

Sport policy and practice: Why a focus on retention of children and young people as sport participants is required for both health and performance

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Abstract

Background: Australia like many developed countries is largely an inactive nation. Participation in sport, a form of leisure-time physical activity, can contribute to a range of individual and community health benefits. National sport policy often has a dual focus on population-based participation, and elite performance. Whilst there are various sport models depicting the pathway to elite, there has been no strategic population-level sport participation pathway model developed as a guide towards increasing sport participation across the lifespan. The aim of this study is to explore sport participation across the lifespan and develop a neutral (conceptual) model that does not favour community or elite sport and that highlights the critical participation transition points including drop-out.

Methods: We conducted a longitudinal analysis of sport participation records for 8 major sports from 2015-2017 for children and young people aged 4-29 years. Individual participation within sports was tracked from 2015 and subsequent years 2016 and 2017.

Results: The total number of participants was 579,696. Only half 50.8% played continuously for the three years, 44.7% dropped out, and 4.5 played discontinuously. Drop-out was highest for those aged 4 (57.0%), and lowest for those aged 10-14 years (39.3%). From the retention and drop-out participation patterns across the lifespan, in conjunction with the published literature on sport policy and participation, we developed the Sport Participation Pathway Model (SPPM). The SPPM conceptually depicts current sport participation and in doing so emphasises the significant drop-out of sport across the lifespan.

Conclusion: Sport policy should focus on retention strategies. Further, a population level, competitive club-based sport alone is not going to solve the physical inactivity epidemic. Our SPPM, and the new (retention related) data presented in this paper, demonstrates the population trends in participation in sport and the high drop-out of competitive club-based sport. We suggest that for people to eventually become active sport participants, the recruitment narrative could be changed towards, first, engaging people in leisure time physical activities. We feel that this can only be done by developing an integrated policy system across the physical activity-sport spectrum rather than looking at sport participation in a closed (club-based) system.

Background

Inactivity and health

Australia, like many developed and developing countries is largely an inactive nation, with the majority of people not meeting the physical activity (PA) guidelines for health. A recent Commonwealth Government report notes that only 26% of children (5-12 years), 8% of adolescents (13-17 years) and 45% of adults met the PA guidelines in 2017-2018 (1){Australian Institute of Health and Welfare, 2019 #5278}. Due to high rates of inactivity, overweight and obesity are now the leading risk factor for ill-health in Australia{Australian Institute of Health and Welfare, 2019 #5278}. The epidemic of physical inactivity is associated with a range of chronic diseases including coronary heart disease, stroke, type 2 diabetes, breast cancer and colon cancer, and early deaths, which puts extreme cost pressure on the health care system (2). Physical inactivity was conservatively estimated to amount to an international cost of \$53 billion in 2013 (2).

There are many ways that people can be physically active including through transport, home- work- and/or leisure-time activities (3). There are three aspects specific to leisure-time PA that people can choose to do (generally for enjoyment), which are defined as the type, mode and setting (4). 'Type' refers to the specific activity (e.g. football, walking, swimming). Different 'modes' of participation include team sports (e.g. football, cricket and netball), individual sports (e.g. tennis, athletics and triathlon), organised but non-competitive PA (e.g. cycling and running groups), and non-organised or informal PA (e.g. going to the gym or going for a walk). 'Settings' of participation include organisational settings, such as schools, clubs or leisure centres, and neighbourhood settings such as home, street or park (4).

The role of sport for health

This paper considers participation in sport as a form of leisure-time activity that is largely organised, such as through sports-clubs, and is often competitive (4). Beyond the proven physical health benefits, there is increasing evidence that leisure-time PA, and more specifically participation in sport, can be associated with improved mental and social health above and beyond the physical other forms of PA. Two systematic reviews provide evidence that within the domain of organised sport, team-based sport can deliver improved health compared to individual based physical activities, and this is largely due to the social nature of participation (5, 6). There is also evidence of different health benefits of participation in sport across the lifespan, with children and adolescents participation in sport having improved self-esteem, more social interaction and fewer depressive symptoms (6). Furthermore, more recently, longitudinal participation in sport for children has been found to be associated with fewer internalizing problems and better prosocial behaviour than those not participating in sport (7). For adolescents, participation in sport can result in reduced psychological distress and specifically lower social anxiety symptoms and loneliness (8).

In addition to the wide-range of health benefits of participation in sport, there are many other positive youth developments through sport. These can also cross-over to other settings such as schools, with children who participate in sport displaying less inattention/hyperactivity within schools (9). The positive youth development concept posits that children and adolescents have 'resources to be developed' rather than 'problems to be solved' which can include caring (a sense of empathy and global self-regard), and connection (positive connections with peers, family, school, and community) (10). This meta-study reports that positive youth development outcomes related to participation in sport include positive self-perceptions, like feeling confident, academic benefits where participation in sport has taught children and adolescents to work harder and strive to achieve in school, learning about independence and taking personal responsibility, maintaining positive attitudes, problem solving skills, stress management and goal setting (10). Within the social domain these positive youth developments include meeting new people and developing friendships, teamwork, leadership and communication skills. Further, in the physical domain these outcomes include improved fundamental movement skills (10).

For adults, the benefits of participation in sport are mainly general wellbeing as well as reduced distress and stress (5). For older adults, the main health benefits are improved social health, as sport provides a sense of belonging and opportunity to socialise (11). Similarly, participation in community group physical activities for older adults can improve social wellbeing, especially following significant life events such as retirement, or moving house (12). Participation in sport for older adults helped to reduce their loneliness and provided an

opportunity to engage with friends and community clubs were an important social element in their lives and provided a positive family-like atmosphere (11).

Sport policy

National sport policy provides a lead for the associated sports organisations to develop their own strategic plans, policies and practices which filter through to local community sports clubs. These policies and strategies have a dual focus of community-level population-based participation and at the other end of the participation spectrum, elite performance (13). At the community level, sport policies are about encouraging people to be active through sport and engage in PA throughout their lives to build and nurture healthy individuals and communities (13). Sport policy development is also about increasing the number of people active through sport and PA for health reasons (13). The current Sport Australia priorities are now to: build a more active Australia; achieving sporting excellence; safeguarding the integrity of sport; and strengthening Australia's sport industry (13). Following these strategic priorities are specific targets that should lead to outcomes of: improved physical health; improved mental health; personal development; strengthening communities and; growing the economy (13). These are nearly identical to the policy outcomes of Sport England which are to achieve: physical wellbeing; mental wellbeing; individual development; social and community development; and economic development (14).

Sport has recently been more broadly defined in Australian policy language and as such is more in line with definitions used in Europe and specifically by Sport England. This change, from sport being traditionally competitive and club-based, now encompasses "a broad range of physical activities including informal, unstructured activity such as walking, riding, swimming and running as well as the traditional, structured sport and new and evolving sport and PA offerings such as mixed martial arts, "ninja" style obstacle courses and stand-up-paddle boarding." (p.6) (13).

Various models that all focus on elite outcomes

To our knowledge no strategic sport participation pathway model has been developed as a guide towards increasing sport participation across the lifespan. Most sport participation models or frameworks were, and are, developed as talent development pathways. However, very few sport participants become internationally competing athletes. These models rarely consider population-level participation in sport and other leisure-time PA seriously, nor do they consider changes in participation across the lifespan.

Sport policy development has mostly been driven by moving mass participation into elite sporting success. For example, the Standard Model of Talent Development (SMTD) is based on the old, yet still utilised pyramid model of sport development. The SMTD model published in 1993 Tinning, Kirk (15) depicts a school sport and physical education hierarchy with physical education at the broad base and national titles at the top. An adapted model is presented in Figure 1 (16). The authors refer to it as a performance (talent) pathway model, therefore focusing on elite development and performance. It depicts the broad base as the foundation of skill development and fewer and fewer people are represented up the triangle as the levels of performance (and talent required) increase (16). A criticism of SMTD articulated by Bailey and Collins (16) is that it focuses solely on progressing those identified as talented ignoring the majority of (potential) sport participants (16). A further criticism about the SMTD, is that it conceptualises development and performance in sport as simple and linear, and that it presumes that successful progression from one level to the next is indicative of ability (16).

Insert Figure 1 about here

Another sport participation pathway framework is the FTEM framework (17). The FTEM represents the Foundations, Talent, Elite and Mastery, with three of its four stages focusing on talent and elite development and mastery. This framework also identifies the foundations of learning and the acquisition of basic movement. There are three foundation phases and then four talent phases, before two elite phases and one mastery phase which represents sustained elite success. The FTEM does depict that people move out of the FTEM and can then engage in an active lifestyle and/or sport.

A third model of sport participation is the Developmental Model of Sport Participation (DMSP), which again is an athlete development model (18). Specifically, the DMSP is based upon both theoretical and empirical data and discusses the development of sport ability through childhood and adolescence (not the lifespan!) and focuses heavily on participation and early diversification before specialisation. Whilst this model focuses on athlete development it does consider that throughout childhood and adolescence the less talented and/or ambitious can continue to play at a recreational level (18). Its focus, however, is on athlete development and the requirements to achieve international success (18).

Rather than criticising these player development pathway models on their incompleteness, we acknowledge that they represent talent development and elite player pathway models and are about the journey from novice to elite athlete. However, very few people playing sport as a child will become successful elite athletes. Therefore, it makes perfect sense for sport participation models to consider the actual sport participation trends across the lifespan.

Sport participation trends

There is a body of research highlighting that there are critical transitional life stages related to drop-out or retention in sport and physical activity (4, 19). Participation patterns at these transition stages often differ between sport and other leisure-time physical activities. There is consistent research that older adolescents shift their participation away from organised, competitive sport and towards non-competitive modes and settings and individual types of PA (4).

Australian community-level sport policy has been driven by an overriding objective of increasing participation numbers. As a consequence, national sporting organisations (supposedly) prioritise increasing participation. A focus of these organisations is to be Australia's leading participation sport, and other goals relate to elite success and fan engagement. Examples include tennis, netball and cricket:

- Tennis Australia's objectives are: more active players, more great champions, more devoted fans and healthier communities (20).
- The vision for Netball Australia is to be Australia's leading team sport. This is underpinned by an objective to be ranked the number one participation sport in Australia, as well as growing broadcast audience, success of the elite competition as the world's number one women's sport league, and to be the world's number 1 ranked netball team (21).
- The vision of Cricket Australia is to be Australia's favourite sport, a sport for all Australians. The three pillars for achieving this are fans – number 1 for fans; participants and volunteers – number 1 for participation and; elite players and teams – number 1 in all formats (22).

It can be derived from these examples that community-level sport policy, in theory, is measured by annual sport participation numbers. With such a focus on achieving increased numbers, sports have commonly concentrated their strategies on input measures such as the number of new members signed up for the season. For example, to meet objectives a strong emphasis has been placed on expanding the market by including ever younger participants in an effort to add to total participation numbers (23, 24). At the younger ages, modified sport programs (programs that offer versions of the sport with rules and/or equipment adapted to the level of development and maturity of participants) have been created that attract a large group of new participants, especially males at the pre-school age (aged 4-5 years) (25). However, recent research shows that in a four-year period, in a study of 209,336 children, more children withdrew from modified sport programs rather than to transition to club-competition (25). Across all ages from 4-12 years, fewer than 25% of females and fewer than 14% of males transitioned from a modified sports program to a club-competition within a 4-year period. In another study, Eime et al. concluded that the optimum entry age for transition from the modified sport to club competition, for continued participation, was 7-9 years (23). From a sport management perspective, sustained participation should be a focus rather than simply increasing numbers annually in order to deliver on a broad sport policy directive.

The trends of participation throughout childhood and adolescence in particular, are confounded by sampling and specialisation phenomena (26). That is, that children and adolescents often sample sport, whereby they play multiple sports before specialising in fewer or even one sport only. Therefore, by using official participation records across sports and combining the data for analysis and reporting, some participants would be counted multiple times if they play multiple sports (27). However, a recent study of 907,150 participant records for 11 major sports used demographic data to achieve more accurate matching across sports to identify the number of individual players within the sport cohort (26). The results showed that the effect of sampling, people playing multiple sports, was highest for ages 5-14, after which this number diminishes as specialisation increases. Furthermore, the study confirmed that after adjusting for this change in behaviour, the drop-off in community-level sport participation during adolescence is real and not simply an artefact of sampling/specialisation behaviour (26).

Australian sport policy makers acknowledge that participation in sport and the role that sport plays in the Australian society has changed, and will continue to evolve (13). There is increasing evidence of a shift from traditional organised and competitive club-based sport to less structured, non-competitive and individual forms of sport and PA (4, 28-30). A ten-year study of leisure-time PA in Australia highlights that whilst participation in leisure-time PA increased over the decade, participation in club-based sport did not (29). Market segmentation research also highlights that children and adults have different attitudes towards participation in sport and PA, and that for most, participation in club-based sport is not of interest (31, 32). In addition, further demographic breakdowns of participants in sport and non-sport PA indicates that sport is not for everyone, and that people who were female, older, married or had a disability were less likely to participate in sport (33).

In the context presented in this paper so far, we argue that (at least in Australia) community-level sport strategic priorities, and therefore practices are driven by sport policies that are mainly based on elite development pathways and in order to feed this system, focus on the number of club-based sport participants. The aim of this study therefore is to explore sport participation further and develop a neutral model that does not favour community or elite sport and that highlights the critical participation transition points between age groupings including drop-out. Internationally, sport policy consistently has a focus on increasing participation in sport and

to stimulate participation for health reasons. In this study, we highlight that a focus on increasing participation without acknowledging drop-out or a focus on retention is not ideal. As such our model that we describe as the Sport Participation Pathway Model (SPPM) offers a holistic starting point to (re)focus sport policy and practice.

Methods

Participants

We conducted a longitudinal analysis of sport participation records for 8 major sports from 2015-2017, whereby individual participation within sports was tracked from 2015 to subsequent years 2016 and 2017. The data for this analysis were collected and analysed as a part of the longitudinal Sport and Recreation Spatial (www.sportandrecreationspatial.com.au) program of research and have been published in detail previously (27, 34). The Sport and Recreation Spatial program monitors participation in sport for the purpose of informing policy development and program planning for the sport and recreation sector.

A participant, or player, was defined as a registered member of a Victorian sporting club competition or program that was affiliated with one of the State Sporting Associations. Most local community club-based competition takes place under the auspices of these associations, and as such registered participants represent the great majority of participants in these sports, particularly among children and adolescents (26).

Data analysis

{Eime, 2016 #4705;Eime, 2016 #4413}The primary data analysis for this investigation involved following an individual's participation in a sport from 2015 to 2017. To do this, sport participation records from eight sports (Australian football, basketball, cricket, football (Soccer), golf, gymnastics, netball, and swimming) were amalgamated. These represent popular Australian sports and are within the top 10 Australian club based sports (35). A participant must have been playing the sport in the first year (2015), and live in Victoria to be part of the analysis. Those aged 4-29 in 2015 were chosen for analysis, as this age range has been shown to generally have higher participation rates (26, 27). Participation profiles for players in five-year age cohorts (4-29) were produced. The separate four year old group was specifically included due to a considerable number of community-level club-based sport participants being aged less than 5 years, aged 4, but not younger (27). Participants who had missing data for age or sex were excluded from the analysis.

The characteristics of interest in this study was dichotomous participation or no participation. Participants were tracked over time using their sport's unique identifier (i.e. sport 'ID') and were further categorised into a pattern of participation with three categories. 1) Drop-out, where a participant played only in 2015, or played in 2015 and 2016 (but not 2017). 2) Continuous participation from 2015 to 2017. 3) Discontinuous, where the participant played in 2015 and 2017, but not 2016. Participation profiles for players in five-year age cohorts (4-29) were produced.

Ethics approval was granted by the University Human Research Ethics Committee, project number C13-007.

The Sport Participation Pathway Model development

Given sport policy focus on increasing participation numbers annually, with the intention to deliver health and community benefits, retention or drop-out in participation receive little to no sport policy attention. Together with

the fact that participation declines significantly during adolescence, a lack of lifespan population-level sport development models in the literature, and the formulation of new, broader definitions of sport by various governments, the authors set out to capture this in a new conceptual model. The literature that underpins the development of this model are described in the results section. The primary sport participation data presented in this paper highlights the recent trends in sport participation and provides a clear picture of the challenging issue of retention in and the large drop-out of sport. The authors used secondary and primary data to underpin the development of the conceptual model, moving to a conception of the 'new sport' (definition) that in the words of Sport Australia encompasses all leisure-time physical activity, and in which we specifically highlight the issue of drop-out of community club-based sport.

Results

Sport participation retention and drop-out

The total number of participants used in the analysis was 579,696 (Table 1). At baseline, the majority of the study participants were aged 10-14 years (33.4%) followed by participants aged 5-9 years (31.7%). Males represented 66.1% of the study participants

Insert Table 1 about here

Overall, half of the participants 50.8% played continuously for the three years, 44.7% dropped-out and the remainder participated in a discontinuous manner (Table 2).

Drop-out was highest amongst those playing at the youngest age (four year olds) in 2015, where 57.0% (n=8,425) of those aged four and playing in 2015 were not participating in the sport in 2017 (Figure 2). In this age group, just over a third (36.4% n=5,389) played the sport continuously for the three years. The age cohort with the lowest drop-out of players was the 10-14-year group in 2015 where 39.3% (n=76,022) players did not continue playing for the three years.

Insert Table 2 about here

Insert Figure 2 about here

The Sport Participation Pathway Model

The following provides a background to the development of the Sport Participation Pathway Model (SPPM).

Most sports collect annual participant registration data, and when government funding is based on sport policy to increase total numbers, sport organisations will focus on that measure. We have demonstrated earlier in this paper, that most sport participation models focus on the elite pathway but that only very few of us will be elite athletes, and most people will drop-out of active sport participation at some point in time. Beyond the participation models that are geared towards elite sport pathways, we require a model that focuses on the population as a whole, that identifies transitions in and out of sport and PA. This will provide policy makers with a holistic (across the lifespan) view to assist in the development of strategies towards higher levels of PA across the population. In Australia, for example, this would better facilitate Sport Australia's aim to be the world's most active, healthy and sporting nation (13).

The SPPM depicts current sport participation and in doing so emphasises the significant drop-out of sport across the lifespan (Figure 3). Furthermore, when progressing through the model, the issue of (poor) retention is clearly visible, and its absence from most sport policy exposed. Secondly, the new longitudinal sport participation data presented in the results of this paper demonstrate the significant drop-out rates.

Insert Figure 3 about here

The SPPM is not designed to identify or address the key barriers to participation in sport across the lifespan as they have been articulated previously (36-38). Rather, it seeks to comprehensively map the total market for sport participation across the lifespan, and what are the critical transition points including drop-out. The model should be viewed as a flow diagram, in which people move from one life stage to the next. The model is divided in five columns that break up the population across age groups. The age groups are separated by critical sport transition points. Within each life stage we have identified the various contexts in which sport participation during that life stage takes place. The size of the different shaded areas represents the relative focus on that activity during that life stage. For example, most if not all of modified club sport is played by 5-9 year olds whereas those 20 years and older – if and when active – spend most of their time in organised social and recreational sport.

During the pre-school years children should be participating in or be active through non-organised play, and non-organised sport. There is evidence that many pre-schoolers (aged 4-5 years) participate in modified club-based sport (23, 25). Nearly, a quarter (24%) of Victorian children aged 4 play one of 11 major sports (26). However, many drop-out before they transition to club-based competition (23, 25). Results of this and other research has demonstrated that the optimal age of entry into modified sport participation for continued participation and transition into club-based competition is between the age of 6-9 years (23, 25).

Through early school years (ages 5-9 years) participation in modified club-based sport is very popular with over half of males and females aged 5-9 participating in one of 12 major club-based sports (39). Children are also active through non-organised PA or free-play and more likely to participate in free play than organised sport (Cairney, 2017 #4923). Within schools, children have the opportunity to play sport through school in either formal sport competitions or physical education. From the ages of 10-14 years approximately half of children play competitive club-based sport (Eime, 2019 #5281) and many of these have transitioned from participation in a modified sports program (23, 25). However, many also drop-out of sport, but there is no research highlighting the enormity of this issue. During these years, children can also be active through non-organised activities and in school activities.

During late adolescence (ages 15-19) there is a significant decline in participation in club-based sport in 2017, and there is much evidence supporting this decline, which is more pronounced for females than males (26, 40) (Figure 2). As represented in the SPPM (Figure 3) the elite represents a very small proportion of sport participants.

Children can transition from modified-sport to club competition, and in Australia the far majority of club-based sport for children is traditional club-competition. 'Organised-social-recreational' sport which is light blue in the SPPM, is largely an underdeveloped offering for that segment of the market, except for an increasing number of social-recreational programs for adults which would fit into this category, such as Rock-up-Netball, bowling with babies, J-ball social hockey, and cardio-tennis. In 2017, from the ages of 20+ few adults, and fewer older adults

participate in club-based sport {Eime, 2016 #4705;Eime, 2016 #4413} (Figure 4). People drop-out of sport at any age, but with current sport policy focusing on total participation numbers, the actual extent of drop-out across age groups has been unknown and sport organisations have not been incentivised to retain participants.

Insert Figure 4 about here

Discussion

This study uniquely uses community level club-based sport participant data of a large population (n=579,696), and demonstrates the significant issue of drop-out in sport. Nearly half (45%) of the sports participants aged 4-29 dropped out of participation in their sport over a two-year period. The data provides clear evidence of a significant issue in regard to sport participation retention and drop-out. From this data and the published literature on sport policy and participation we developed the SPPM to further highlight the critical participation transition points across the lifespan, and what are the resulting sport participation retention and drop-out patterns.

The SPPM visualises the patterns of participation in organised, non-organised sport and social and recreational activities across the lifespan and displays the issue of drop-out in sport. It clearly highlights that participation in club-based competitive sport is popular for children, however very few adults participate in this form of sport. Our model extends beyond the scope of other participation models with a focus on the talent development pathway, showing that few make it into elite sport and that the majority of the population is not participating in organised sport, and of those that do play, the majority drop-out. To capture this majority cohort and facilitate them into more active lifestyles, other policy mechanisms will have to be enabled.

Sport is still largely stuck in a traditional (Northern European inspired) club-based competitive structure (41). The data and model provided in this paper, in addition to previous research, underpin a case that sport in the traditional club-based structure does not cater for the broader population (27-29). Firstly, historical and current sport policies focus on increasing numbers, and do little to assist increasing participation at a population level. We argue that sport policy should actually more focus on retention strategies. Secondly, sport governing bodies need to recognise that organised and competitive sport, in its current dominant format of offering, does not appeal to the majority of the market past early adolescence. A focus towards retention may deliver two distinct outcomes. Firstly, it is a commonly known fact in consumer marketing that it is much cheaper to retain existing customers than it is to recruit new ones. Secondly, a strategic focus on retaining customers forces senior management of the organisation to better listen to the needs, wants and desires of its current customers. To better deliver on their demands leads to higher lifelong customer value and loyalty, in turn leading to a higher likelihood of remaining involved with the sport(ing club) in various capacities other than being an active player.

As noted in the previous paragraph, governing bodies and sport clubs have to become smarter and more strategic in their marketing and service offering focus (27, 31, 32). With the evidence presented in this paper about transition points during the early life-stages and the type of sport offerings (potential) participants want, the extent and duration of their membership-based involvement can be intensified and prolonged. However, it needs to be recognised that sport is not for everyone, and only for a few there is continuous participation throughout their lifespan (27, 29, 34). As we started this paper with the observation that the problem at the population level is chronic physical inactivity, it can be noted that drop-out in sport is a problem for sport

management however is not necessary a problem in terms of public health, if people remain active through other pursuits.

It has been shown that both in numbers and proportion of people who drop-out of sport, the current Australian competitive sports club model does not provide the infrastructure and services that are required to keep people in sport and is not yet equipped to fulfil newly envisioned objectives of Sport Australia that go beyond sport participation – to significantly reduce levels of physical inactivity. Although community sports clubs are increasingly pressured to produce a wider range of social and health outcomes, research highlights that volunteer-based sports clubs do not have the capacity and can therefore not be expected to extend beyond their core responsibilities and deliver a range of other services outside the scope and resource capacity of their organisation (42).

Rather than continuing to focus sport policies on increasing participation, the broader context of participation in sport could be moved towards offering or developing (sport-like) physical activities that match skill levels with task challenges. This may lead to higher levels of enjoyment which in turn increases the likelihood of more continuous involvement (5). Competitive sport (at all levels of competition) as a platform offers purpose for PA, but sport is/can (be) designed to improve skill levels, work towards competitive events, and compare and contrast against the performance of others and oneself. However it needs to be acknowledged that competitive sport is not for everybody, and that some sports are harder to master (and therefore harder to enjoy) at a basic skill level than others. Therefore, to optimise enjoyment in sport participation at all stages of life, 'how to retain' participants naturally sharpens the focus of sport managers on the needs of the customer – the sport participants.

A strength of the sport registration data is that it is a large dataset of all registered sport participants within each given sport and that it provides a comprehensive and accurate record on which to base longitudinal analysis. However, a limitation of this study and the associated sport participation dataset is that it does not cover all sports, nor does it include other non-organised sport participation, or any general physical activity.

Recommendations for further research include understanding individuals' transitions into and out of sports and other physical activities across the lifespan, which would provide sport and physical activity profiles that collectively can measure and monitor individuals' health enhancing behaviours.

Conclusion

At a population level, competitive club-based sport alone is not going to solve the physical inactivity epidemic. Our SPPM, and the new (retention related) data presented in this paper, demonstrates the population trends in participation in sport and the high drop-out of competitive club-based sport. Internationally sport policies are starting to transition towards integrating sport in the leisure-time PA continuum which also extends sport beyond the traditional club-based system. We suggest that for people to (eventually) become active sport participants, the (recruitment) narrative could be changed towards (first) engaging people in leisure-time physical activities. We feel that this can only be done by developing an integrated policy system across the PA-sport spectrum rather than looking at sport participation in a closed (club-based) system. The SPPM can be used to developing a more integrated PA-Sport participation model. The SPPM highlights that the drop-out of participation in sport

could lead to the development of a broader integrated view on participation which specifically connects sport policy with physical activity policy and strategies for the population as a whole.

Those who manage and govern sport in Australia need to better recognise that club-based sport merely is one component of a range of leisure-time physical activities. If sport is to have an increased impact on making Australians becoming more active, then the evidence about the participation patterns and significant drop-out should be used to justify a re-focus on retention. This may require an industry wide sport policy reform underpinned by the acknowledgement that people do drop-out out of sport and that many take up other non-competition forms of PA.

The reality is that sport policy focused on participation is rarely, nor critically evaluated. We recommend that the collection, analysis and reporting of longitudinal PA and sport participation data is expanded, to better serve policy evaluation and redirection.

Abbreviations

DMSP: Developmental Model of Sport Participation

FTEM: Foundations, Talent, Elite and Mastery

PA: Physical Activity

SPPM: Sport Participation Pathway Model

SMTD: Standard Model of Talent Development

Declarations

Ethics approval and consent to participate

Ethics approval was granted by the Human Research Ethics Committee of the Federation University, Australia, (C13-007) for secondary data analysis of de-identified sport participation data which had been collected by the primary data custodians.

Availability of data and materials

The data is not able to be shared due to confidentiality agreements with the primary data holder. Data is not sharable at all, even to researchers.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

RE and HW contributed to the study design, methodology, model development, interpretation of results, manuscript conceptualisation and preparation. MC data management, statistical analysis and interpretation, manuscript preparation. All authors have read and approved the final manuscript.

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Tables

Table 1: Demographics of participants

	n	%
	579,696	100.0
Age range		
4	14,794	2.6
5-9	183,475	31.7
10-14	193,702	33.4
15-19	93,422	16.1
20-29	94,303	16.3
Gender		
Female	196,656	33.9
Male	383,040	66.1

Table 2: Retention pattern by age

Participation pattern	Age range											
	4		5-9		10-14		15-19		20-29		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Continuous	5,389	36.4	91,918	50.1	112,060	57.9	41,689	44.6	43,463	46.1	294,519	50.8
Discontinuous	980	6.6	8,566	4.7	5,620	2.9	4,930	5.3	5,726	6.1	25,822	4.5
Drop out	8,425	57.0	82,991	45.2	76,022	39.3	46,803	50.1	45,114	47.8	259,355	44.7
Total	14,794	100.0	183,475	100.0	193,702	100.0	93,422	100.0	94,303	100.0	579,696	100.0

Figures

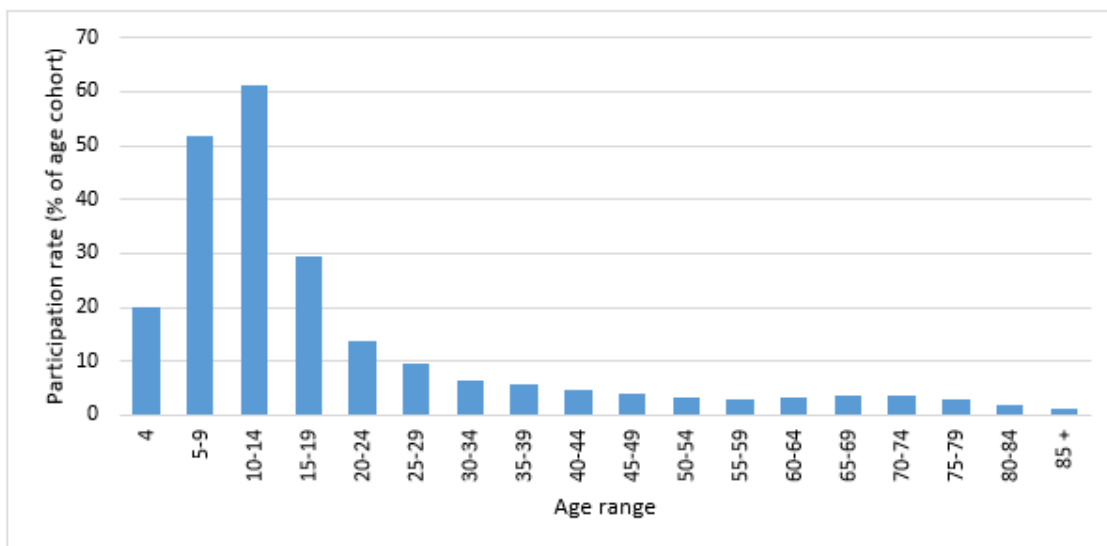


Figure 1

Participation rates, 2017, Victoria: by age

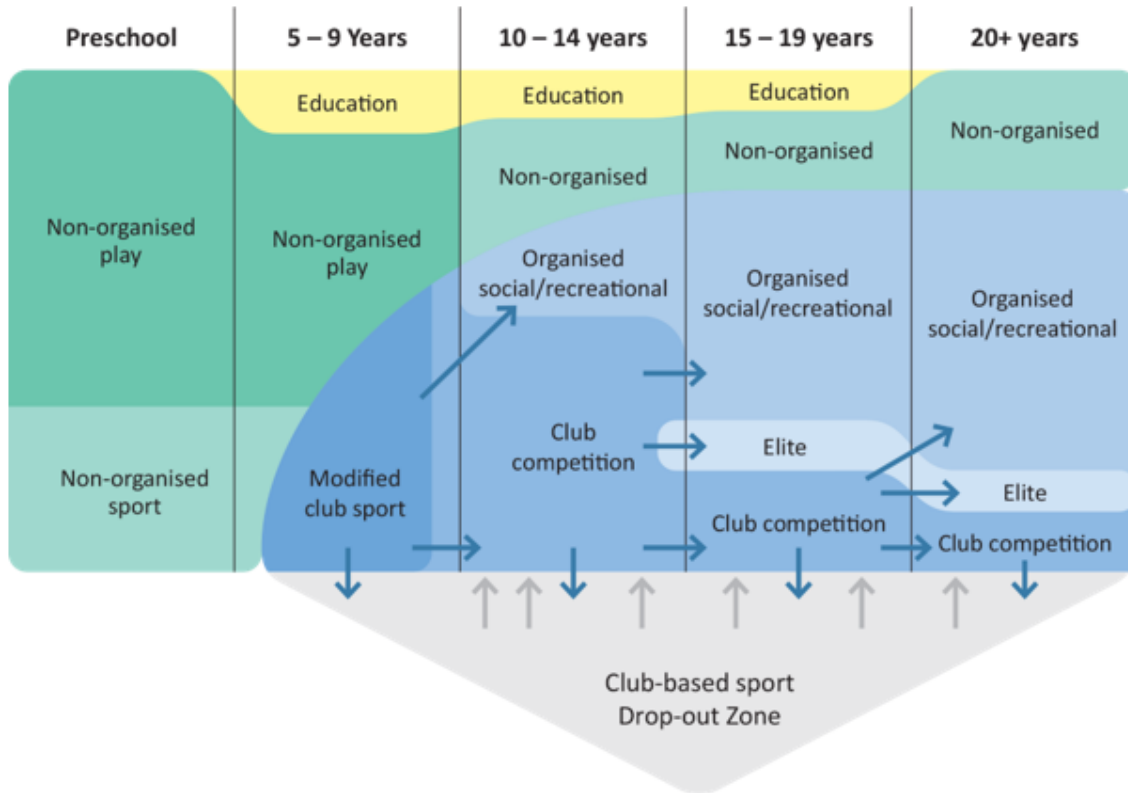


Figure 2

The Sport Participation Pathway Model (SPPM)

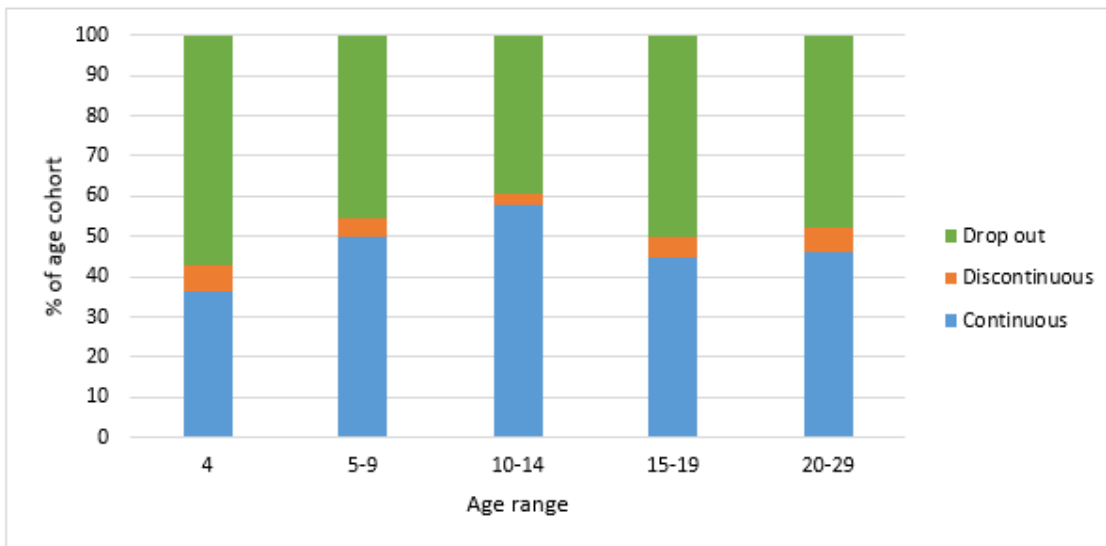


Figure 3

Retention pattern of registered sport participants



Figure 4

The Standard Model of Talent Development (adapted from Tinning et al. (1993).