of these areas, including **statistically significant improvements in:**

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

Figure 3: statistically significant improvements in mental wellbeing



Reduction in participants' fear of falling

In total, 175 participants completed the Short FES-I at both the baseline end follow-up points, the results of which are presented in Table 5 below. **Encouragingly, there has been a statistically significant reduction in participants' fear of falling.** This is demonstrated in the table below, with a 12.4% increase in the percentage of individuals that derived a score of 7-8 and are therefore classed as "low concern".

Table 5: fear of falling cut-off points[29]

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)
Baseline survey	28.6%	46.9%	24.6%
Follow-up	41.7%	40%	18.3%
Difference	**12.4% (p<0.05)**	**6.9%**	**6.3%**

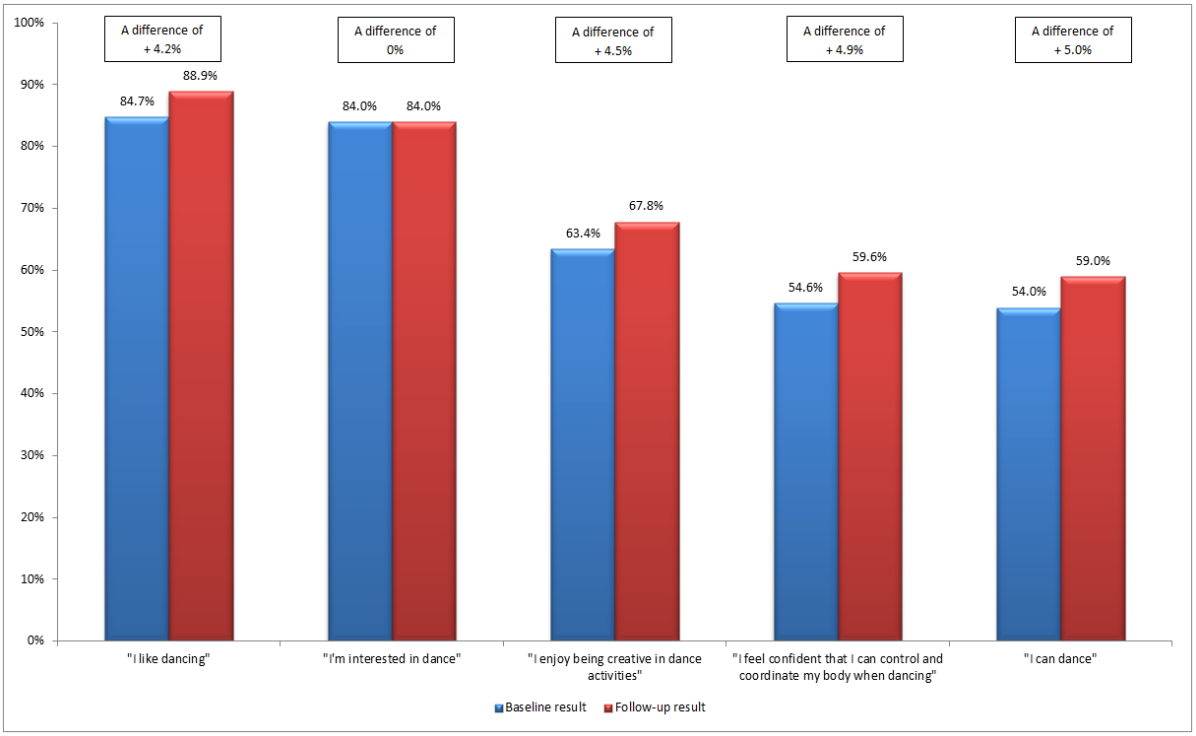
[29] Delbaere, K, et al. 2010. The Falls Efficacy Scale International (FES-I). A comprehensive longitudinal validation study. *Age & Ageing*, 39, 2

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 **97.5% stating that they have enjoyed taking part in the Dance to Health programme**, whilst **86.2% said they have made new friends as a result of taking part in the Dance to Health programme**.

3.3.4 Dance interest and ability

In terms of dance interest and ability, the mean results between the baseline and follow-up stages improved across four of the five areas by at least 4%, with only "I'm interested in dance" indicating no change (Figure 4 below). These are very positive changes, albeit not statistically significant. The baseline results were very high to begin with, in particular in terms of how much participants like and are interested in dance, therefore it is more difficult to show statistically significant increases in already very positive results.

Figure 4: improvements in dance interest and ability



Of the sample, the most common types of dance participants had been involved with previously included ballroom dancing (22.6%), line dancing (12.9%) and tap dancing (5.9%). Overall, it is evident that dance is a powerful driver in attracting participants to the programme, whilst participants feel that the programme has increased their confidence and ability to control their body and made them feel that they are more capable, creative dancers.

3.3.5 Overall perceptions of the programme

Overall, the findings detailed within this report are overwhelmingly positive. It is clear the programme has had a profound impact on the participants in the evaluation, with **over 97% stating 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:

> *"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."*
>
> *"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 feel so energised and motivated. I started to believe in my mobility again. I am now walking 25 minutes a day three days a week and I go to the gym to do weight training."*
>
> *"I have more balance. I am no longer scared to cross the road, my joints are less painful and I'm more mobile."*

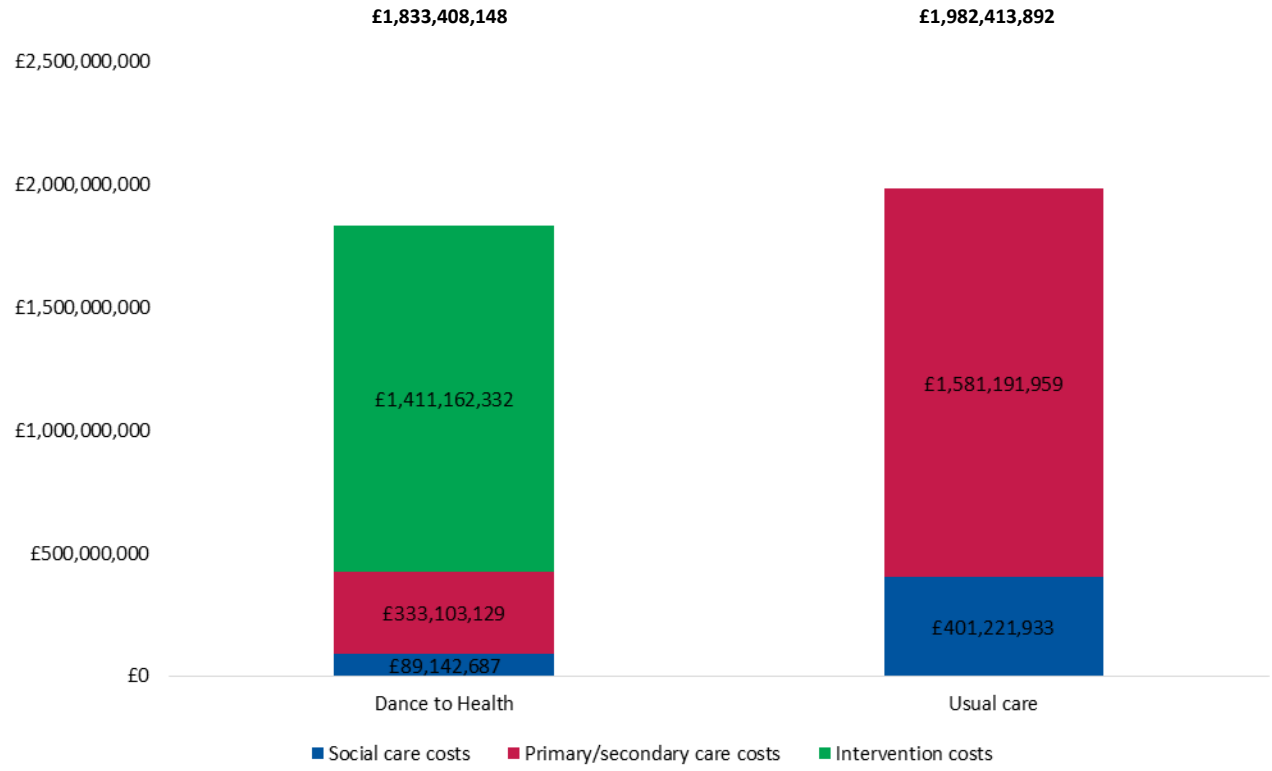
3.4 The cost-effectiveness of Dance to Health

3.4.1 Cost savings from the programme

Based on the analysis conducted, **there is a potential cost saving of over £149m (£149,005,744) over a 2 year period, of which £120m (£120,244,700) 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 (50%) the final population included in the analysis is 1,650,967 people.

The cost of implementing Dance to Health in England (demonstrating a saving of over £149m) is shown in Figure 5 overleaf.

Figure 5: 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 6 below, 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[20].

Table 6: 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	£1.11 : £1.00	£2.37 : £1.00	£1,173.19
Otago	£0.95 : £1.00	£2.20 : £1.00	£528.58
FaME	£0.99 : £1.00	£2.28 : £1.00	£283.07

In terms of realised cost savings, the **financial ROI** is £1.11, i.e. for every £1 invested in Dance to Health there is a positive return of £1.11.

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 £60,000 based on guidance from the Department of Health[30].

Taking into account societal ROI, Dance to Health has a potential ROI of £2.37 for every £1 invested, indicating there is a positive return of £1.37.

Table 6 also shows a **Net Monetary Benefit (NMB)** of Dance to Health of £1,173.19 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.

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

To date, eleven of the eighteen planned fidelity observations have taken place and for this sample the sessions took place between weeks 14 and 27. Table 7 (below) provides an overview of the sessions.

Table 7: fidelity observation visits

Date	Venue	Programme type	Week
18.06.2018	Stocksbridge CLC Sheffield	FaME	15
20.06.2018	Lozells Methodist Church, Birmingham	Otago	27
21.06.2018	Crewe Lifestyle Centre	FaME	18
25.06.2018	Church of Resurrection, Macclesfield	FaME	14
02.07.2018	Bob Carter Centre, Drayton	Otago	22
04.07.2018	Saint Augustine's Church Sheffield	FaME	24
05.07.2018	Galanos House, RBL, Banbury	Otago	14
06.07.2018	Ladywood CC Birmingham	FaME	22
09.07.2018	Gorseinon District WMC	Otago	15
10.07.2018	Pontarddulais	FaME	25
30.07.2018	Barton Community Centre, Oxford	FaME	26

In terms of the background of the facilities, sessions took place in a variety of settings including care homes, sports halls, dance studios, church halls, community centres and one Working Men's Club. All the venues had appropriate flooring, most had natural light as well as artificial lighting and the temperature of the room was appropriate for exercise. As the observations took place during the hot summer months, the dance leads made adjustments to accommodate this with open windows and fans and utilised more frequent hydration breaks and reduced time spent exercising in some cases. The length of session on average was one and a half hours, with time at the beginning to meet and greet, take a verbal health check and record any falls. At the end of the sessions most had time for a

[30] Glover, D. 2010. *Quantifying health impacts of government policies: A how-to guide to quantifying the health impacts of government policies.* London, UK. URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216003/dh_120108.pdf

cup of tea and a chat, with discussion about the session and homework. All the sessions provided a time for older adults to engage with each other in a safe environment and enabled them the opportunity to move as freely as they wished to a range of music which at times was both moving and magical to watch.

3.5.2 Findings from the observational visits

Overall, it was observed that Dance to Health has been able to effectively translate Otago and FaME exercise programmes into dance sessions, therefore from our perspective confirming the fidelity of the Dance to Health programme to these two exercise programmes.

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.

Overall there were excellent examples of elements of Otago and FaME within the sessions. Sometimes there was not always clear delineation between programme elements, but this may not be of importance. Throughout the sessions from beginning to end, there was a lot of smiles and laughter and for the participants being there was important to them. It was obvious from the observations that rapport and trust had developed within the participant group and with the participants and Dance Artists, Assistant Dance Artists, mentors and volunteers. Some participants required more support than others, which was accommodated and the instructors were motivating and encouraging.

4. DISCUSSION

The findings from this research demonstrate that Dance to Health has achieved a reduction in the number of falls experienced by participants, whilst 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. Adherence rates to the programme were more favourable in comparison to Otago and FaME, and moreover the evidence suggests that significant potential cost savings could be made in comparison to existing provision. 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, and the high levels of dance interest, it is evident that the programme is attractive for people at risk of falling and that there is demand for a programme such as Dance to Health.

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, at the baseline stage of the study, participants were asked to recall previous falls, therefore there may be recall bias in retrospective reporting of falls.

Current falls services and prevention programmes for older people in the UK are patchy in terms of provision; many in existence have low take-up, there is a lack of ongoing sustainable activity for individuals (gains are often lost and investment is wasted), and many services are not evidence based. Dance to Health aims to address these challenges with this current model of delivery outlined within this report. 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 the better understand the impact of the programme; this could include conducting a Randomised Control Trial (RCT), something which is already in the planning stages. Any further 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 a more 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."

ACKNOWLEDGEMENTS

SIRC would like to acknowledge and thank Dance to Health participants and stakeholders that have supported this research, including participants from all programmes for their valuable contribution, Dance to Health Regional Coordinators, Dance Artists and Assistant Dance Artists for all their support with the data collection.