



Academic Review Paper

Sports Participation and Ageing - Influence and Impact

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Introduction

In most countries there is a trend of reduced participation in sporting activities with age from as early as 12, becoming much more pronounced in the older age groups. Yet sport is recognised as a significant contributor to the accumulation of sufficient physical activity to promote and maintain physical health with additional recognised social and psychological benefits. Added to this across most developed societies, as a result of reduced birth rates and improved healthcare, there is a demographic shift resulting in increasingly ageing populations.

The challenge in many countries including Scotland is understanding the reasons for the steep declines in participation with age and developing evidence-based policies to counter this trend of reduced participation. The aim of this review is to analyse the existing data to reveal the current sports participation rates and trends in the older age groups (65+) in Scotland. This data will be compared with equivalent analyses in other countries around the world, and will also include exploration of some of the key factors known to influence participation rates. In addition, there is an examination of the current sports policies and delivery strategies that could influence sports participation in the older age groups.

Changing Demographics - Ageing Population

The leading edge of the baby boomer group (born between 1946 and 1964) are now in their 60s and this bump in the demographic makeup will last for the next 20 years. According to Scottish Government projections, the population of those over the age of 65 will increase from just over 1m in 2018 to more than 1.4m in 2038, with the overall population of Scotland only increasing by 0.23m over the same period and the population of working age declining by about 150,000. The proportion of those 65+ in Scotland will grow from 18.8% to 25.2% of the total population over the next 20 years. An additional effect is increasing life expectancy across most developed countries; this is projected to increase by 7.1 years (9.1%) for men and 6.4 years (7.7%) for women in the UK by 2050 (Parr et al., 2016). However, in recent years this increase has plateaued (NRS, 2017). This clearly indicates a shift in the population towards older age groups with a number of social and health consequences.

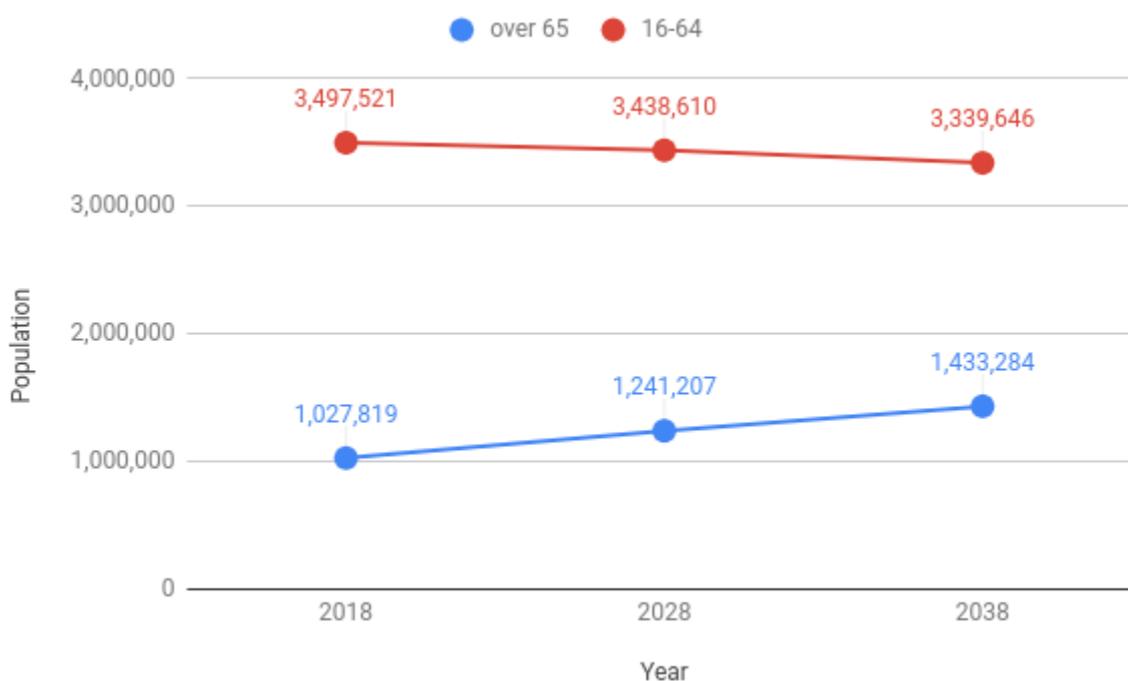


Fig 1 Projected population of Scotland (2018-2038), 16-64 and over 65 age groups (ONS 2018).

Scotland has the lowest current life expectancy from birth (77.1 years) in the UK and the second lowest Disease Free Life Expectancy (DFLE) (61 years) and is placed in the lower half of both statistics in Europe. At age 65 Scottish men have the lowest DFLE in the UK (8.6 years) (ONS). While many factors determine life expectancy, and in particular healthy life expectancy, physical activity is a key factor. Community sport has the potential to make a significant contribution in increasing the physical

activity levels of the older age groups improving and maintaining their physical, psychological and social health status.

Sports Participation in the Older Age Groups

One of the difficulties understanding the research literature in this area is the confluence of sporting activity with the broader term 'physical activity' and this is further exacerbated in the older age groups where competitive and more formal sport is less prevalent. Recognising the health implications of inactivity WHO in 2018 launched its Global Action Plan for Physical Activity 2018-2030 and there in recognised that "Sport is an underutilized yet important contributor to physical activity for people of all ages" (WHO, 2018). For many individuals, sports participation is the primary way that they gain the majority of their physical activity over the week. However, this is not consistent across the age range as it has been shown that younger adults are more likely to gain their weekly physical activity through sport than those over 55 (van Uffelen et al., 2015). Some researchers also suggest that a sports participant can mean any person who directly or indirectly participates in sports as a player, contestant, team member, coach, manager, trainer or administrator, it is recognised that the majority of physiological, psychological and social benefits arise from the physical participation of being a player, contestant or team member there are also documented psychological and social benefits for the non-physical participation of being a coach, manager, trainer or administrator (Jenkin et al., 2018). For the purposes of this paper we will focus on physical sports participation, only referring to the data on broader physical activity where a clear parallel can be drawn and there is a lack of distinct or equivalent research data on sports participation. Where possible we have compared Scottish sports participation with other published international data to enable appropriate comparisons. We have defined older people as those aged 65 years and older. However, we do occasionally refer to data and research from slightly younger (50-65) cohorts where there is significant information that indicates important trends or concepts.

While in Scotland and internationally there are a number of repeated cross-sectional surveys on sports participation across the age ranges, there is a distinct lack of longitudinal or cohort data. Cross-sectional studies cannot measure developments or differentiate between age and cohort effects as they are clumped together. Longitudinal approaches can measure development processes and monitor cohort effects, but age and period effects are combined and thus cannot be differentiated. A cohort sequence analysis period and cohort effects can be monitored; this is where the same population is measured at several time points with a new 'youngest age group' is added at every measurement point (Breuer & Wicker, 2009). The data on the impact of ageing on physical performance or physiological function shows that longitudinal declines with age tend to be significantly larger than those measured from cross-sectional studies (Mitchell et al., 2012).

Modelling of data from the Active People Survey in England has shown that, net of other effects, being over 65 reduced the probability of participating in sport by 25 percentage points, the largest factor determining participation in this study (Widdop et al., 2018). Thus, aside from other trends over time, age is a very significant factor in sports participation. Depending on how it is calculated, sports participation in

Scotland is less than half as much for the 65+ age group compared to the 16-24 age group.

The frequency of exercise or sport also tends to decrease with age. Data from the Eurobarometer survey on physical activity across Europe shows that a majority of 15-24 year olds (62%) exercise or play sport regularly or with some regularity; this falls to 46% in the 25-39 age group, 39% for 40-54 year-olds and 30% for the 55+ age group. Correspondingly, the proportion that never exercises or plays sport ranges from 24% among 15-24 year olds, to 61% of those aged 55 or over. (European Union, 2018)

In Scotland there is limited high quality sports participation data and the data on older individuals is even more limited. The two main sources of data that do exist are the Scottish Household Survey (SHS) and the Scottish Health Survey (SHeS). Both are high quality surveys in terms of their methodology; however, the questions related to sports participation are somewhat limited resulting in a lack of important detail in the information available. In addition, both surveys are carried out all year round but do not document the date of collection and this would potentially impact on the understanding of seasonal participation in sport.

- The Scottish Health Survey 2017 has a specific question on participation in sport for children but for adults the most detailed data is the amount of 'Sport and Exercise' in the last four weeks and the number of hours in the last week. There is no information on the nature of the 'Sport and Exercise', limiting more detailed analysis of potential trends. One advantage that the SHeS has over the SHS is that it is possible to differentiate elements of physical activity like Heavy housework, Heavy manual/gardening/DIY, Walking, and Sport and exercise, thus giving a clearer picture of sports participation minus the interference of the other physical activity categories.
- The SHS consists of two simple questions: *What activities* (from a list of 12 including walking and 'other' option) *have you taken part in in the last four weeks?*, followed by *How many days in the last four weeks did you do at least one of the activities?*

Adequate overall physical activity levels are critical for the maintenance of good health and although there are several standards throughout the world they broadly relate to a similar acceptable threshold of physical activity. Fig 2 shows the most recent data for Scotland which clearly indicates that with age there is a significant decline in the amount of adequate physical activity. However, it could be argued that applying the same physical activity target across all ages is unrealistic and that there should be age appropriate guidelines. The new 'UK Chief Medical Officers' Physical Activity Guidelines' do specifically mention 65+ as a separate group but the moderate/vigorous physical activity (MVPA) target remains the same as for younger adults (Foster et al., 2019).

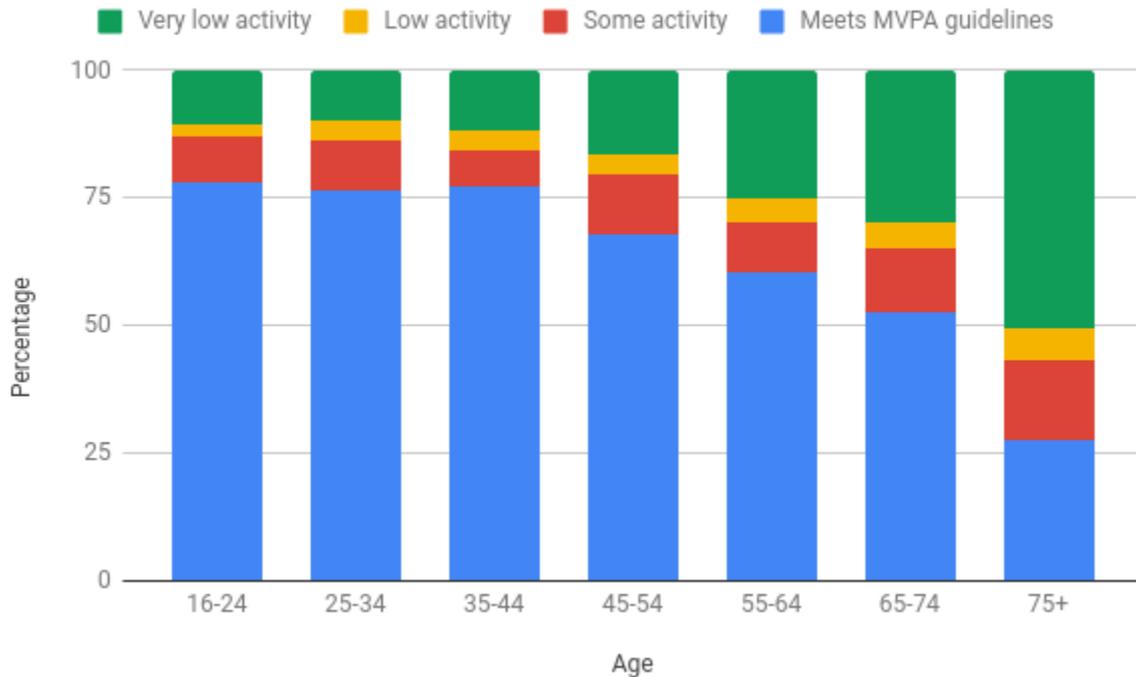


Fig 2 Scottish Health Survey 2017, Physical activity levels by age group

Meets moderate/vigorous physical activity (MVPA) guidelines: at least 150 minutes of moderately intensive physical activity or 75 minutes vigorous activity per week or an equivalent combination of both. Some activity: 60-149 minutes of moderate activity or / 30-74 minutes of vigorous activity or an equivalent combination of these. Low activity: 30-59 minutes of moderate activity or 15-29 minutes of vigorous activity or an equivalent combination of these. Very low activity: less than 30 minutes of moderate activity or less than 15 minutes of vigorous activity or an equivalent combination of these.

Across Europe (European Union, 2018; Hovemann & Wicker, 2009) and most other countries (Brocklesby, 2018) and in Scotland (Fig 3) it is clear that both general physical activity and specific sports participation decline with age. Figure 3 shows the percentage of adults undertaking any sport and exercise activity in the last 4 weeks. Despite very significant declines in participation with age it is interesting to note that there is very little if any gender difference in participation over the last four weeks in the older age groups when considering solely the number of sport and exercise activities in that time frame. However, this somewhat masks the time spent participating in sport and exercise with a real gender difference across all age groups including 65+ (Fig 4).

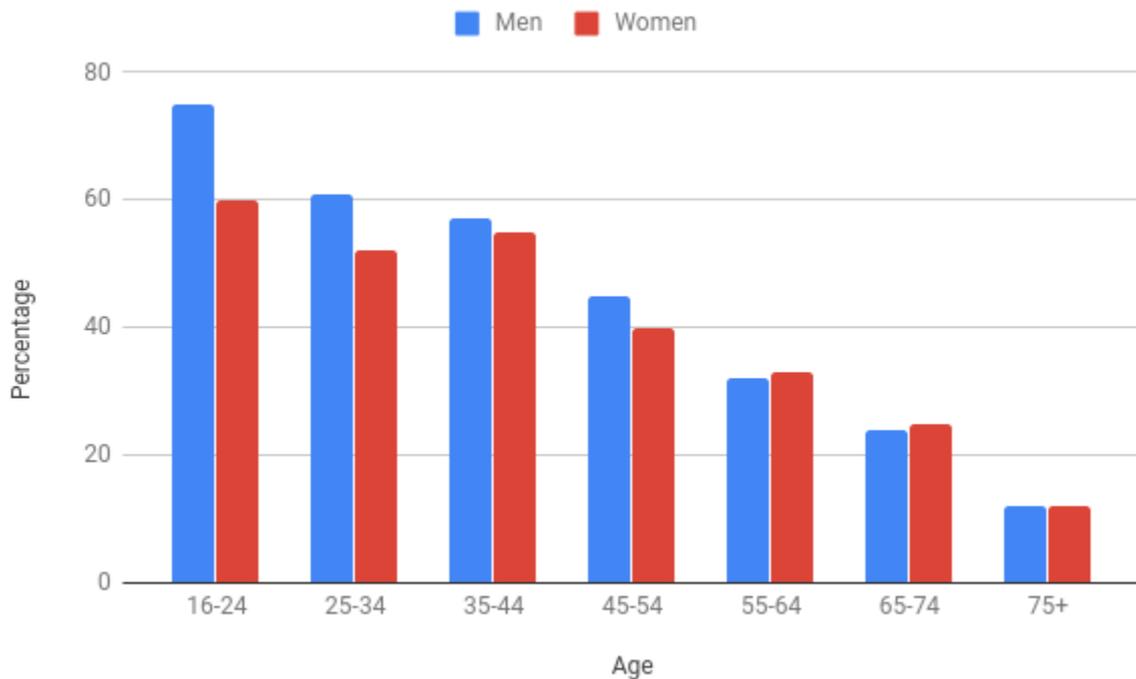


Fig 3 Scottish Health Survey 2017, any sport and exercise participation in the last 4 weeks (percentage)

Figure 4 shows that addressing the hours per week taking part in 'sport and exercise' reveals a significant gender difference with women of all ages accumulating fewer hours. This was particularly evident in the 65+ age group where women spent 58% less time taking part in sport and exercise.

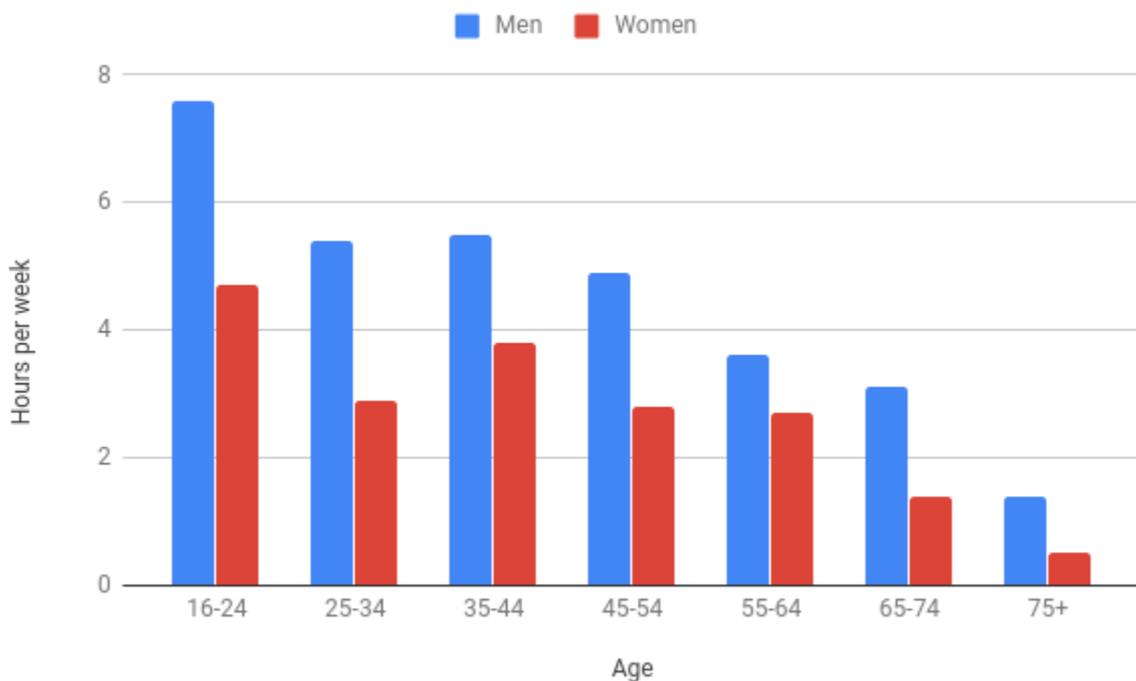


Fig 4 Scottish Health Survey 2017, Sport and Exercise participation, hours per week

In contrast the Scottish Household Survey of 2018 shows much higher participation levels suggesting that 63% of adults aged 60+ participated in sport, exercise or walking in the last 4 weeks, which was an increase from 54% in 2012. The higher participation numbers for the SHS compared to SHeS are most likely due to the way the questions are constructed and thus different data sources included in the calculation. The SHeS is a lot more specific in terms of the components of overall physical activity and the exact nature in terms of duration, frequency and intensity. It also includes a more extensive list of sports, therefore it could be argued it gives a more detailed picture of total physical activity with a slightly more accurate assessment of Sport and Exercise which excludes other significant physical activity categories including walking, heavy housework, heavy manual/gardening/DIY activities, thus leading to lower participation numbers. The major factor affecting the reported participation rates is the inclusion or exclusion of walking. In the most recent SHS adults participating in sport and exercise including walking was 80% whereas after removing walking this falls to 54% (SHS 2018). Figure 5 indicates the influence of walking on participation trends from the Scottish Household Survey (2018). For the older age group 60+ removing walking from the data has a very significant effect of dropping overall participation from 63% to 31.5%. For both men and women peak participation rates occur in the 16-25 and 26-35 year age groups with significant declines thereafter so that participation is 43% less in the 65+ age group.

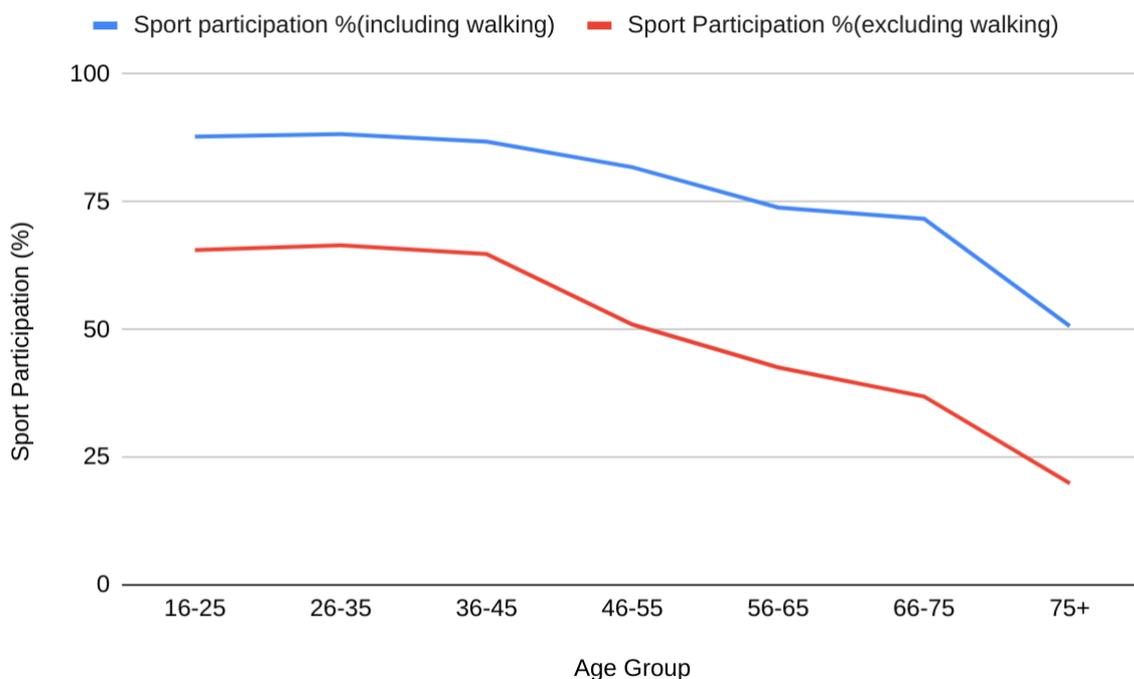


Fig 5 Adult participation in sport in Scotland in the last 4 weeks by age (SHS 2018)

Equivalent data from Denmark (Table 1) shows no decline in ‘Sport and Exercise’ with age with the highest participation group being the 60-69 age group. More in-

depth analysis of the number of times and hours of sport and exercise participation per week still confirms that the 60+ age group in Denmark are very active and at least as active as their younger counterparts. (Pilgaard & Rask, 2016)

	Total	Gender		Age						
		Female	Male	16-19	20-29	30-39	40-49	50-59	60-69	70+
Yes	61	62	61	61	61	57	62	62	66	61
Yes, but not currently	14	16	13	22	19	17	14	14	10	8
No	25	23	27	17	20	26	24	25	25	31

Table 1 Sports participation in Denmark 2016. "Do you usually practice sports / exercise?" Total and by gender and age (percentage, n = 3,914). (Pilgaard & Rask, 2016)

It is recognised that sport can make a significant contribution to the overall levels of physical activity, particularly in the younger age groups (van Uffelen et al., 2015). Data from the SHeS in Figure 6 shows that 39% of all physical activity comes from sport and exercise. It has also been reported elsewhere (Australia) that the contribution of sport to overall physical activity declines with age (van Uffelen et al., 2015) as is the case in Scotland. However, Figure 6 shows that the percentage of physical activity from sport and exercise seems to rise slightly in the 65+ age group, although this is in the background of significant absolute declines in both sport and exercise and other physical activity.

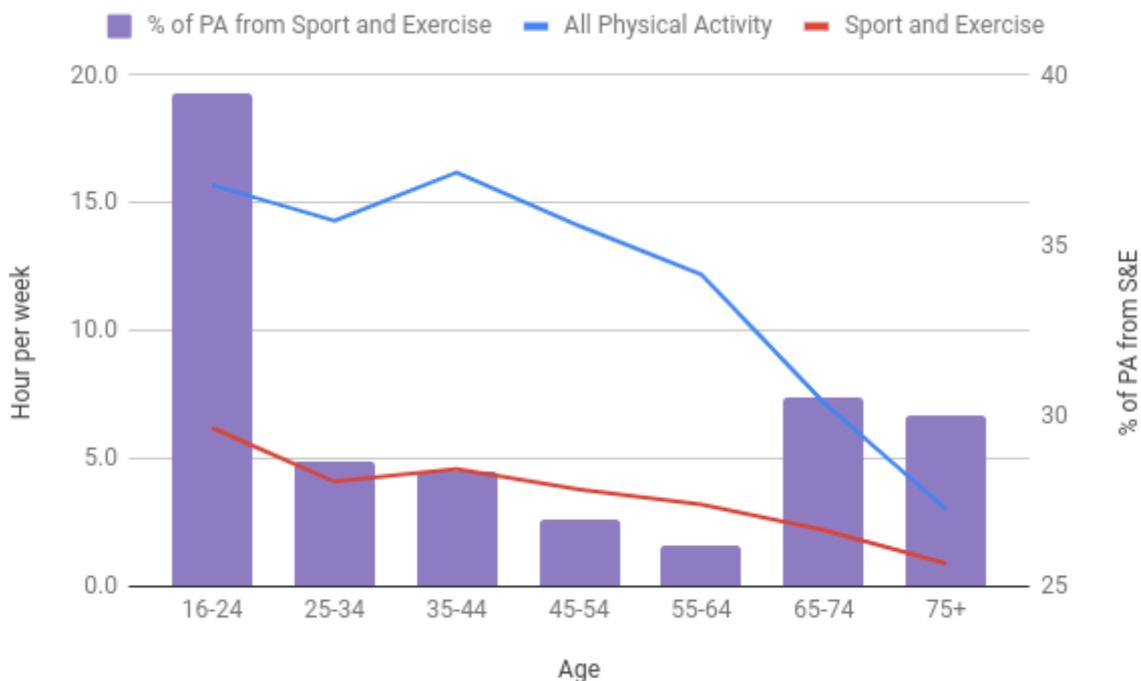


Fig 6 Comparison of total physical activity and activity from sport and exercise from the Scottish Health Survey (2017) by age (bars represent the % of total PA from Sport and Exercise).

It might be imagined that older adults' involvement in club sport would be predominantly as a volunteer; however data from Australia suggests that 90% of older (50+) members were still actively participating in the sport (van Uffelen et al., 2015). Moreover, membership of a sports club made it much more likely for older adults to meet their required level of PA, compared to membership of other organisations or non-members. In Scotland there is a lack of data which profiles the roles and activities that older adults undertake within sports clubs/ governing bodies therefore it is not possible to determine if a similar pattern of involvement exists.

Trends in Sports Participation in Scotland (2007-16) in the older age groups

While there is at best a flat trend in terms of overall physical activity and sports participation in Scotland (Rowe, 2019; Shibli, 2018) and across Europe (Downward et al., 2014), national surveys in Canada and Australia suggest that between 17% and 30% of those over 50 years of age participated in sport (Canadian Heritage, 2013; van Uffelen et al., 2015). From the limited international trend data on older adults the participation in sport in the older age groups is in decline although possibly not as steep a decline as in the younger age groups, which is up to 4 times greater (van Uffelen et al., 2015).

Data from the Scottish Household Survey indicates a slightly upward trend in overall population participation when walking (at least 30 minutes) is included, but considering just sports participation there is a slight downward trend between 2007 and 2016. Within this complete dataset it would seem that there has been a decrease in the in traditional sports such as swimming, football, golf, cue sports and bowls (Shibli, 2018).

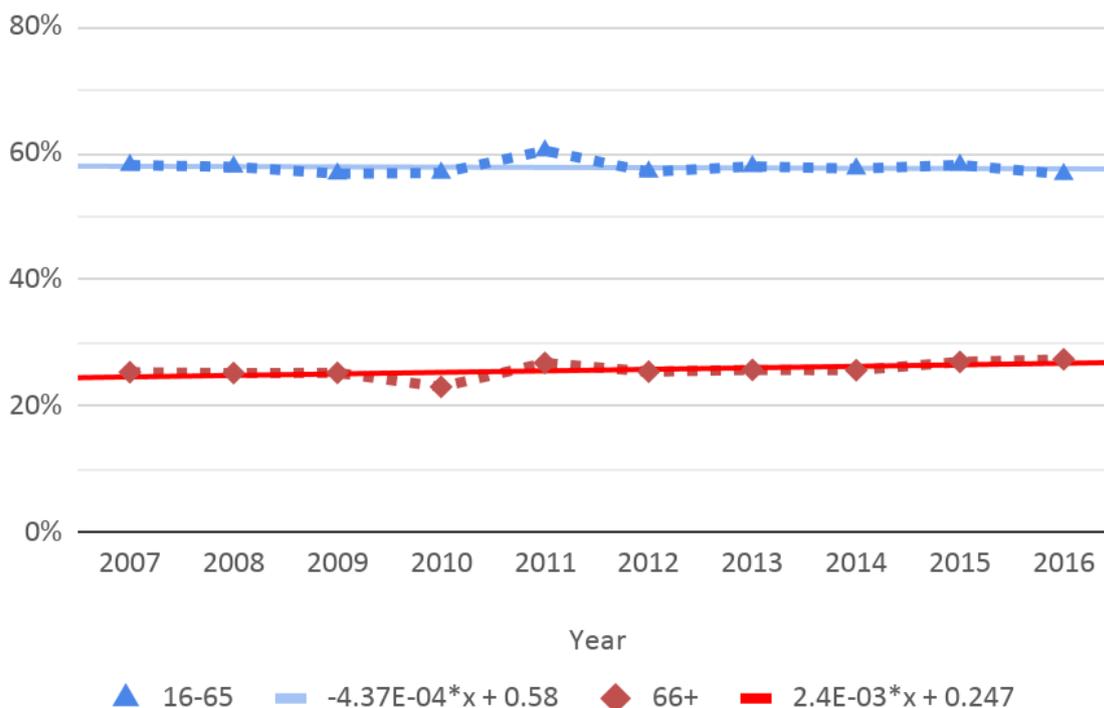


Fig 7 Participation in Sport (excluding walking) at least once in the last 4 weeks, 2007-2016 for 16-65 and 66+ age groups (SHS).

However, there does seem to be a difference in the trend when young and old datasets are compared (Figure 7). Data from the SHS divided into those older and younger than 65 demonstrates that the overall trend for those under 65 is a slight overall decline (indicated by the $-ve$ gradient of the trendline) in sports participation from 2007 to 2016, whereas over the same period there is a very slight increase in participation in the 66+ age group.

Interestingly, examination of Figure 7 also fails to show any significant changes in participation related to the London 2012 Olympics or more significantly the Glasgow 2014 Commonwealth Games. Therefore, this data seems to confirm the findings from other studies that major international sports events do not significantly impact on population-level sports participation (Weed, 2016), regardless of the age group, even when the respective governments or local authorities support a range of sport development initiatives within a 'legacy' project (Morrison & Thompson, 2018). As the majority of the sports development initiatives were arguably targeted at the younger generations there may have been an expectation that those age groups have increased their sports participation; however, Figure 7 suggests that any increase in sports participation in the last 10 years has occurred in the older age groups with a slight positive trend. This trend difference is more strongly reflected in some sports for example swimming where there is a trend for higher participation rates in the older age groups versus the younger age groups. (Figure 8).

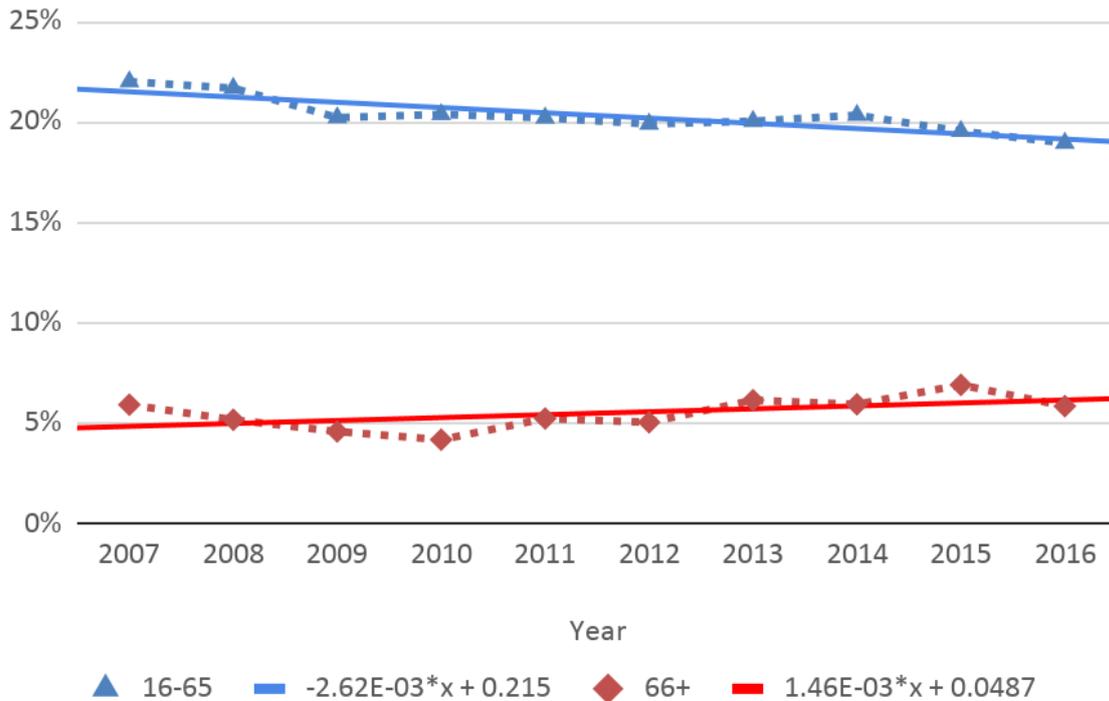


Fig 8 Participation in Swimming at least once in the last 4 weeks, 2007-2016 for 16-65 and 66+ age groups (SHS).

The trend for swimming in Figure 8 is not representative of all sports and there are a number of sports where the trend over time is upward for both the younger (16-65) age group and the older (66+) age group. This is the case for both cycling (Figure 9) and fitness-related activities (Figure 10); however, investigation of the trends suggests that the rate of increase in participation in these activities is about half for the older age group compared to the younger group.

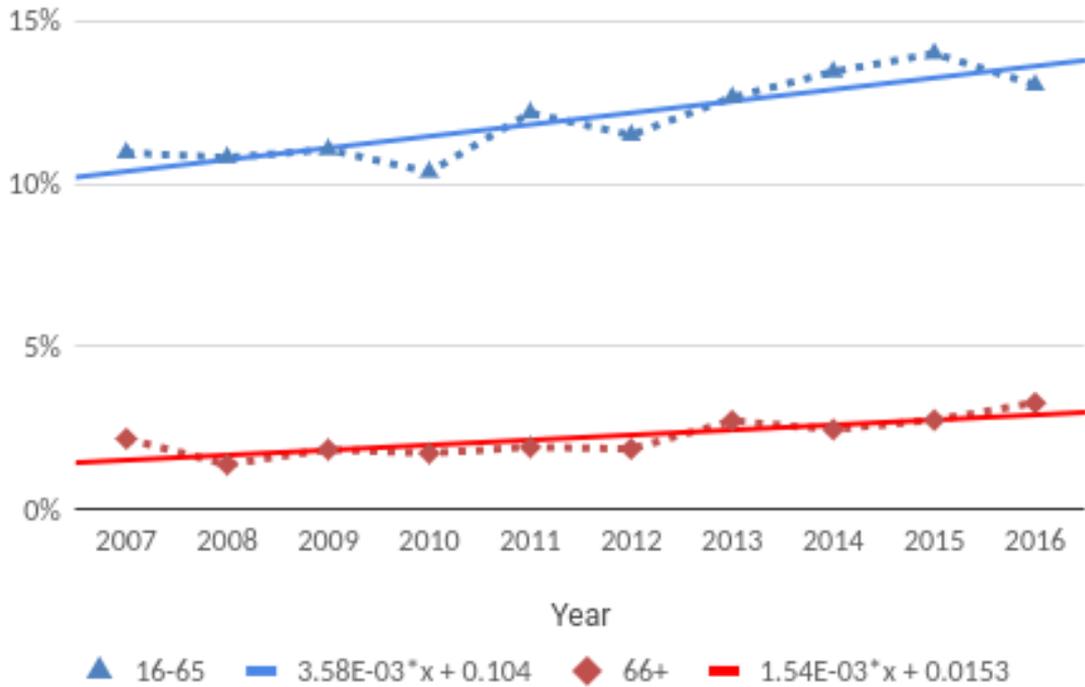


Fig 9 Participation in Cycling at least once in the last 4 weeks, 2007-2016, 16-65 and 66+ age groups (SHS).

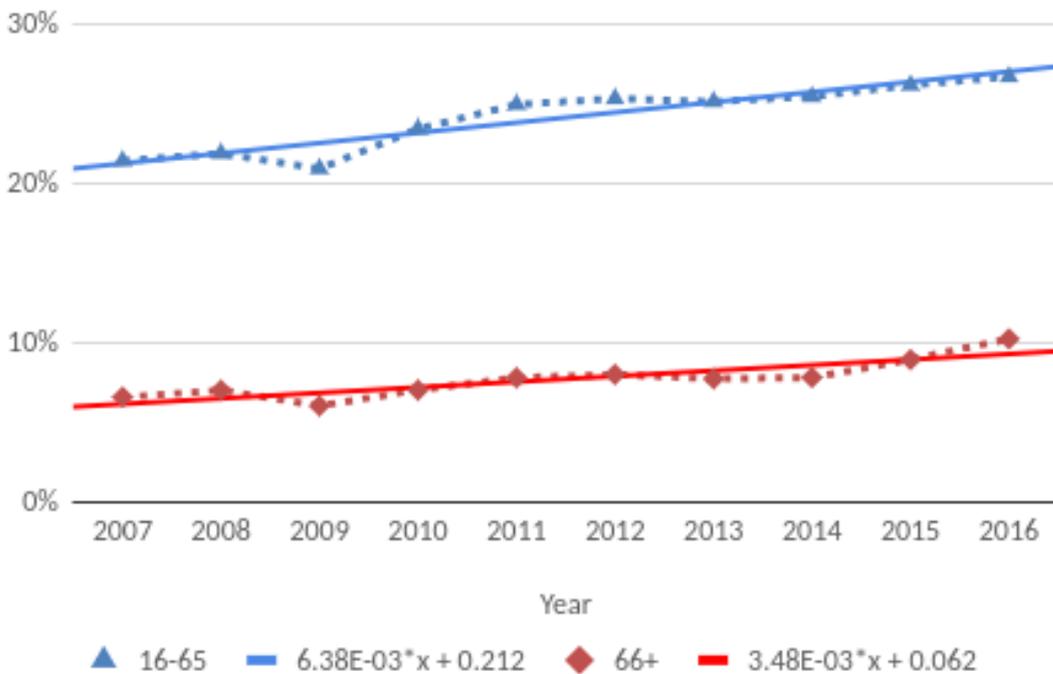


Fig 10 Participation in Fitness-related activities at least once in the last 4 weeks, 2007-2016, 16-65 and 66+ age groups (SHS).

Across the UK new versions of individual sports have emerged with some showing significant growth in participation across all age groups. One example is Parkrun, a weekly opportunity to take part in a timed 5km in a local park. Figure 11 shows the growth of participation in the 55+ age group over the last 10 years. This represents an absolute growth from 13 participants in 2008 to over 55,000 in 2018. However, this needs to be set in context with the overall growth of parkrun in all age groups over the same period. Nevertheless, the proportion of those from the 55+ age group taking part has risen from 13% to 18% for men and from 9% to 14% for women. While this is not a population survey and thus cannot be considered as indicating a true population participation trend it does signify a dramatic increase in participation in this activity. We do not know if this is real growth or substitution from another sporting activities but there is no particular reason to assume that this activity has been undertaken preferentially by any specific age group. Further research is required to establish individual motivations and other social factors influencing participation in this type of activity.

In addition, future population surveys of sports participation need to consider the impact of these new sporting activities on the overall participation rates. While the number of participants in so-called 'lifestyle sports' is relatively small it seems that there is a growing number of older participants sustaining participation into older age and also taking up lifestyle sport in middle age (Gilchrist & Wheaton, 2017; Wheaton, 2017).

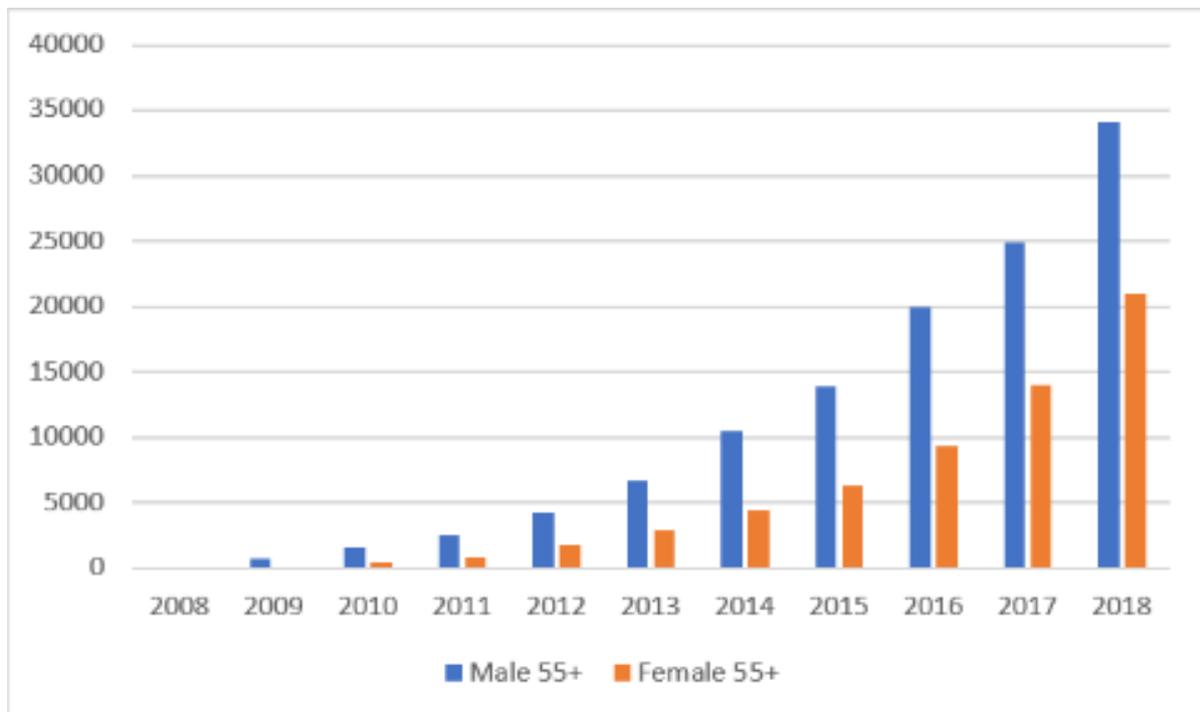


Figure 11 Participation in parkrun in Scotland for the 55+ age group (2008-2018)

Gender

Predominantly more men participate in sport than women across all age groups and most sports, a pattern that is replicated across Europe (Hovemann & Wicker, 2009)

and Australia (van Uffelen et al., 2015). In England sports participation for females across all age groups, controlling for other factors, has increased slightly in the period 2008-9 to 2013-14 (Widdop et al., 2018). In virtually every survey completed the proportion of older women participating in sport is lower than older men. In addition, other sources of data (eg, Parkrun in Figure 10) also confirm this finding with a background of a significant absolute increases across the 10 years. From the Scottish Health Survey (2017) Figure 3 suggests a similar % of older men and women completing any sport and exercise in the last 4 weeks, however Figure 4 clearly shows that the number of hours per week is substantially lower (3.1 vs 1.4 h/week) for women in the 65-74 age group and 1.4 vs 0.5 h/week for the 75+ age group. Thus, the overall volume of sport participation is significantly lower for the older women.

Non-competitive sport is more likely to play a greater role in the older age groups particularly for women. A recent report from New Zealand showed that there was no gender difference in participation of non-competitive sport and actually more adult women were participating in non-competitive sport than men. Of course, this pattern is reversed when looking at competitive sport (Brocklesby, 2018). Unfortunately, we do not have any data on this relationship between gender and competitive/non-competitive sport in Scotland.

Growing Old Competitively

While the trends for community sport participation in the general population for older age groups is flat or are at best increasing very slightly the trend in the more elite competitive age group competitions is significantly higher with elite masters level competition flourishing (van Uffelen et al., 2015). It should also be noted that even for some older women competition is a key motivator to participate in sport (Berlin & Kelnosky, 2014).

The World Association of Veteran Athletes was founded in 1977 at the second World Association of Veteran Athletes Championships in Gothenburg, Sweden. The World Masters Games, a multi-sport games for those over 35, has been held every 4 years since 1985 and has seen significant growth in numbers competing. The Sydney 2009 World Masters Games attracted a record 28,676 competitors. This is more than double the number of competitors that took part in the Sydney 2000 Olympic Games. Figure 10 shows the growth in the number of competitors from 1985 to 2017. Other indicators of increased participation include an increase in the proportion of over 40-year-old male finishers in the 'Ironman Switzerland' from 23% to 48% in the period 1995-2010 (Stiefel et al., 2014). Participation rates in the marathon show that master athletes now make up about 55% (Lepers & Cattagni, 2012) of the total field growing to about 70% of the field in ultra-marathons (Knechtle et al., 2012) (Knechtle, Rüst, Rosemann, & Lepers, 2012)

In addition, age-categorised record performances have improved significantly over the last 50 years. For example, Ed Whitlock set a large number of running world records in his later life, the most recent being the oldest person to complete the marathon in under 4 hours (age 85, 3 hours 56 minutes 34 seconds). However, his time of 2:54:48 at age 73 is widely considered his greatest athletic achievement (Vanderburgh, 2016). Examples from other sports show very significant

improvements in times, much greater than their younger counterparts (Akkari, Machin, & Tanaka, 2015).

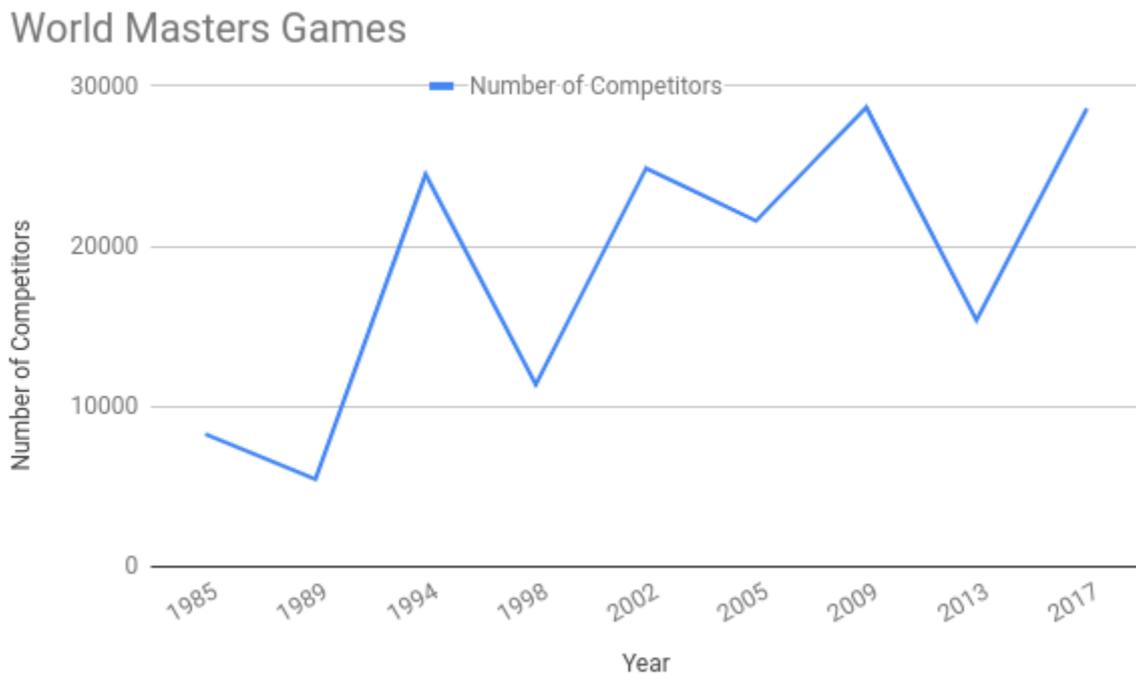


Figure 11 Growth of the number of competitors taking part in the World Masters Games 1985-2017

Why do Older Adults Not Engage in Sport?

The main reason why people of all ages do not take part in sport or other physical activity is their self-reported perception of 'a lack of time'. This finding is consistent across Europe with 40% of respondents across Europe stating that time was the major reason for not partaking in sport (Eurobarometer 2017). There is relatively little information on why older adults do not engage in sport in Scotland. The main data originates from the Scottish Health Survey which collates the reasons provided by those who do not engage in sport and exercise. Figure 12 presents the main findings from the SHeS 2018 for those younger and older than 65. There are some key differences between the two age groups, 'time' is less relevant and 'health is not good enough' becomes the overriding factor.

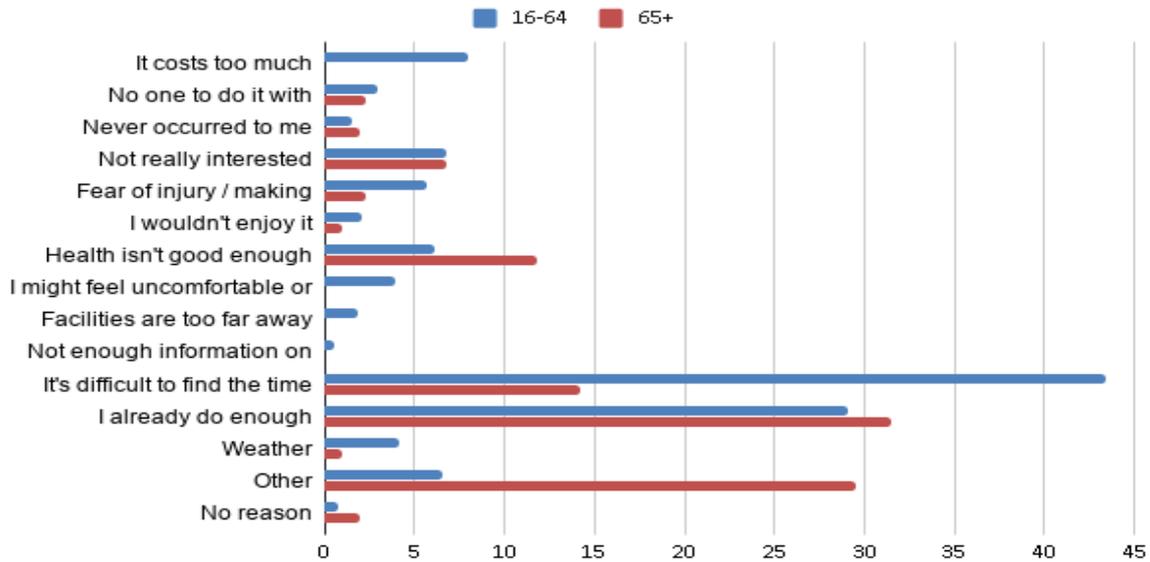


Fig 12 Scottish Health Survey 2018, reasons for not doing any or more sport and exercise in the 16-64 and 65+ age groups.

While the SHeS 2018 data does indicate high level reasons for non-participation in sport and exercise it is not able to distinguish between specific 'sport participation' and 'exercise and dig deeper into the motivations and barriers within specific sports. In contrast an in-depth focus group interview- based study in Australia which looked at older adults who played cricket, tennis or no sport concluded that personal reasons, social reasons and organisational reasons constituted the major categories for non-participation (Jenkin et al., 2016). The summary of reasons presented in the table below reveal a number of other important factors many of which are not picked up in the SHeS 2017.

Personal Reasons	Social Reasons	Organisational Reasons
Time constraints Physical health concerns Costs	Family commitments Friends stopped playing sport Working patterns changed Lack of social acceptance that older adults played sport	Lack of sports that specifically catered for older adults Lack of playing opportunities with peers Older adults not a high priority for sporting organisations Non inclusive marketing

Motivations to take part in sport

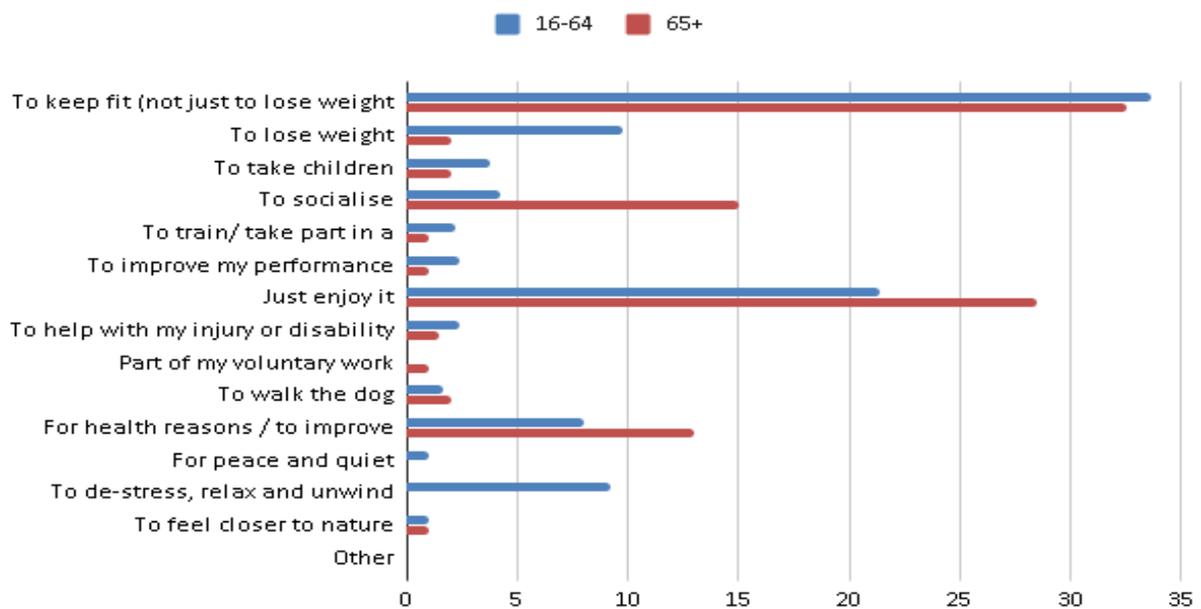


Figure 12 Scottish Health Survey 2018, motivations for taking part in sport and physical activity in the 16-64 and 65+ age groups.

The key motivations for sport and other physical activity participation in the older age groups indicated in the Scottish Health Survey (SHeS 2018) are ‘enjoyment’, ‘social’ and ‘for health reasons’. (Figure 12) Therefore, it is interesting that ‘health’ seems to be both a reason to take part in and not take part in sport. Trujillo and colleagues (2004) compared exercise motivations to consequences of not exercising across four age groups (in the range of 18-86 years of age) and found the importance of health, physical capacity and psychological health to be associated with increasing age. A recent report from New Zealand also suggested that ‘physical wellbeing’ was a very strong motivator for participation in sport in the older age groups, particularly compared to younger age groups (Brocklesby, 2018). It is likely that gender also influences the motivations for participation but there is very little information on this topic. Berlin & Kelnosky (2014) specifically interviewed 79 women (>60 years of age) finding that in addition to the health benefits, socialisation and competition were key motivational factors. Another factor not investigated in the SHeS but highlighted in other research include the fact that it provides a regular routine post retirement that for many is replacing what was the work routine (Pike, 2012). From a psychological perspective motivation and self-efficacy have been found to be consistently linked to higher physical activity levels in older age groups (Notthoff et al., 2017). It should also be recognised that ‘social norms’ are a powerful influencer of many behaviours including physical activity and healthy eating (Ball et al., 2010) or the converse of sedentary behaviour (Melvin et al., 2020). Unfortunately, there is no research that has investigated the concept of social norms for sport participation in older adults.

Scotland like most developed countries enjoys a relatively good quality of life; however it does also have a wide spectrum of socioeconomic circumstances (SEC). There is some research on the impact of both early and later-life SEC on physical activity levels (Cheval et al., 2018) and as might be expected lower SEC does

increase the risk of physical inactivity. There is no equivalent Scottish data on sport participation and SEC. The recent OSS Academic Review paper, 'Sport and social inequality - unloading the dice' (Kay, 2019) looked at the impact of inequality on sporting participation in the wider context but the interaction of age and inequality on sport participation is much more difficult to determine. Despite the fact that there are no direct data on this interaction we do know that there are approximately 140,000 pensioners considered to be living in relative poverty (Kay, 2019) which will inevitably impact on sport participation in this age group.

However, over-50s account for a third of the population and about half of all consumer expenditure. In the UK, according to research from Saga and the Centre for Economic and Business Research, the grey pound has been helping to keep the economy moving. At £320 billion a year the over-50s account for around 47% of all UK consumer spending, up from 41% in 2003 (CEBR, 2015). ONS figures show that the average pensioner's income increased by around 50% in real terms between 1995 and 2011. Further data shows that between 2008 and 2018, the median disposable income of retired households increased by £3,200 – for people in work it was only £900. Pensions account for a large portion of the disposable income of older adults and in Scotland pensions account for more than 50% of the overall individual wealth (ONS, 2018). Therefore, there is a segment of the older population who have private pensions who are relatively wealthy with disposable income who can afford to pay for their sports participation. The interaction of relative wealth, age and sport participation in Scotland is an area that requires further research.

A further social factor affecting sports participation found in the research is education level with significantly greater sports participation in individuals with higher educational attainment. In the Netherlands this trend with educational level is consistent across age ranges from age 25-79 (Van den Dool, 2017). This is an extremely powerful effect in the individuals in the 65-79 age group with 'higher education' who have a higher sports participation rate than those in the 25-34 age group with lower educational attainment.

Benefits of sport for older adults

While there are several reports outlining the economic (Sport England, 2013), social (Davies, 2019) and health benefits of sport in the UK, none address the specific benefits to the older age groups. This would seem to be a gap in the literature that requires further research to both drive the type of intervention and justify policy changes that affect this age group. The social and psychological health benefits of community sport participation in the younger age groups and whole populations has been extensively researched (Brocklesby, 2018; Eime et al., 2013); however, there is a lack of equivalent research for the older age groups. Much of the research on the benefits of sport for older adults has focused on the physical aspects with much less evaluating the impact of social and psychological benefits (Gaymen et al., 2017). A large cross-sectional study in Japan (n=74,681) demonstrated a significant relationship between community sports participation in adults older than 65 years and depression. This effect was significant despite the definition of sports participation as low as 1 day/per month. (Tsuji et al., 2018)

The social benefits of sports participation, while having common features, will differ across the population age range. Social capital is recognised as a key factor in sport

participation across all ages (Wiltshire & Stevinson, 2018) but this may be more important for the older age groups. Some of the reported social benefits like community cohesion, educational performance and reduced crime and anti-social behaviour are more important in the younger age groups (Taylor, 2015), whereas improved physical and mental health, wellbeing, life satisfaction and improved social capital would be more likely outcomes for the older age group.

A growing concern in the older population is loneliness and social isolation. According to the Office for National Statistics the prevalence of loneliness in the over-65 age group in the UK is somewhere 6% and 22% and rising. However loneliness and social isolation is not unique to the older age groups and the latest cross-sectional ONS data from England does not show any relationship with ageing and loneliness (ONS, 2018). In contrast longitudinal studies tend to show increasing loneliness with age moderated by factors like living with partner and health status (Dykstra et al., 2005) Never the less loneliness, social isolation and living alone are significant health risk factors and have been shown to increase the risk of mortality by 26%, 29% and 32% respectively (Holt-Lunstad et al., 2015).

In Scotland there are no direct measures of loneliness or social isolation; however the Scottish Health Survey does contain data on 'Social Contact' which reveals that 7% of those over 65 have contact with neighbours, family and friends less than once or twice a week (SHeS 2017). Men over the age of 50 seem to be more vulnerable to social isolation than women (Teuton, 2018). Intuitively sports participation and other physical activity would seem to provide ideal opportunities to reduce loneliness and social isolation; however, baseline data and validated approaches are lacking. There are a number of studies of varying quality that have investigated a wide range of interventions, including a few using sport and other physical activity, with varying degrees of success (Cohen-Mansfield & Perach, 2015; Shvedko et al., 2018). From the limited research that does exist, involvement in physical activities including sport can have a significant positive effect on loneliness and social isolation (Lindsay-Smith et al., 2018; Shvedko et al., 2018). It has also been suggested that participation in external social activities, including sport, can reduce loneliness regardless of socioeconomic status (Niedzwiedz et al., 2016). The recent NHS Health Scotland report on 'Social Isolation and Loneliness' indicated the need for an agreed set of indicators leading to survey data to understand the extent of the problem and evaluate potential interventions (Teuton, 2018).

Research on quantifying the social impact of sport in Scotland is very limited (Davies, 2018). At the population level, there is some research on the potential cost savings to the NHS from people who participate in sport and other physical activity. Research conducted by the Scottish Parliament Information Centre (Scottish Government, 2011) suggests that there are cost savings to the NHS from health improvement by people who are more active (Research Scotland, 2017). They note that a 1% increase in sport and other physical activity would yield a £3.5m saving each year from coronary heart disease, stroke and colon cancer alone. The research also suggests that it will lead to improvements in people's wellbeing, although this is not quantified.

There is strong evidence that in older adults sport and exercise improves general physical health. It prevents the onset of several chronic diseases and reduces the

risk of musculoskeletal injuries by improving agility and balance and reducing falls. There is also strong evidence that moderate to vigorous activity in older adults can reduce the risk of depression as well as neurodegenerative disorders such as Alzheimer's disease and Parkinson's disease. (Taylor , 2014)

How do you increase sport participation in the older age groups?

Strategies to improve sports participation in the older age groups

Firstly, it is important to recognise that there is very limited evidence on how to increase sport participation in any age group. In addition, as sport participation clearly declines with age there needs to be a clear understanding of the factors that influence the continuation of sport into old age. Nielsen et al. found that the key factors that impact on exercise continuation in older men were the extrinsic factors of 'exercise and sport to stay healthy' and the intrinsic factors of 'relatedness' from being part of a team or group for exercise (Nielsen et al., 2014). Therefore, any strategies must address these factors to be potentially successful at increasing participation levels.

It is striking that a Cochrane Review carried out by Priest et al. in 2008 revealed that there were no controlled or uncontrolled studies evaluating interventions implemented through sporting organisations for increasing participation in sport in all age groups (Priest et al., 2008). Even over the last 10 years a literature search has failed to identify any new studies evaluating intervention strategies to increase sport participation. Therefore, there is a real need for such evaluations to take place to inform future policy making particularly when considering how to increase participation in older age groups.

Several studies have examined the effectiveness of different strategies to increase physical activity levels in older adults (Baxter et al., 2016) but there is a lack of equivalent research into strategies to increase sport participation. Sport or derivatives of sport have the potential to provide physical activity of the duration, type and intensity required to have significant health benefits for middle-aged and older adults (Fløtum et al., 2016). Sports clubs could provide a venue and expertise in delivering other physical activity programmes not linked directly to the sport itself, eg Football Fans in Training (Gray et al., 2013).

In the Netherlands there has been significant progress in improving sports participation in the over 65 age group from 2001 to 2016, with an increase in participation from 30% to 40% (Van den Dool, 2017). It is thought that this is a generation effect due to greater acceptance of sports participation as well as increasing education levels and not any single specific strategy.

Modification and adaptation of sport for older adults

For some sports the natural ageing process makes them increasingly difficult to maintain participation into old age and thus there is an increasing trend of adapting the sport/game to enable continued participation into old age.

For example, the physiological, social, and psychological health benefits of playing football are well established (Bangsbo et al., 2014; Krstrup et al., 2010; Neilson et al., 2014). As people get older, however, they often struggle with the intensity at which football is typically played. A popular variant of association football which has emerged in recent years is walking football (Reddy et al., 2017). Walking football is based upon the principles of association football, however running and slide tackles are prohibited, and the game is usually played with fewer players on each team (eg, 5-a-side). Walking football, may, therefore, present an attractive option for older adults who no longer engage in sport. Research has indicated that participation in walking football provides an opportunity for older adults who are overweight, sedentary and exhibiting blood pressures outside normal ranges to re-engage with recreational sport (McEwan et al., 2019), and also positively alters a range of anthropometrical and fitness parameters (Arnold et al., 2015). In their recent pilot study examining the feasibility of recruiting and retaining older adults in a walking football programme in Scotland, McEwan et al. (2019) revealed that walking football programmes can recruit and retain older men with various employment statuses and education attainments and those from all socioeconomic groups. One logical approach for the major sports governing bodies would be to expand the range of age adapted sports to achieve higher participation rates in their sport.

Policies to increase sport participation in the older age groups in Scotland

Sports organisations currently prioritise participation towards children and the younger generation but rarely older adults. All governing bodies of sport will have grass-roots programmes and athlete development pathways that clearly identify progression from child entry to the sport through development of core techniques and skills towards the competitive environment feeding the bottom of the performance pyramid where 'World Class' programmes will take the best of these athletes to international competition. There would seem to be a complete lack of policy or planning for the older sportsperson. Older individuals potentially make a large contribution to sports clubs not only by taking part but also by increasing the capacity of the club through volunteering. In the most recent 'Playing our Part' report from sportscotland there is not a mention of any initiatives with older adults (sportscotland, 2018).

While there seems to be Government-led initiatives raising awareness of the importance of physical activity in delaying the onset of frailty through the 'Take the Balance Challenge' and the '400 yard challenge' campaigns (from the Scottish Government Allied Health Professional Unit), initiatives and strategies from Government or governing bodies of sport to encourage older adults to take up sport or maintain sporting activity seem to be very lacking.

Whilst the Scottish Government's (2018) 'physical activity delivery plan' makes a couple of mentions of older people: "supporting those who work with people facing particular challenges in being active, such as older people living within care settings" and a specific outcome for the "active to stay active throughout life", the plan is extremely light on specific initiatives that are targeted at increasing the sports participation rates in the older age groups. The two actions that are listed comprise:

- “Supporting the Cycling Without Age project to expand across Scotland (Active Scotland)”; and
- “Working in partnership with sports bodies to encourage participation in sport for older adults, e.g. through walking sports such as walking football, walking netball, etc. (Active Scotland)”.

These could be considered as acting at arm's length, supporting already established initiatives and not specific strategic programmes led by government. There are a large range of government policies aimed at getting the population more active by increasing Health Enhancing Physical Activity (HEPA); within these there is little mention of the possible contribution of community sport, yet in other countries data suggests that as much as 38% of HEPA is sport based (van Uffelen et al., 2015). In addition, data in this report from the SHeS also suggests that sport currently contributes >30% of the physical activity in the older age groups (Figure 6). In contrast across Europe there are a number of different approaches to sports policy; for example, the national sport policy in the Netherlands focuses on three main objectives:

- Health – improving health through sport and other physical activity and reducing injuries.
- Participation – increasing sports participation rates and levels of physical activity, stimulating people to join a sports club and encouraging volunteering.
- Achievement – excellence in elite sport, with the Netherlands being among the top 10 performers at successive Olympic Games.

In the Netherlands where overall sports participation is high, Hoekman (2018) found that in contrast to youth sports participation there was a negative relationship between municipal sports expenditure and adult participation (Hoekman, 2018). However, this needs to be considered against the background of very high participation rates compared to Scotland and without specific research data it is not possible to assess the relationship between relative expenditure on local sport provision and participation among the older age groups.

When Australian sports organisations were asked about their target group priorities, older adults were ranked as the lowest priority (van Uffelen et al., 2015) and only 27% of sports organisations had strategies for older adults. In Scotland it is currently unknown how many governing bodies of sport have specific strategies for older adults.

It is well recognised that sport can be a tool to effect positive change in individuals and communities and the ‘Sport for Change’ concept has emerged as an overarching term to describe this outcome. “Sport for Change refers to sports-based activities which are intentionally used to deliver a broad range of social impacts for individuals and communities and to address inequalities.” (Robertson Trust, 2015). An overview of the Sport for Change concept commissioned by the Robertson Trust outlines a number of benefits of sport; however, there is very little specific mention of older adults beyond the fact that regular sport can help prevent falls (Research Scotland, 2017).

In summary, while there are cursory mentions of older adults in policy documents in Scotland, there is very little detail on specific targeted initiatives to try and improve the very low sports participation rates in the older age groups to be more equivalent to other European countries.

What types of sport should older adults engage in?

We do know that one of the reasons that older adults do not take part in sport is their 'physical health concerns' in that they do not want to exert themselves in older age (Jenkin et al., 2016). However, the research shows in fact that older adults can benefit significantly more from exercise which is more vigorous in nature. Typically, many sports require episodes of high intensity exercise interspaced with periods of relative rest-like interval training. In recent years high intensity interval (HIT) training has been extensively investigated for its health benefits and risks even in unfit and older age groups (Bruseghini et al., 2015; Hurst, Weston, & Weston, 2018). To date the findings are very much in favour that this mode of exercise is both safe and extremely effective at improving fitness and providing significant health benefits, including improvements in aerobic fitness (Grace et al., 2015; Hurst et al., 2019), systolic blood pressure (Ciolac, 2012), blood glucose levels (Scott et al., 2018) body composition, strength, muscle size and bone density (Ravnholt, Tybirk et al., 2018). To date the literature on the effectiveness of HIT has focused on the physical benefits and there is little information on psychological or mental health benefits from this type of exercise, although combined aerobic and resistance exercise has been demonstrated to improve sleep quality in elderly women (Sousa et al., 2017).

Summary

- There are population shifts that will result in significantly higher numbers of over-65 year-olds in Scotland over the next 30 years.
- For both men and women peak participation rates occur in the 16-25 year age group with significant declines thereafter so that participation is 43% less in the 65+ age group.
- More than 50% of those over 75 are in the lowest physical activity category and more than 70% do not meet the physical activity guidelines.
- Men and women over 65 seem to participate in the same number of sporting activities but the amount of time per week of engagement is 58% less in women.
- Trends using cross-sectional data suggest that in contrast to younger age groups there has been a very slight increase in sports participation in the over-65 age group during the last 10 years.
- Some sports do report increased participation in older age groups but it is unknown whether this represents new uptake or some older adults doing more.
- 'Health problems' and 'already do enough' are the main reasons for older adults not taking part in sport.

- Enjoyment, for health reasons and keeping fit are the key motivations for sports participation in the older age groups.
- There is a significant expansion of participation in competitive sport with the development of more elite age group competitions.
- There are no national or governing body of sport strategies specifically targeting sports participation for the older age groups.

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