



VicHealth Research Practice Fellowship – Physical Activity

Final report – March 2016

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Contents

- Executive summary4**
- Sport participation – participation levels and trends, and influences on participation4**
 - Recommendations5
- Places to play – the nexus between facilities and participation.....6**
 - Recommendations7
- Value of sport – the health benefits of participation7**
 - Recommendations7
- Data management systems8**
 - Recommendations9
- Introduction.....10**
- Aim and scope.....10**
- Partners11**
- Methods12**
 - Data analysis12
 - Research translation13
- Results14**
 - Participation levels and trends, and influences on participation14**
 - Sport participation trends 2001–2010.....14
 - Population levels of sport participation.....16
 - Age patterns of participation in sport across the lifespan.....22
 - Sport retention and withdrawal: four-year trends across the lifespan24
 - Participation in modified sports programs: a longitudinal study of children’s transition to club sport participation27
 - Participation in sport and physical activity: associations with socio-economic status and geographical remoteness.....30
 - Value of sport – the health benefits of participation30**

Psychological and social benefits of participation in sport for children and adolescents	30
Psychological and social benefits of participation in sport for adults	34
Contribution of sport participation to overall health	34
Correlations between sport participation and health	36
Places to play – the nexus between facilities and participation.....	38
Location of sports facilities and sport participation: a geographical analysis	38
References.....	40
Contact.....	41
Appendix 1: Sport and Recreation Spatial – geographic information system	42
Appendix 2: Summary of data definitions and sources	52

Executive summary

This report integrates the results of a number of separate research studies conducted throughout the VicHealth Research Practice Fellowship 2011–2015. The aim of the Fellowship was to work with seven state sporting associations (SSAs) – for Australian football, tennis, netball, basketball, cricket, hockey and bowls – to conduct research and translate the resulting knowledge to sports to provide an evidence base to inform their strategies for growing participation in sport.

In collaboration with the seven SSAs the following key themes for investigation were established:

- participation levels and trends
- influences on participation
- places to play – the nexus between facilities and participation
- value of sport – the health benefits of participation.

The overarching project is named Sport and Recreation Spatial.

The Fellowship included identifying key research questions within the four key areas; identifying and gaining access to appropriate datasets for analysis; developing a geographic information system (GIS) (refer Appendix 1), accessible to SSAs, for data analysis and display; analysing the data; and translating knowledge through industry reports, industry forums and conferences, academic peer-reviewed publications and other media.

Key themes emerged from this program of research. Some key points regarding each theme follow, together with recommendations.

Sport participation – participation levels and trends, and influences on participation

Evidence from a national survey, Exercise, Recreation and Sport Survey (ERASS), indicates some significant increases in general sport and recreation participation among the population aged 15+ years over the 10 years 2001–2010; however, this was not the case in the specific context of organised and/or club participation, which remained steady across that decade. Whilst surveys such as these provide broad population trends we need more detailed sport-specific data to provide the evidence for policy and program development. Therefore sport club participation data from SSAs was integrated to investigate sector-level trends.

Measurement of club membership data (for ages 4–100 years) for five major sports indicates that **sport participation in Victoria increased by more than 50,000 persons for the three years 2010–2012** (from 7.5% to 8.3% of the population). These findings extend those of other national surveys, as

this study captured sport participation across the lifespan including children, for whom sport is a popular activity.

Participation in club sport is dominated by young people and peaks at ages 10–11 years. Nearly one-third of all participants (28%) were aged 10–14 years, before a considerable **decline in participation at 15–19 years. Most sport participants (80%) are aged <30 years.**¹

More males than females were registered sport participants, especially for ages 5–9 years, with 26% higher participation rate for males compared to females. **Males from non-metropolitan Victoria aged 10–14 years had the highest participation rate** of 64% in 2012.²

Junior modified sport programs designed for those aged 4–12 years had a **high proportion that are very young, especially males aged 4–6 years** (73% of males playing modified sport programs).

However, few children continued to play in a modified sport programs for four consecutive years, and the majority withdrew from the sport before transitioning to a community level sports club. There are gender differences, with **males transitioning from modified sports programs into club competitions earlier** (at 7 years) than females (at 10 years).³

The highest rates of continuous participation over four consecutive years were amongst those aged 10–14 years. Participation significantly declined at 15–19 years, especially for females. For many sports, this drop-off in sport participation during adolescence occurred at the time when people would enter the elite sport pathway. SSA priorities may be a factor here, since most government funding to national sporting organisations is linked to elite sport rather than to community sport.⁴

There are also regional differences, with **sport participation more popular for non-metropolitan adolescents** than metropolitan adolescents.

Recommendations

State sporting associations

- Develop strategies that better link modified sport programs to community-level participation structures to retain participants, including considering intermediate or transition programs.
- Reflect age and gender participation trends in the development of programs and products that consider flexible structures and schedules, to boost retention and maximise transition into community-level sport.

¹ Across seven sports: Australian football, tennis, netball, basketball, cricket, hockey and bowls.

² Across seven sports: Australian football, tennis, netball, basketball, cricket, hockey and bowls.

³ Across three sports: Australian football, netball and cricket.

⁴ Across four sports: Australian football, netball, basketball and cricket.

- Develop non-competitive products targeting young people and/or women, focused on fun, friends and fitness to maximise participation. These may focus on building competency and skills, and building confidence and social connection.
- Investigate how competitive grades could be structured differently to target wider ranges of skills and abilities of young people, to support retention in sport participation.
- Develop strategies to increase sport competency/skill development to enhance confidence and participant retention, especially amongst children and adolescents.

Policy makers and funders

- The sport sector should focus on the issues of drop-out and retention, particularly for very early modified sport adopters, adolescents, females and those 30 years of age and over.
- Consideration should be given to the balance of sport funding. Australian sport policy is currently highly directed towards elite player development, and not community grass roots and the decline in grass-roots participation.

Researchers

There are clear opportunities for researchers to investigate and advise on a range of related themes and topics, including:

- characteristics and demographics of sport participants
- influences on participation for different segments of the community
- effectiveness of modified programs for children, in influencing the patterns and determinants of participation and retention
- impact of participation in modified sport programs by children at a very early age on their participation in organised sport later in life
- what leads children, adolescents and adults to continue – or not continue – to participate in organised sport, to inform strategies that maintain participation

Places to play – the nexus between facilities and participation

The provision of more sports facilities and fields/courts is associated with increased sport participation. However, there are large differences between different sports and across geographical regions. The mean number of participants (in seven major sports) per 1000 persons within a local government area (LGA) ranged from 16 to 50 in 2012. These sports have been provided with specific rates of provision of facilities and courts/fields per head of population and per participant in all Victorian LGAs, together with the minimum number of facilities per capita for an LGA associated with a medium or high level of participation. These figures were very specific to each sport. **These results provide objective evidence to inform decisions about future investment in sport facilities.**

Recommendations

State sporting associations

- Use data-driven, evidence-based decisions in day-to-day operations and strategic directions to increase participation and in planning facility developments.

Policy makers and funders

- The results of this research relating to facility provision and participation data, including trends, should be used to inform evidence-based decisions about future investments in sport and recreation facilities.

Researchers

- links between participation rates within a community and facility usage, facility characteristics (for example female change rooms) and facility quality (for example age and state of repair)

Value of sport – the health benefits of participation

Club sport participation contributes considerably to leisure-time physical activity at health enhancing levels, with nearly one-fifth of all such activities participated in within a sports club. **Many different psychological and social health benefits** were reported for sport participants, with the most common for children and adolescents being improved self-esteem, social interaction and fewer depressive symptoms, and for adults increased wellbeing and reduced distress and stress. **Compared to non-sport activities, sport may be associated with improved psychological and social health above and beyond physical health outcomes, due to the social/collective nature of participation in clubs and teams.**

The rate of participation in sport for children aged 5–9 years is associated with lower overall prevalence of overweight and obesity in an LGA. The rate of participation in sport across all age groups in an LGA is associated with lower prevalence of type 2 diabetes, lower prevalence of psychological distress and lower prevalence of child development vulnerability such as physical health and wellbeing and social competence.

Recommendations

State sporting associations

- Promote the physical, mental and social health benefits of participation in sport across all ages.
- Capitalise on the multiple benefits of sport participation at the individual and community levels, to create strategic partnerships.

Policy makers and funders

- The health benefits of participation in sport across the lifespan should be promoted.
- Relevant health and sport policy should emphasise the impact of sport participation at a community level in enhancing health, to support a balanced investment alongside a focus on elite participation pathways.
- Community sport participation should be promoted alongside less structured and organised physical activity options, in recognition of its potential contribution to mental and social health outcomes.

Researchers

- Physical, social and psychological health impacts of discontinuing participation in sport during late adolescence and amongst females in particular

Data management systems

Sport participation/club membership data management systems generally have improved over the past four years, but quality of data collected by SSAs varied considerably. For example, some SSAs only had good quality data for 2012 and not for earlier years. Five of the seven SSAs had participation data of reasonable to high quality over the three years 2010–2012. **Many sports did not fully utilise their membership data, and had limited capacity to analyse their data to inform strategic developments.**

The best quality sports data management systems are those that require individual participants/members to register online and provide their details. The main data quality issues related to date of birth, ID numbers and free-text fields. For example, some sports data systems with incomplete date-of-birth data have substantial proportions of default dates of birth (such as 1/1/1900 or 1/1/1970). In many instances, an individual participant's ID number was different in subsequent years due to an additional or missing digit. The amount of free-text entered for a range of variables including club names, association names, program names, coach and umpire levels and qualifications means that there is substantial non-uniformity. Online participant/member registrations that utilise mechanics of previous details automated from year to year and with drop-down menus to limit the free text would increase the quality of sports data management systems.

The scope of available sports-related data could be extended. It should be feasible for a wider group of SSAs to reach similar levels of data collection and management as the seven SSAs engaged with through the Fellowship. The SSA registration process, and online registration in particular, could provide an opportunity to capture more extensive data about sports participants.

Recommendations

State sporting associations

- Improve the quality and consistency of membership data collection and management – including online participant registration systems – so that data can be better used to monitor trends and inform strategic priorities.
- Contribute to the continued integration of sport participation data at a sectoral level.

Policy makers and funders

- A uniform, sector-wide approach to collecting, managing, analysing and monitoring sport participation data and trends should be encouraged, to inform an evidence-based approach to strategic decisions and investments.

Researchers

- Expanding the collection of participation data to capture additional information, including more detail on types of participation, such as recreational and other leisure-time physical activity.

Introduction

Physical activity, whether organised or otherwise, is a determinant of health. With the burden of chronic disease a major concern, often dominating commentary on health, prevention strategies are required now more than ever to halt and reverse the growing prevalence of non-communicable physical diseases such as cardiovascular disease, stroke, cancers, overweight/obesity and type 2 diabetes. The relationship between participation in physical activity and physical health and wellbeing has long been recognised (US Department of Health and Human Services 2008) and incorporated in public health recommendations (Department of Health and Ageing 2005).

The benefits of sport participation to mental and social health have also been demonstrated (Eime et al. 2010; Eime et al. 2013a,b; Eime et al. 2014a). Club-based or team-based sport participation has been associated with better psychological and social health outcomes, particularly due to the social nature of sport participation, and this is true for children and adolescents as well as for adults (Eime et al. 2013a,b). Other recent research has shown positive associations between participation in sport and physical activity and lower rates of psychological distress and child development vulnerability, such as communication skills, cognitive skills and general knowledge (Eime et al. 2014b).

However, most people in Australia are not sufficiently active to gain these health benefits. For example, only 43% of Australian adults are sufficiently active to achieve health benefits, and 19% of children aged 5–17 years meet the recommended one hour of physical activity per day (Australian Bureau of Statistics 2013, 2014). Furthermore, only one-third of Australian males aged 15+ years and one-fifth of females aged 15+ years participate in club sport (Eime et al. 2015a).

To develop targeted strategies to improve sport participation and consequently physical activity levels we need to understand the trends in and influences on participation to inform policy developments (Eime et al. 2015a). High-quality data is abundant for physical activity in general but limited for sport in particular, which limits our capacity to make evidence-based strategic decisions about sport policy (Eime et al. 2015a).

The measurement and analysis of a range of sport data is vital to provide the sport sector with evidence to make informed decisions, to enhance the engagement of people to be active through playing sport.

Aim and scope

The aim of the Fellowship was to work with seven state sporting associations (SSAs) – for Australian football, tennis, netball, basketball, cricket, hockey and bowls – to conduct research and translate the

resulting knowledge to sports to provide an evidence base to inform their strategies for growing participation in sport.

In collaboration with the seven SSAs the following key themes for investigation were established:

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- places to play – the nexus between facilities and participation.
- value of sport – the health benefits of participation

The overarching project is named Sport and Recreation Spatial.

Partners

A number of key partners were involved with the development of this project:

- **Victorian Health Promotion Foundation (VicHealth):** funder of the VicHealth Research Practice Fellowship – Physical Activity, industry expertise and advice
- **Sport and Recreation Victoria:** industry expertise and advice, contribution of Victorian sporting infrastructure data
- **VicSport:** industry expertise and advice
- **School of Health Sciences and Psychology – Federation University Australia:** co-funder through provision of statistical expertise
- **Centre for eResearch and Digital Innovation – Federation University Australia:** co-funder, information technology services and technical implementation
- **Institute of Sport, Exercise and Active Living – Victoria University:** co-funder through Australian Sports Commission/Victoria University collaborative research grant and provision of data management and statistical expertise
- **Australian Sports Commission:** co-funder through Australian Sports Commission/Victoria University collaborative research grant, industry expertise and advice, expertise and knowledge of research databases, contribution of Exercise, Recreation and Sport Survey data, service user
- **Australian Football League Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user
- **Basketball Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user
- **Bowls Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user
- **Cricket Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user
- **Hockey Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user
- **Netball Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user

- **Tennis Victoria:** industry expertise and knowledge, contribution of participation, coach and official data, service user.

Methods

The Fellowship included identifying key research questions within the four key areas; identifying and gaining access to appropriate datasets for analysis; developing a geographic information system (GIS), accessible to SSAs, for data analysis and display; analysing the data; and translating knowledge through industry reports, industry forums and conferences, academic peer-reviewed publications and other media.

Sport and Recreation Spatial provides a GIS for analysing and presenting spatial data relevant to all levels of the sport and recreation sector. From an industry perspective this provides a strong evidence base and an increased capacity for research, strategic planning, and development of participation programs and facilities. The creation of the Sport and Recreation Spatial GIS tool is assisting sports to become self-reliant in their use of data for decision making. Sport and Recreation Spatial also conducts an associated research program which can address questions of national and international significance in the four key themes.

The first phase of data capture included gaining access to the participant, coach and umpire data of seven Victorian SSAs, and cleaning the data for analysis, with a total of 2,500,990 records. In addition, data from 10 years of the Exercise Recreation and Sport Survey (ERASS), with 195,926 records, was accessed and analysed.

Data analysis

The following table summarises the types of data analysed. See Appendix 2 for data sources and definitions.

Data subject	Data types/sources
Sport participation and physical activity	<ul style="list-style-type: none"> • Sport participation – registered club member • Sport coaches • Sport officials • Sports facilities, playing fields and courts • Meeting the physical activity guidelines • Leisure-time physical activity • Organised leisure-time physical activity • Club-based leisure-time physical activity • Regular leisure-time physical activity – past 12 months • Regular health-enhancing leisure-time physical activity – past 12 months • Recent health-enhancing leisure-time physical activity – past two weeks

Data subject	Data types/sources
Health	<ul style="list-style-type: none"> • Overweight and obesity • Type 2 diabetes • Child development vulnerability (physical health and wellbeing, social competence, emotional maturity, language and cognitive skills, communication skills and general knowledge) • Psychological distress
Population	<ul style="list-style-type: none"> • Census population data, by demographic segments and regions

Research translation

All publicly available reports and peer-reviewed publications are available on the Sport and Recreation Spatial website: www.sportandrecreationspatial.com.au

Tailored reports have been produced for each of the seven individual sports on the following topics:

- age patterns of sport participation
- longitudinal participation patterns of those commencing as a participant in a sport
- longitudinal participation patterns
- sport transition patterns
- sport facility provision
- future sport facility provision requirements.

This research summary provides an aggregated report on four separate research studies.

1. Sport Participation Rates: Victoria 2010–2012
2. Sport Participation Age Profiles: Victoria 2010–2012
3. Longitudinal Sport Participation Patterns: Victoria 2010–2012
4. Contribution of Sport to Physical Activity Levels: Australia 2010

The first three studies are based on annual Victorian player registration data for five popular sports (Australian football, basketball, cricket, hockey and netball) for the period 2010–2012, and the fourth based on national data from the 2010 ERASS commissioned by the Australian Sports Commission.

The aggregation of sports data has also been used for analysis and to develop several peer-reviewed publications published to date: Eime et al. 2015a, Eime et al. 2015b, Eime et al. 2015c, Eime et al. 2015c, Eime & Harvey 2015, Casey & Eime 2015, Eime et al. 2013a, Eime et al. 2013b, Eime et al. 2016.

Results

Participation levels and trends, and influences on participation

Sport participation trends 2001–2010

The analysis of 10 years of data from ERASS included people aged 15+ years and investigated their participation in leisure-time physical activity (Eime et al. 2015a; Figs 1–2).

- Males are more active in sport and recreation and more specifically in organised contexts and club settings than females.
- Participation in any sport or recreation for males increased from 80% in 2001 to 83% in 2010 and for females from 76% to 81%.
- One-third of males participated at least once in club sport in the previous year, compared to only 1 in 5 females.
- Increases in leisure-time physical activity were generally evident amongst older females (aged 35+ years), but not in those that were younger (15–34 years).
- Participation in organised or club settings remained unchanged over the decade. There were no significant changes in male participation in organised (from 42% to 43%) or club settings (from 31% to 32%). For females, participation in organised and club settings remained unchanged at rates of 37% and 20% respectively.

Conclusion

There were some significant increases in sport and recreation participation in general over time; however, this was not the case in the specific context of organised and/or club participation, which remained steady across the decade.

Whilst surveys such as these provide broad population trends we also need more detailed sport-specific data to provide the evidence for program and policy development. An avenue for this to occur may be through the integration of participation data from peak sport organisations.

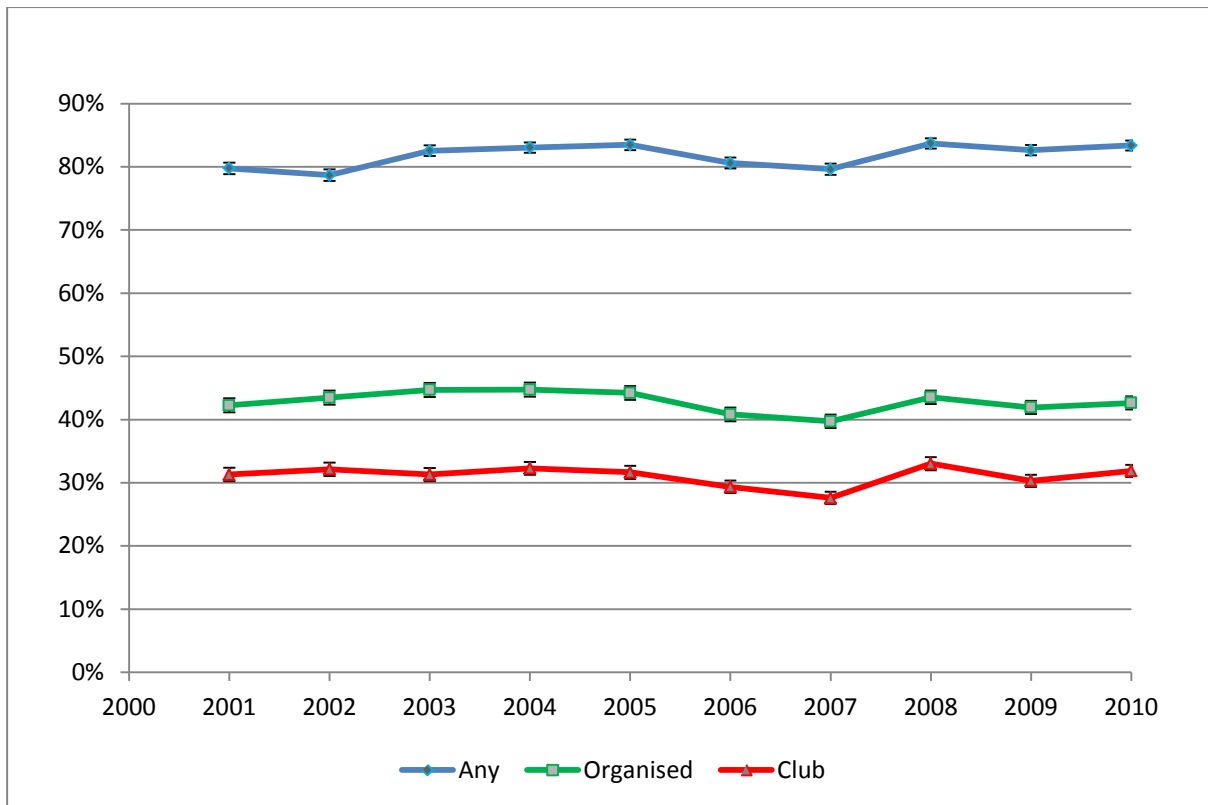


Figure 1: Sport and recreation participation for males, 2000–2010, by year (source: ERASS)

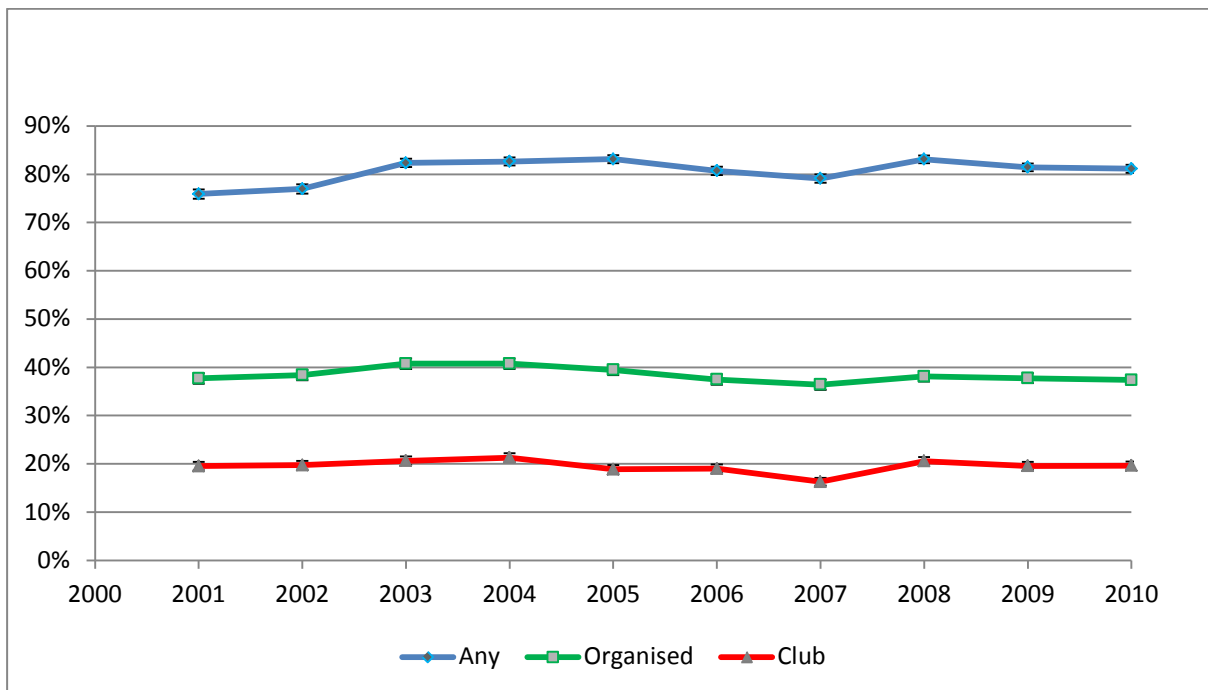


Figure 2: Sport and recreation participation for females, 2000–2010, by year (source: ERASS)

Population levels of sport participation

Data from 2010 to 2012 on sport participation across the lifespan for five sports (Australian football, basketball, cricket, hockey and netball) was investigated (Figs 3–13). This included annual Victorian player registration data.

- The total number of participants increased from 417,975 to 468,944.
- The increase in participation corresponded to a rise in the proportion of Victorians participating in these sports, from 7.5% in 2010 to 8.3% in 2012.
- The highest proportion of participants was within the age range of 10–14 years, corresponding to participation rates of the population of 36% in 2010 to 40% in 2012.
- There was considerable decline in participation in the age range of 15–19 years. This corresponded to participation rates of the population of 19% in 2010 to 23% in 2012.
- More males than females were registered sport participants, especially in the age range of 5–9 years, where participation rates for males were 26 percentage points higher, and this remained consistent over the three years. This may be a reflection of the sports involved.
- Males from non-metropolitan Victoria aged 10–14 years had the highest participation rate: 64% in 2012, up from 47% in 2010.
- There was an increase in participation rate from 2010 to 2012, most notably amongst non-metropolitan compared to metropolitan people.

Conclusion

It is promising that participation in sport has increased by more than 50,000 participants from 2010 to 2012 in these popular sports. It is recommended that sport policy places a higher priority on grass-roots participation. This could support sport to prioritise the retention issues occurring during adolescence particularly for females. Large proportions of the population aged 5–14 years participate in club-based sport. Can sport curb the retention issues during late adolescence, keeping people engaged in sport, and influence population health?

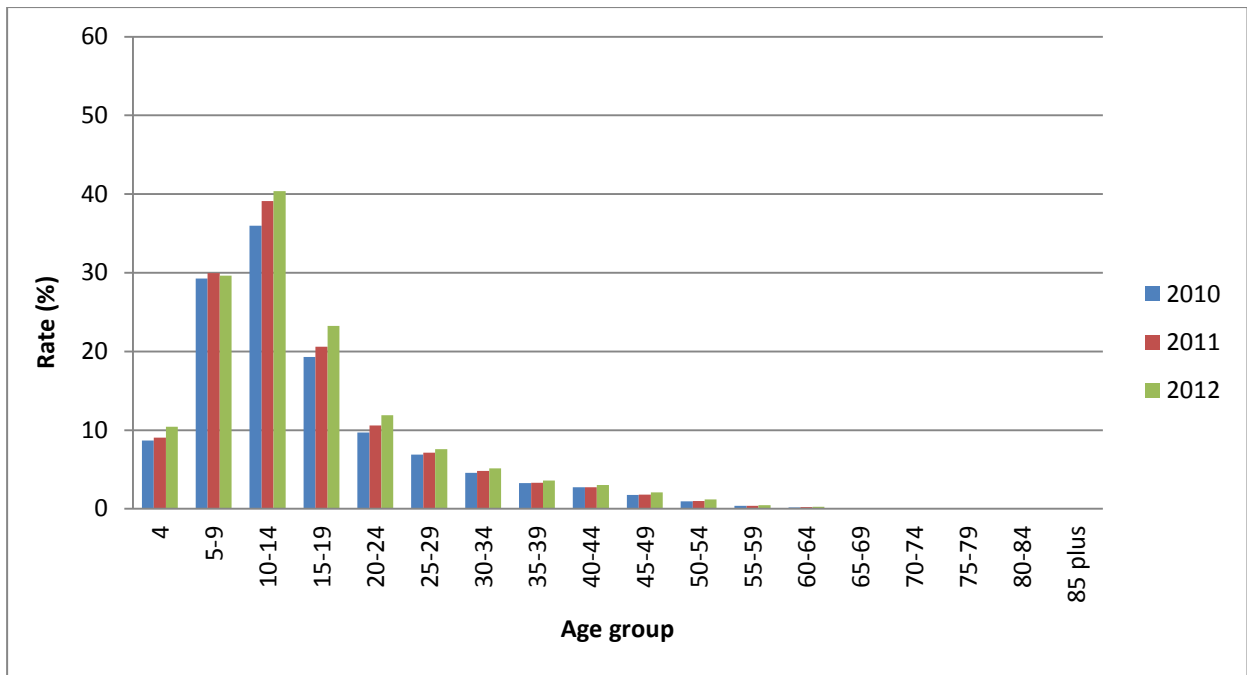


Figure 3: Sport participation rates in Victoria for males and females, 2010–2012, by age group and year (Source: Australian football, basketball, cricket, hockey and netball)

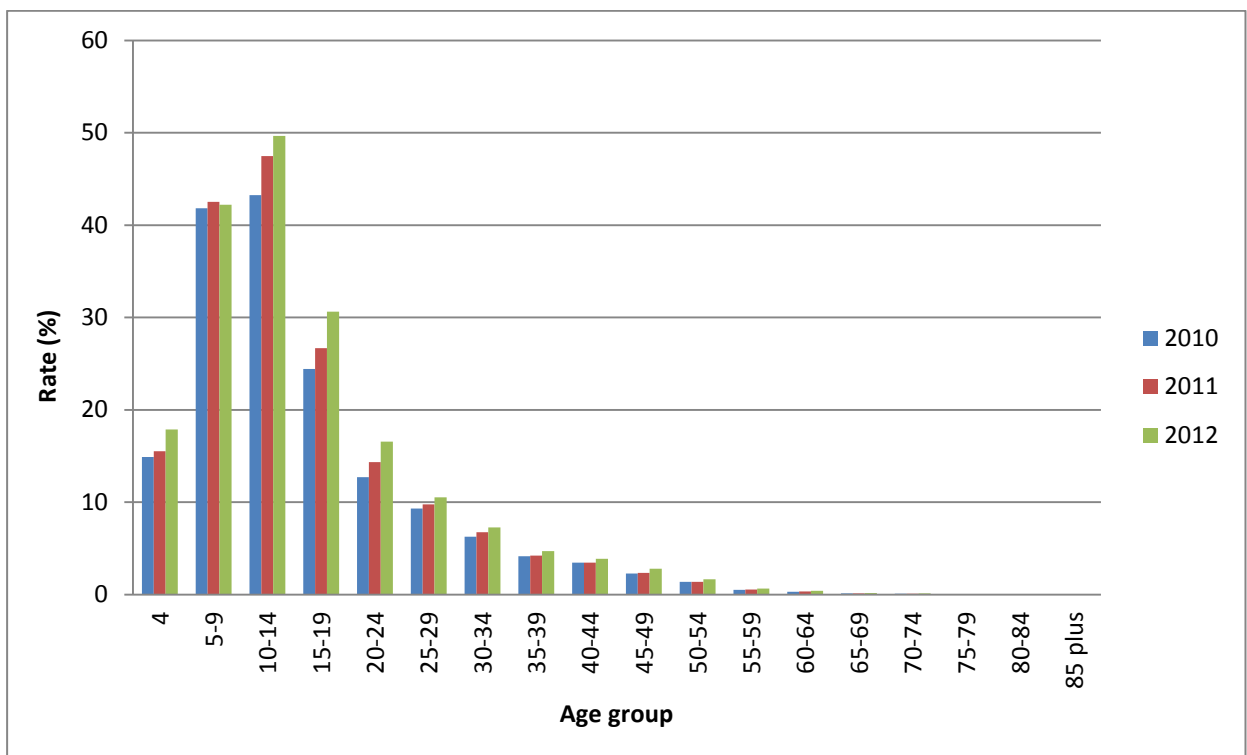


Figure 4: Sport participation rates in Victoria for males, 2010–2012, by age group and year (Source: Australian football, basketball, cricket, hockey and netball)

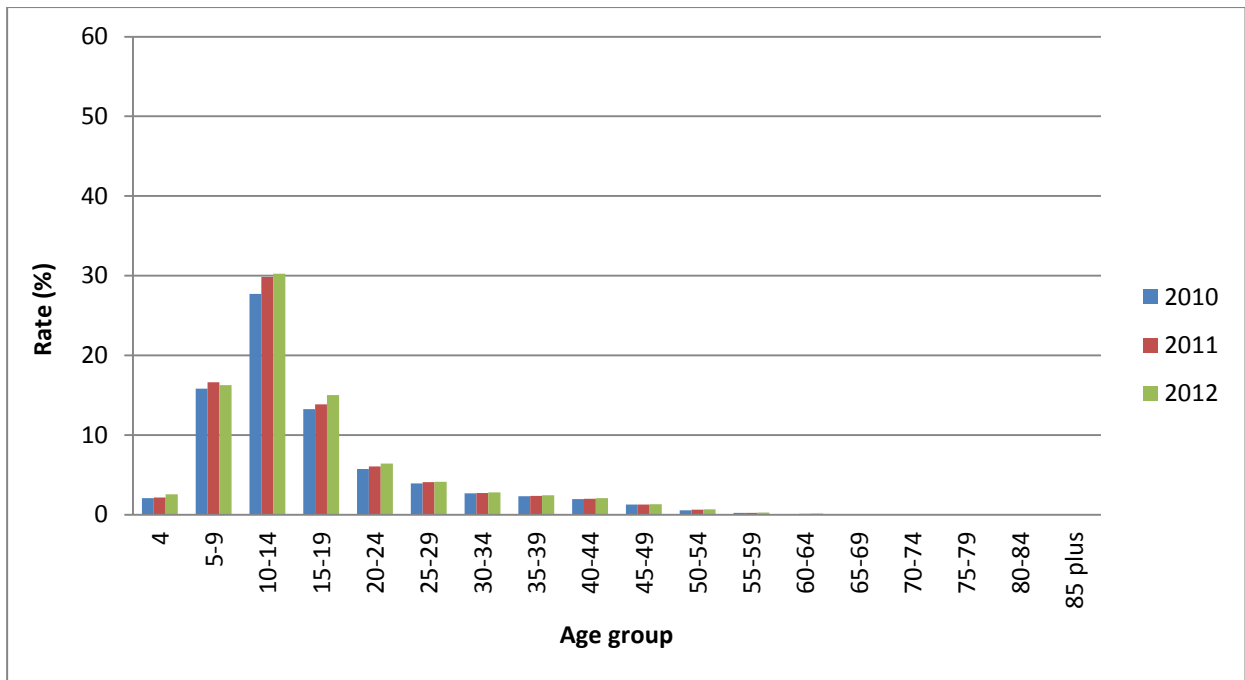


Figure 5: Sport participation rates in Victoria for females, 2010–2012, by age group and year (Source: Australian football, basketball, cricket, hockey and netball)

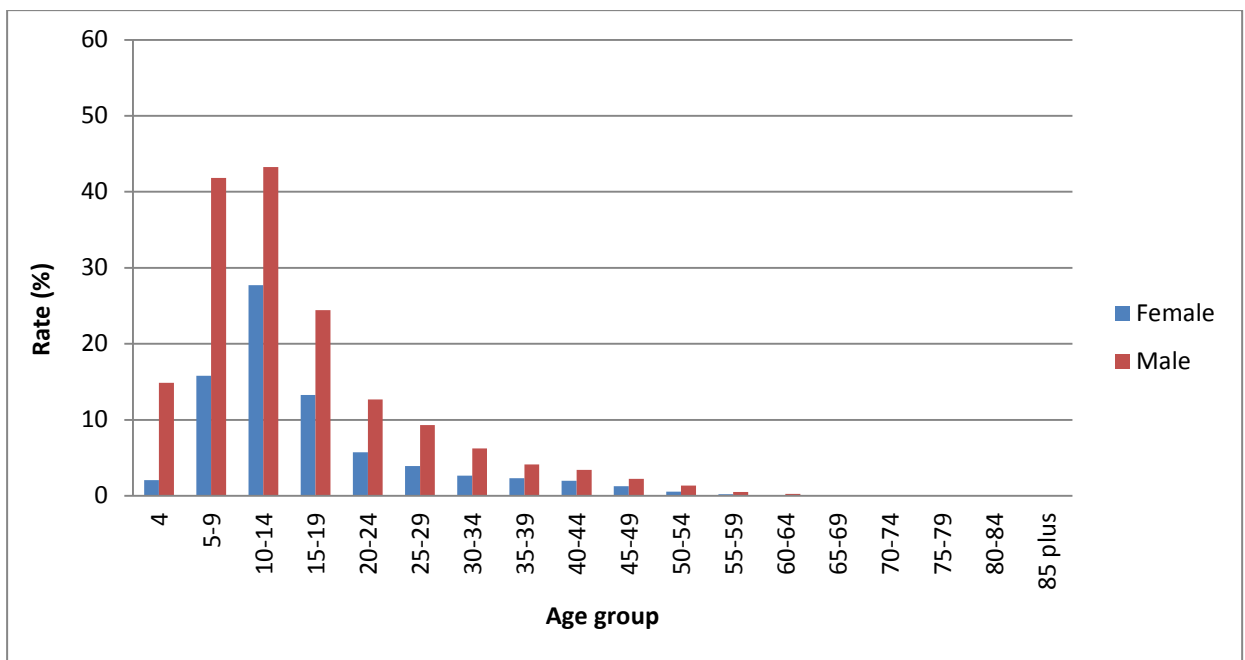


Figure 6: Sport participation rates in Victoria, 2010, by age group and gender (Source: Australian football, basketball, cricket, hockey and netball)

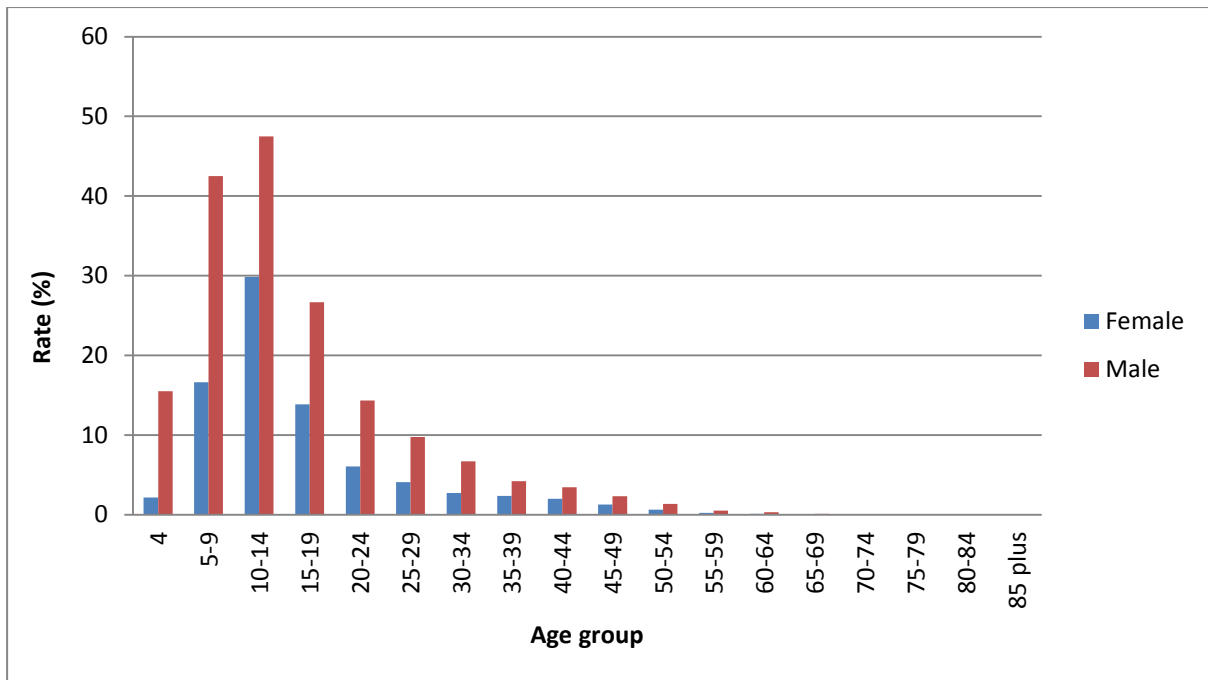


Figure 7: Sport participation rates in Victoria, 2011, by age group and gender (Source: Australian football, basketball, cricket, hockey and netball)

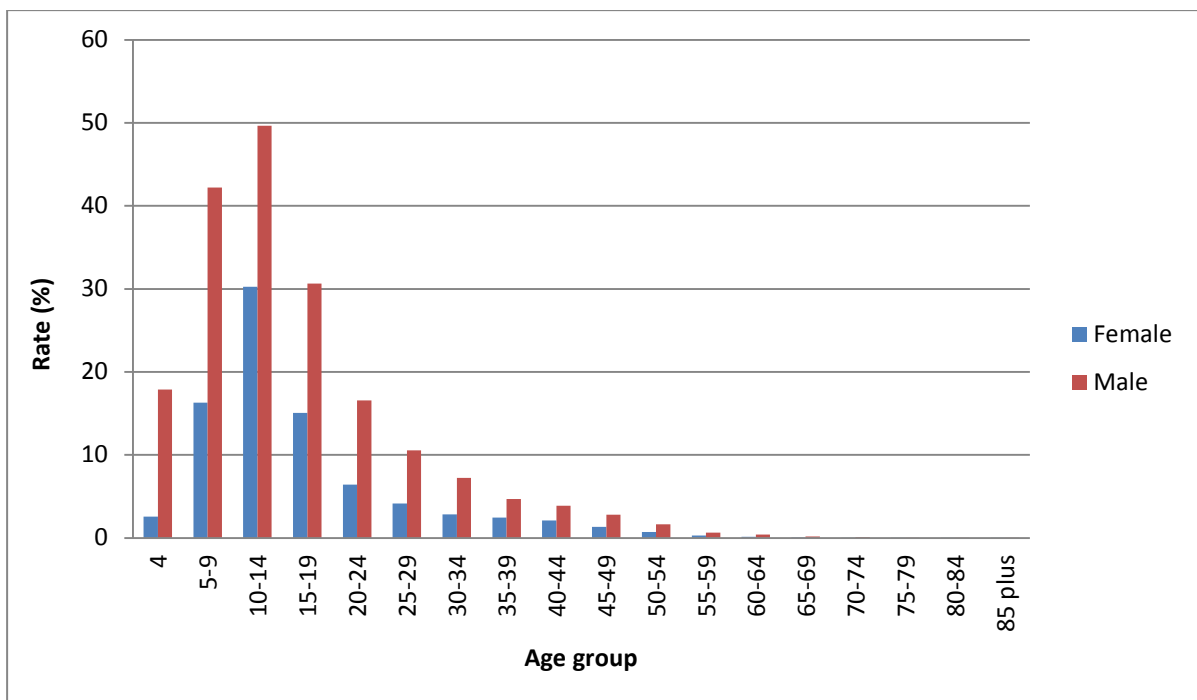


Figure 8: Sport participation rates in Victoria, 2012, by age group and gender (Source: Australian football, basketball, cricket, hockey and netball)

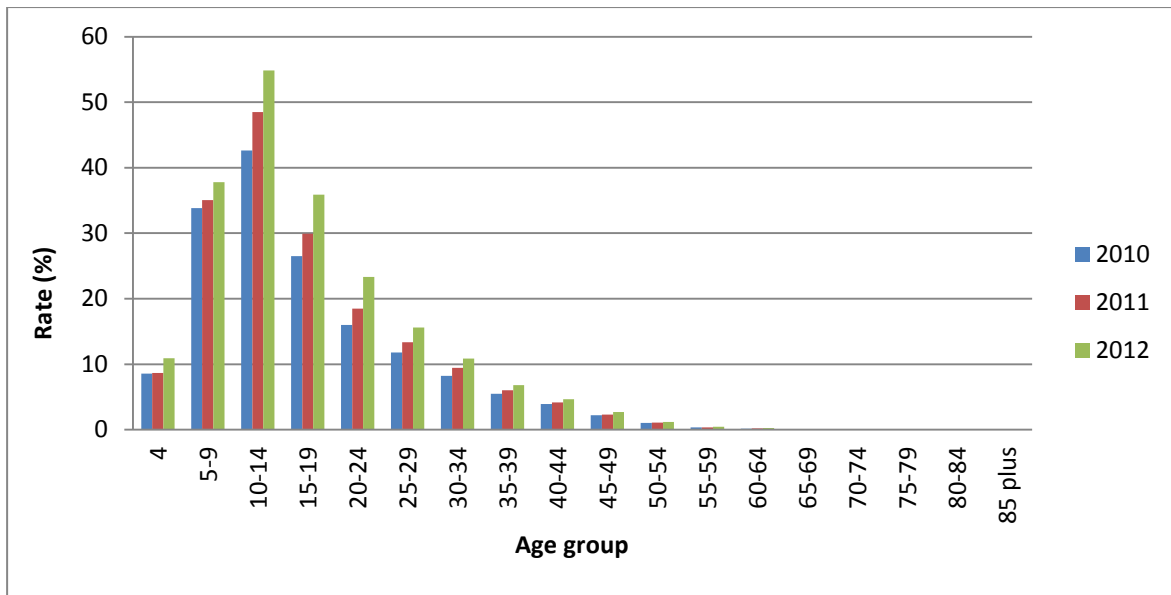


Figure 9: Sport participation rates in Victoria in non-metropolitan areas for males and females, 2010–2012, by age group and year (Source: Australian football, basketball, cricket, hockey and netball)

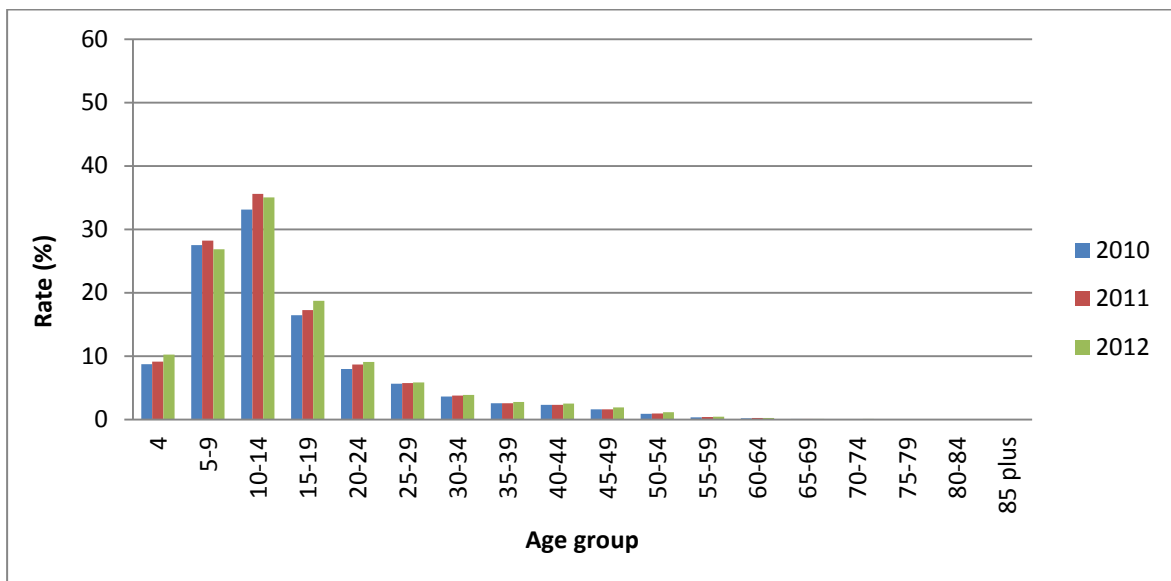


Figure 10: Sport participation rates in Victoria in metropolitan areas for males and females, 2010–2012, by age group and year (Source: Australian football, basketball, cricket, hockey and netball)

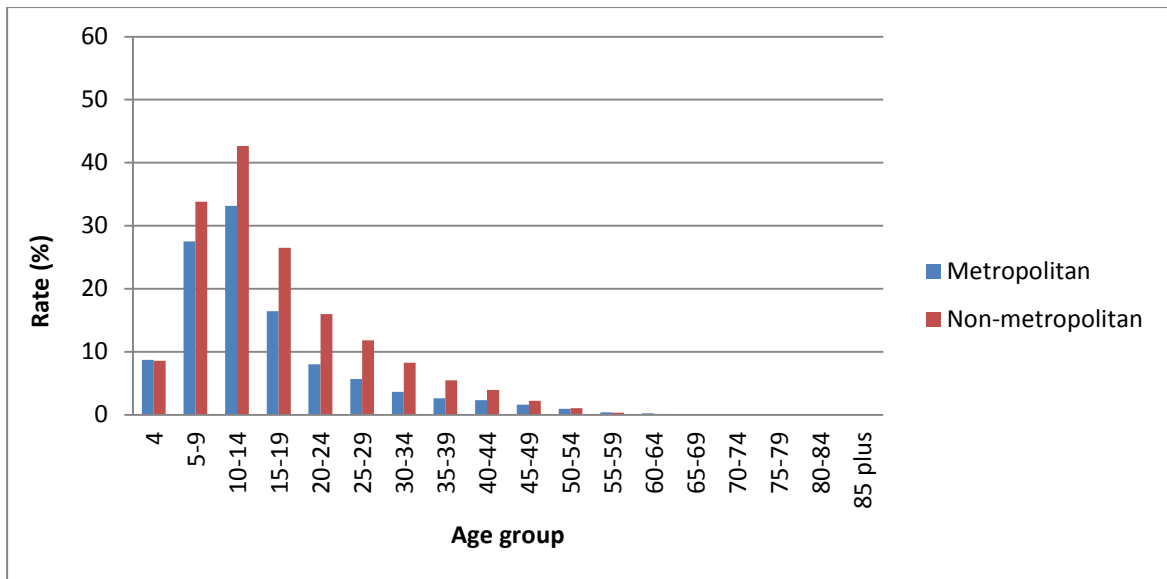


Figure 11: Participation rates in five organised sports for males and females, 2010, by age group and residential location (Source: Australian football, basketball, cricket, hockey and netball)

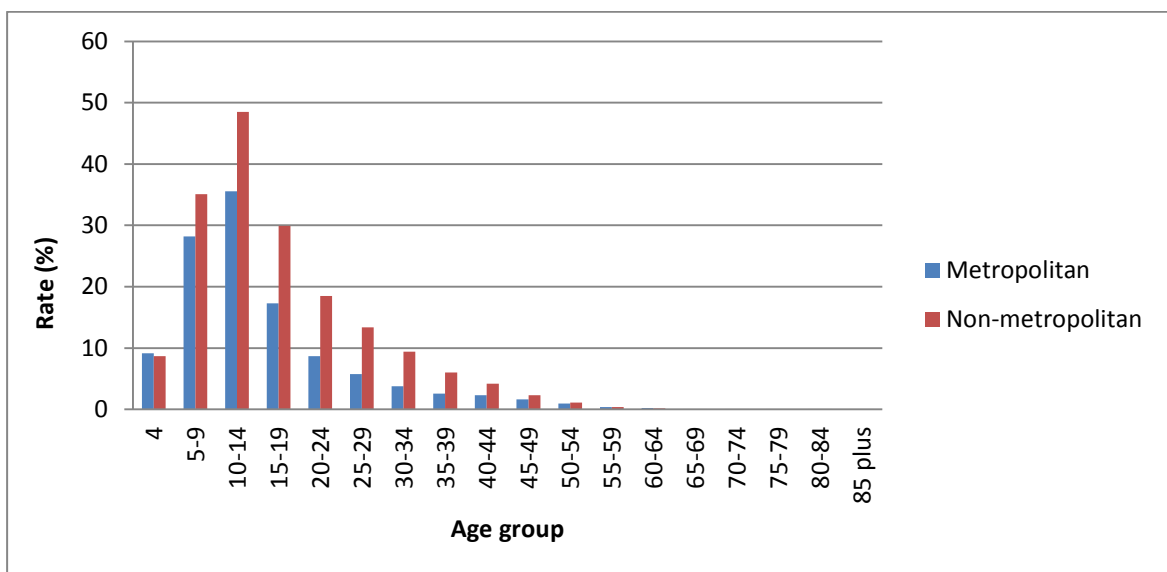


Figure 12: Participation rates in five organised sports for males and females, 2011, by age group and residential location (Source: Australian football, basketball, cricket, hockey and netball)

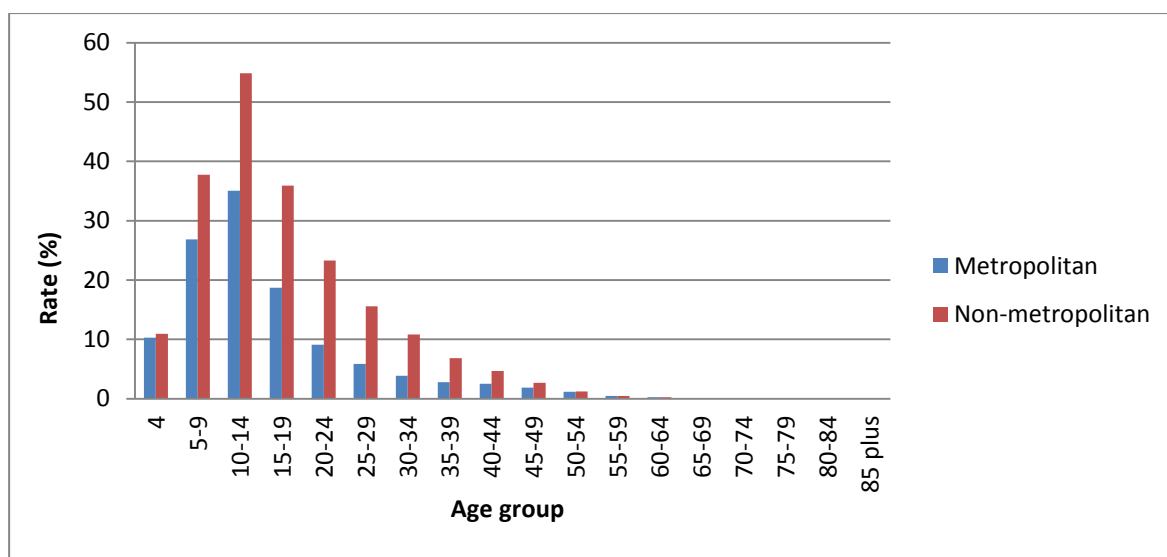


Figure 13: Participation rates in five organised sports for males and females, 2012, by age group and residential location (Source: Australian football, basketball, cricket, hockey and netball)

Age patterns of participation in sport across the lifespan

Age profiles of sport participants were investigated and the trends compared for gender and residential location. This included analysis of all seven SSAs' registered participant data for a single year - 2011 (Australian football, tennis, netball, basketball, cricket, hockey and bowls). This included a dataset of 520,102 participants (Figs 14–15) (Eime et al. 2016).

- 80% of sport participation is amongst those aged 4–29 years.
- Most participants (64%) were aged less than 20 years.
- Nearly one-third (28%) of all participants were aged 10–14 years, followed by the 5–9-year age group (20%).
- Participation peaked at ages 10–11 years.
- Participation declined rapidly during adolescence. Of all participants, 28% were aged 10–14 years, and 15% were aged 15–19 years.
- A higher proportion of male than female participants were young children (4–7 years) or young adults (18–29 years); this pattern was reversed among those aged 8–17 years, where participation was higher for females than males.
- A higher proportion of metropolitan participants were engaged between the ages of 4–13 and 19–29 years, whereas non-metropolitan participation was higher during adolescence (14–18 years) and throughout mature adulthood (30+ years).

Conclusion

The majority of organised sport participation within these sports was by children aged 10–14 years, peaking at ages 10–11 years. The proportion of individuals engaged in these sports declined rapidly during adolescence. Further, more males and metropolitan participants were more likely to be represented in younger age categories compared to non-metropolitan participants.

Further research is required to investigate reasons for attrition more closely, especially relating to the very young cohorts, and females, particularly to inform program design.

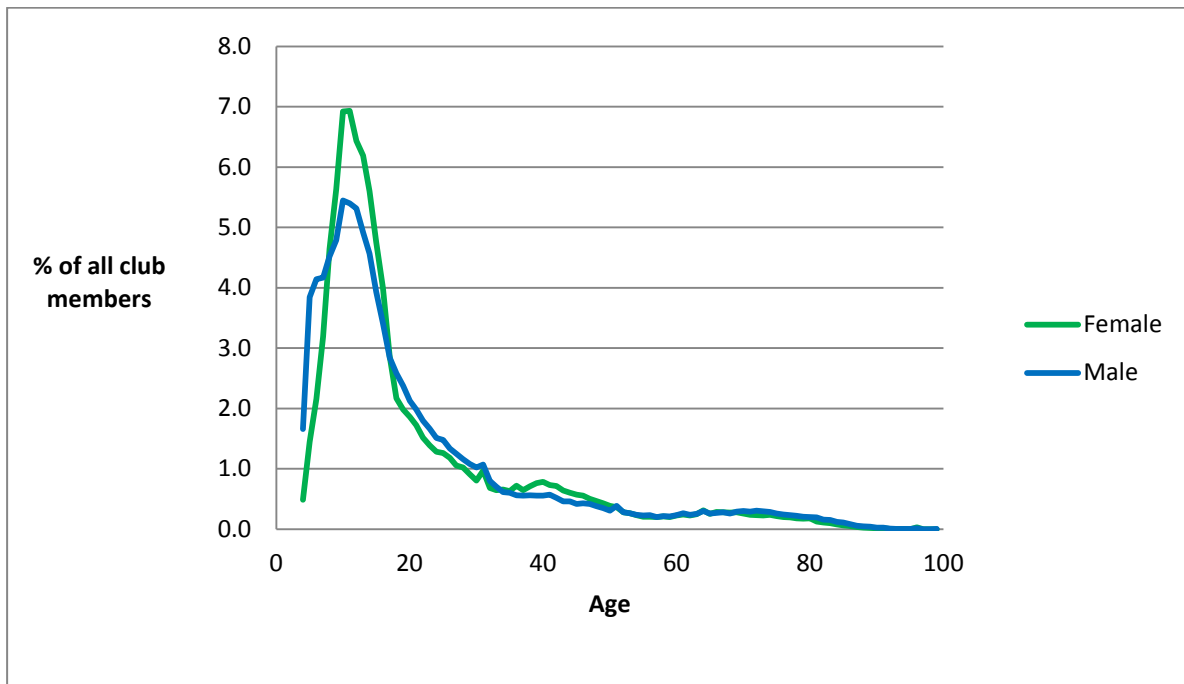


Figure 14: Age profiles (4–100 years) for organised sports, by gender (Source: Australian football, tennis, netball, basketball, cricket, hockey and bowls)

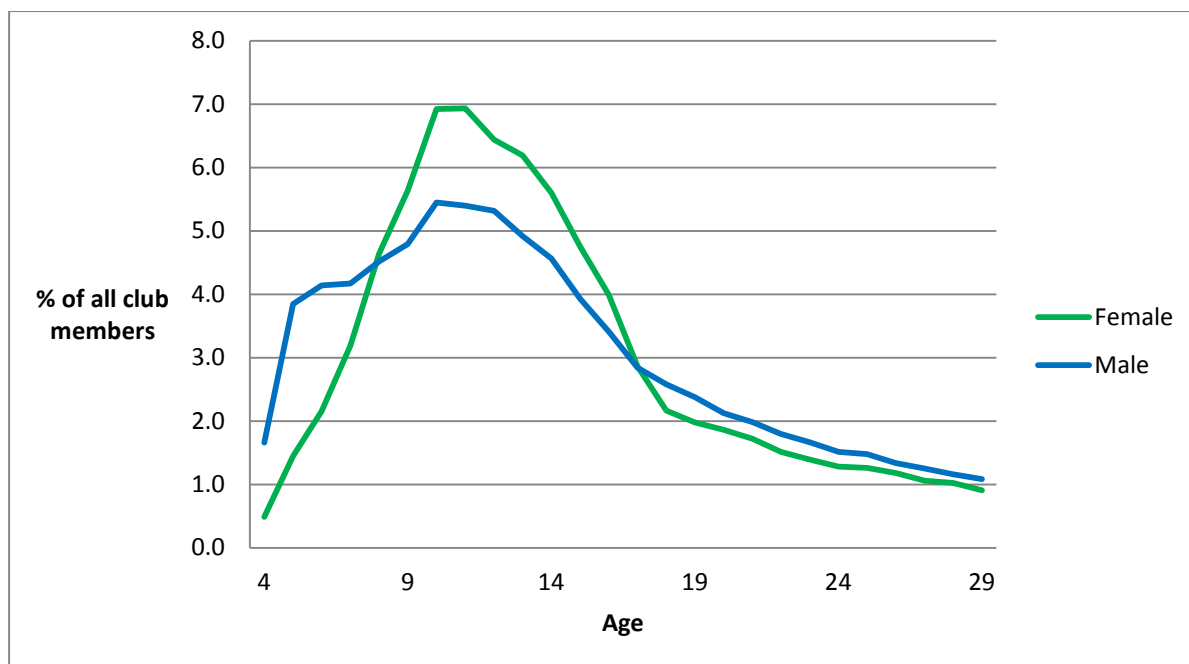


Figure 15: Age profiles (4–29 years) for organised sports, by gender (Source: Australian football, tennis, netball, basketball, cricket, hockey and bowls)

Sport retention and withdrawal: four-year trends across the lifespan

Sport participation retention and drop-out trends across the lifespan in four SSAs (Australian football, basketball, cricket, netball) over a four-year period were investigated, with a particular focus on ages 4–14 years, where most participation occurs. A total of 408,544 participant records were analysed (Figs 16–19).

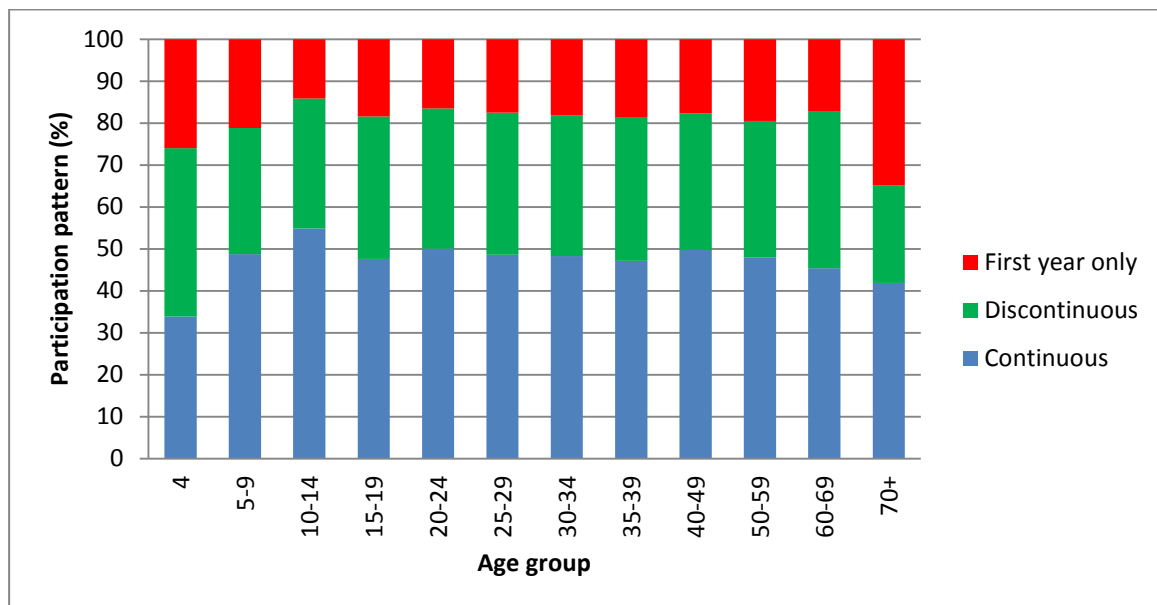
All participants were tracked from a base year (2009 or 2010) through a four-year period. The age profiles presented are based on the age of each member in the base year. For each member, participation was classified as single year (membership for the first (base) year only), discontinuous (membership for two or three years of the four-year period) or continuous (continuous membership for the four-year period).

- A greater proportion of the study population were males (70%) compared to females (30%).
- Overall, except for 4-year-olds, at least 40% of participants across the lifespan participated continuously.
- In most age groups at least 80% of participants participated, either continuously or discontinuously.

- There were low retention rates for very young participants and for females. For males, only 34% of 4-year-olds and 35% of 5-year-olds participated continuously. Many males aged 4–5 years participated for one year only (26% and 28% respectively). For females, only 14% of 4-year-olds and 24% of 5-year-olds participated continuously. Many females aged 4–5 years participated for one year only (49% and 43% respectively).
- Participation trends across the lifespan were generally consistent for males but fluctuated for females.

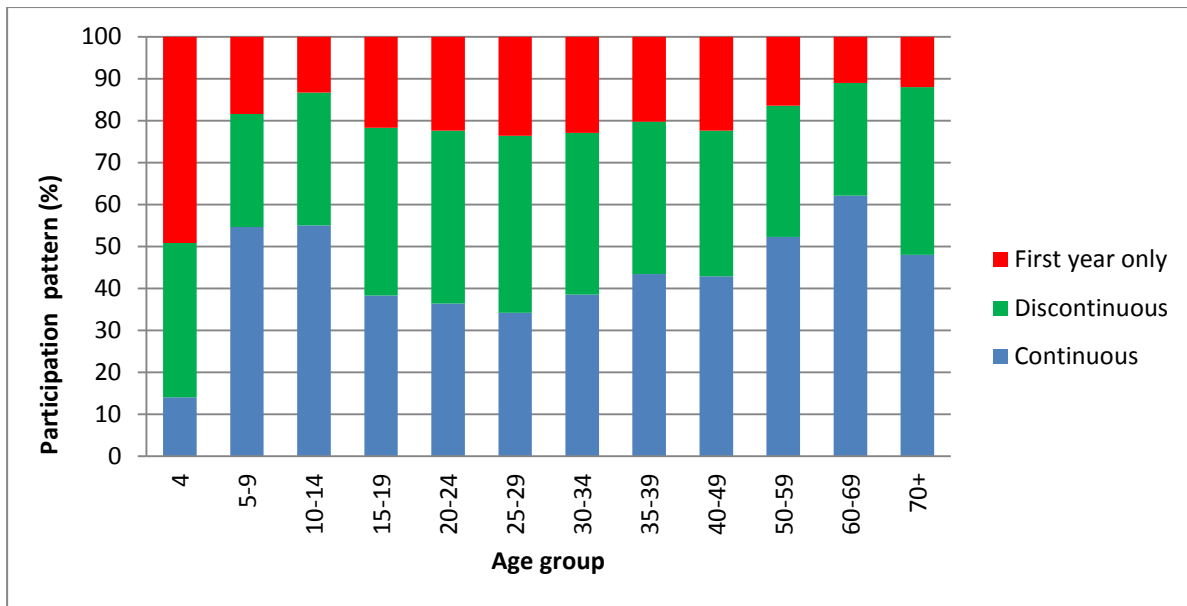
Conclusion

The high numbers of very young participants (4–6 years) and corresponding low retention rates require further investigation, as do the much lower rates of retention for females. Perhaps new sport offerings are required to take into account the factors contributing to low participation and retention rates from adolescence (15 years) through to adulthood.



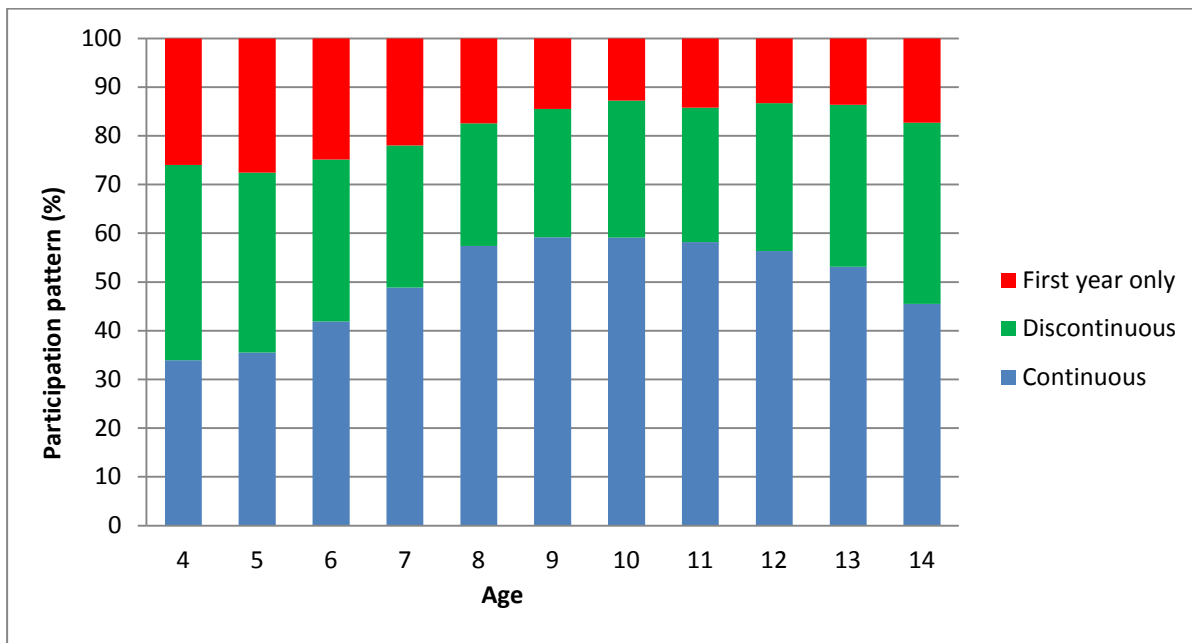
Age	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-49	50-59	60-69	70+
N	6,109	75,993	75,118	44,619	26,777	19,741	11,542	8,639	10,613	2,463	350	43

Figure 16: Organised sport retention for males, by age group and participation continuity (Source: Australian football, basketball, cricket, netball)



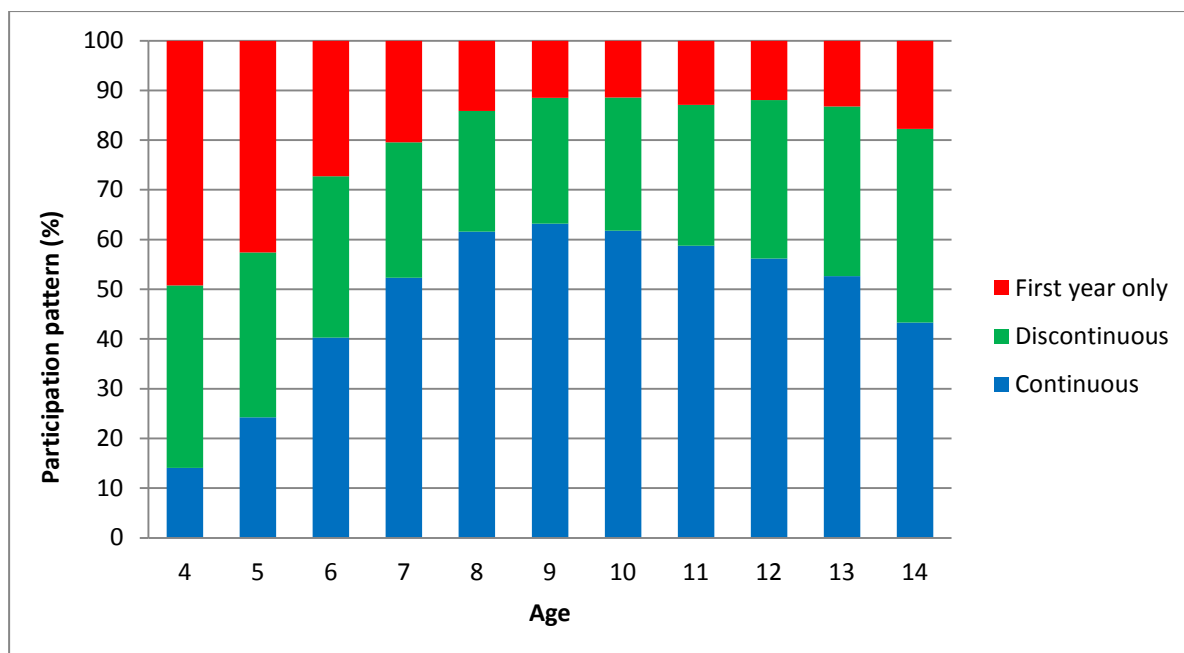
Age	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-49	50-59	60-69	70+
N	746	26,772	40,652	20,478	10,041	6,980	4,550	4,322	5,588	1,109	182	50

Figure 17: Organised sport retention for females, by age group and participation continuity
 (Source: Australian football, basketball, cricket, netball)



Age	4	5	6	7	8	9	10	11	12	13	14
N	6,109	14,387	15,303	15,410	15,078	15,815	15,704	16,643	15,141	14,846	12,784

Figure 18: Organised sport retention for males aged 4-14 years, by age and participation continuity
 (Source: Australian football, basketball, cricket, netball)



Age	4	5	6	7	8	9	10	11	12	13	14
N	746	2,146	3,422	5,103	7,208	8,893	8,712	8,714	8,307	7,838	7,081

Figure 19: Organised sport retention for females aged 4–14 years, by age and participation continuity (Source: Australian football, basketball, cricket, netball)

Participation in modified sports programs: a longitudinal study of children’s transition to club sport participation

Trends in modified sport participation, including continuation in the modified sports program, withdrawal from the program or transition to community level sports club participation, among children 4–12 years was investigated for three sports (Australian football, cricket, netball) over a four year period (Figs 20–21) (Eime et al. 2015d).

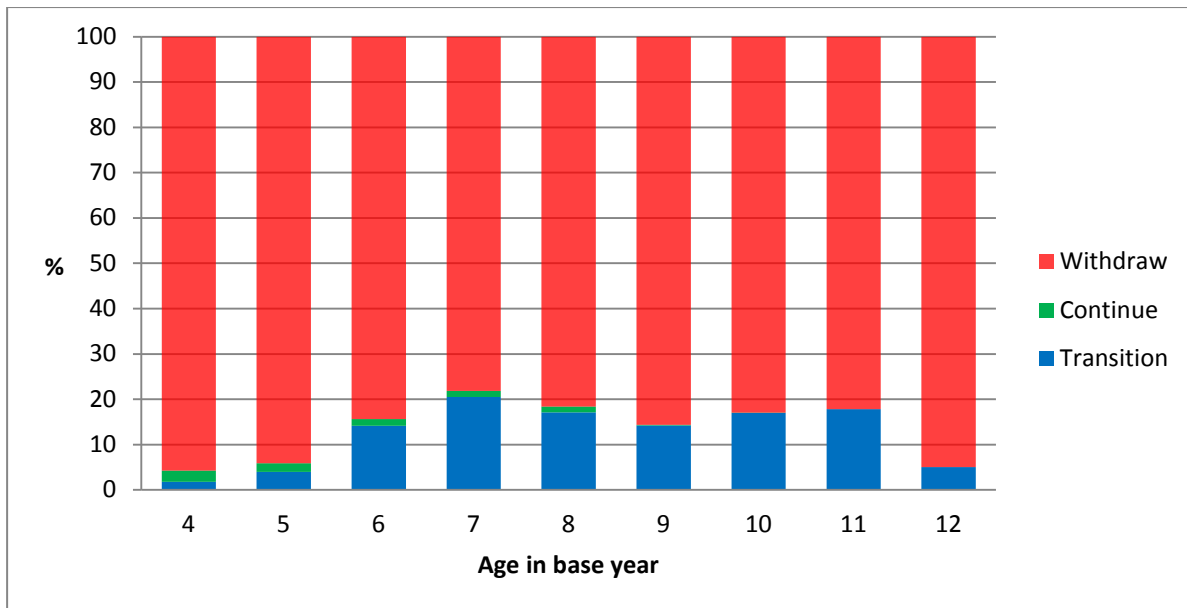
This research identified 4–12-year-old participants in modified sport programs in Year 1 (either 2009 or 2010) and, using the unique identifiers, tracked them over the four-year period. Each member was classified as transition (member transitioned from the modified sport program to a club sport competition within the same sport during the four-year period), continue (member continued participation in the modified sport program in the same sport throughout the four-year period) or withdraw (member discontinued participation in the modified program of the particular sport during the four-year period, and did not transition to a club sport competition in that sport).

- A total of 209,336 children (female 36%, male 64%) participated in one of three modified sports programs in the base year.
- Within modified sports programs the majority of female children were aged 8–10 years, compared to males, amongst whom the majority were younger (aged 4–6 years).
- More children withdrew from their modified sport program rather than transitioning. Across all age groups, fewer than 25% of females (24.5%) and fewer than 14% of males (13.6%) transitioned from a modified sports program to a club sport competition within the 4-year period.
- Very few children continued participation in a specific modified sports program for the whole four-year period (females 4%, males 2%).
- 68% of children withdrew immediately after the base year/season.
- The peak age of transition to club competition for females was 10 years, compared to 7 years for males.

Conclusion

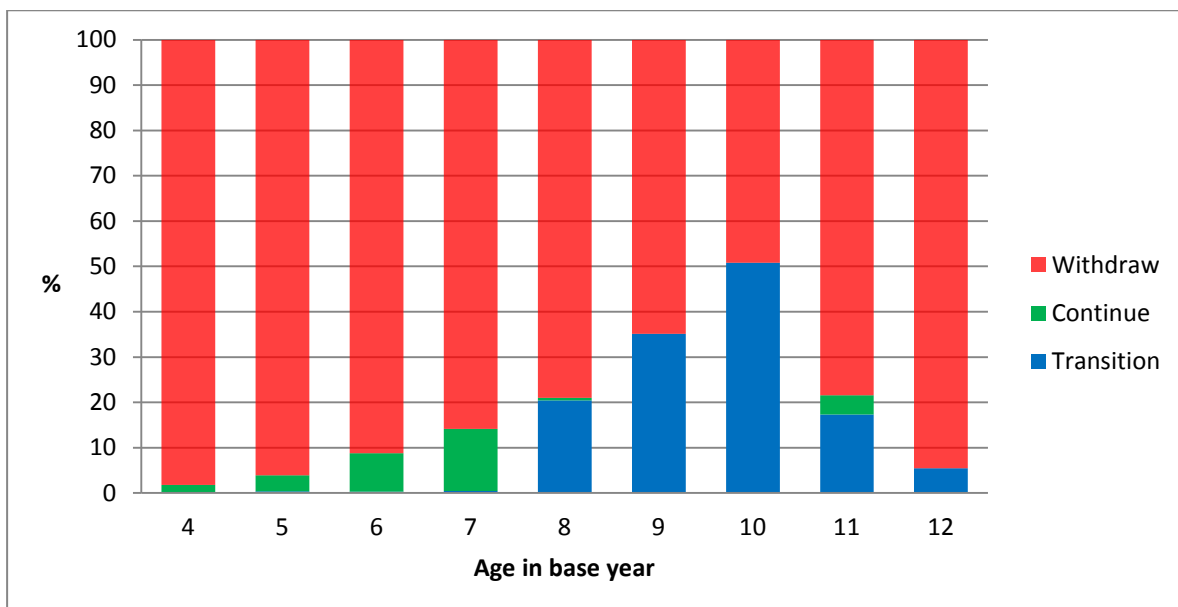
Many modified sports participators were very young, especially for males (aged 4–6 years). More children withdrew from their modified sport program rather than transitioning. There were age differences between when boys and girls started, withdrew and transitioned from the modified sports programs.

This study highlights considerations for the development and implementation of sport policies and programming: the same program may not be equally suitable for both boys and girls, nor throughout the ages of 4–12 years. Further, the study highlights a need for better links between modified programs and community-level sports club competition/pathways to maintain sport participation as children grow. The inclusion of an intermediate program within the sport participation/competition pathway, such as between modified and club competition, may be required.



Age	4	5	6	7	8	9	10	11	12
N	23,933	41,562	26,883	17,882	9,016	4,749	2,263	1,022	159

Figure 20: Modified sport program participation outcomes for males, by age in base year (either 2009 or 2010) and participation continuity (Source: Australian football, cricket, netball)



Age	4	5	6	7	8	9	10	11	12
N	3,243	8,213	9,488	12,377	14,240	12,010	9,247	397	55

Figure 21: Modified sport program participation outcomes for females, by age in base year (either 2009 or 2010) and participation continuity (Source: Australian football, cricket, netball)

Participation in sport and physical activity: associations with socio-economic status and geographical remoteness

The relationship between physical activity participation and frequency of participation in particular contexts to socio-economic status and residential location was investigated using data from ERASS (Eime et al. 2015b).

- Rates of regular physical activity participation increased gradually as socio-economic status increased and they decreased as remoteness increased.
- Participation in physical activity was socio-economic- or remoteness-prohibitive for only a few types of physical activity.
- The positive associations between participation and socio-economic status generally occurred for niche sports and activities (such as canoeing/kayaking, rock climbing and rowing) rather than the more mainstream sports (such as cricket and netball).
- Popular mainstream and team sports such as cricket, netball, Australian football, basketball, hockey and tennis were less likely to be associated with higher socio-economic status than were niche sports and activities, and indoor activities.
- For some activities the rate of participation was higher with increasing geographical remoteness. These activities included Australian football, cricket, netball, hockey, bowls and fishing. This is likely to be due to the popularity of traditional sports in non-metropolitan areas and fewer activity choices as remoteness increases.
- After initial engagement in physical activity is established, socio-economic status and remoteness are not critical determinants of the depth of engagement. Once people are participating in sport, regularity of participation does not strongly relate to socio-economic status and location.

Conclusion

It is encouraging that few types of physical activity were cost- or remoteness-prohibitive in terms of participation. This study demonstrates the complexity of the associations between socio-economic status and location across different contexts of participation. Nevertheless, it seems that after initial engagement in physical activity is established, socio-economic status and remoteness are not critical determinants of the depth of engagement.

Value of sport – the health benefits of participation

Psychological and social benefits of participation in sport for children and adolescents

Specific guidelines have been developed regarding the level of physical activity required to provide health benefits. However, the research underpinning these physical activity guidelines does not

address the element of social health. Furthermore, there is insufficient evidence about the levels or types of physical activity associated specifically with psychological health.

A systematic review of the psychological and social health benefits of participation in sport for children and adolescents was conducted (Eime et al. 2013b). The results were used to develop a conceptual model of health through sport (Fig. 22). The model depicts the relationship between determinants of sport participation and the reported psychological and social health benefits of participation. Upon reviewing the studies, two dimensions of sport participation were identified, and it became evident that some reported health benefits were more likely to be associated with some contexts of sport participation. Therefore, the model was developed to represent the two contextual dimensions of sport participation and the different strengths of association between different contexts of sport participation and the three health aspects (physical, psychological and social).

- Many different psychological and social health benefits were reported, with the most common being improved self-esteem and social interaction, and fewer depressive symptoms.
- Compared to individual activities, team sport may be associated with better psychosocial health, due to the social nature of the participation.
- For children and adolescents, the most common positive psychosocial outcomes associated with sport participation than non-sport participation have been higher self-esteem, better social skills, fewer depressive symptoms, higher confidence and higher competence.
- For adults, the most common positive psychosocial outcomes associated with sport participation than non-sport participation have been improved wellbeing, reduced stress and reduced distress, increased social functioning, and vitality.
- The ‘health through sport’ conceptual model developed by Eime et al. (2013a) depicts the relationship between psychological, psychosocial and social health domains, and their positive associations with sport participation.
- Eime et al.’s model was developed to represent the two contextual dimensions of sport participation and the different strengths of association between three health aspects (physical, psychological and social).
- The model (Fig. 22) includes three major elements: determinants of sports participation, sport itself, and health outcomes of sport participation. The ‘determinants’ element is based on the well-established social ecological model and is represented as rings spreading out from the individual’s intrapersonal characteristics to widening spheres of influence. The sport element incorporates two dimensions of context: individual – team, and informal – organised, each of which is almost separate, but also has some intermediate variants (e.g.

running alone, running in an informal group, running for a club team, running in a club relay team). The three types of health outcomes – physical, psychological and social – are shown as overlapping, representing the fact that there may be interactions and interrelationships between physical and psychological aspects and between psychological and social health aspects. For example, there are relationships between physical fitness and mental state, and interpersonal relationships may satisfy needs for belongingness and, as such, influence psychological health. Another example is resilience, whereby psychological health may influence an individual's capacity to engage in interpersonal relationships.

- The different strengths of the various linkages between the sport element and the health outcomes represent the notion that all forms of sport contribute strongly to physical health, but that while organised and/or team forms also contribute strongly to psychological and social outcomes, informal and/or individual forms contribute somewhat less to psychological outcomes and relatively little to social outcomes. The limited evidence of causality in the literature reviewed has been noted. This ambiguity or reciprocity could perhaps be represented by double-headed arrows linking the physical, psychological and social elements to the sport element, but it has been represented by feedback loops from the three outputs to the intrapersonal and interpersonal determinants.

Conclusion

It is recommended that community sport participation is advocated as a form of leisure time physical activity for children and adolescents, in an effort to not only improve physical health in relation to such matters as the obesity crisis, but also to enhance psychological and social health outcomes. It is also recommended that the causal link between participation in sport and psychosocial health be further investigated and the conceptual model of 'health through sport' tested.

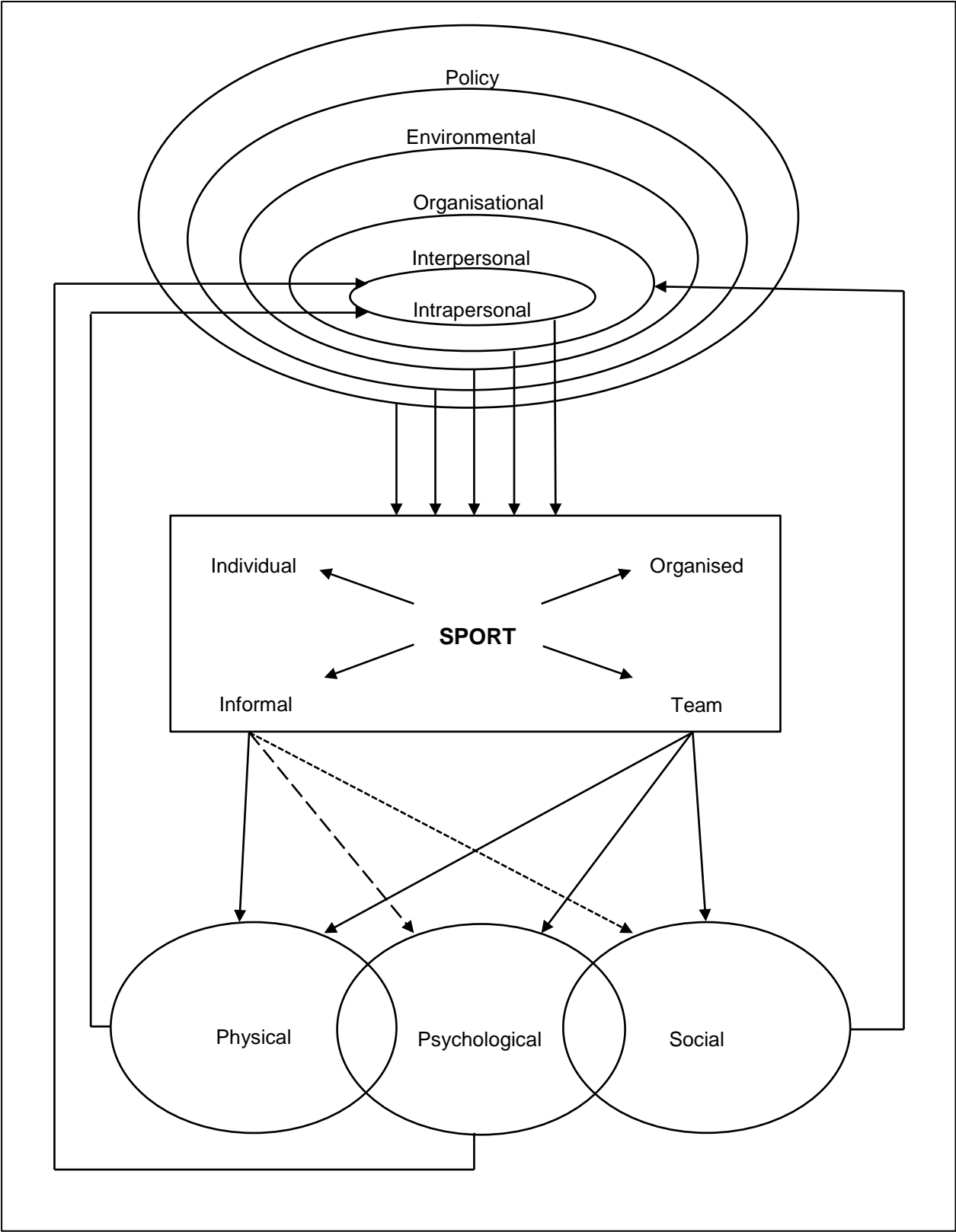


Figure 22: 'Health through sport' conceptual model

Psychological and social benefits of participation in sport for adults

A systematic review of the psychological and social health benefits of participation in sport for adults was conducted (Eime et al. 2013a).

- Many different psychological and social health benefits were reported, with the most common being wellbeing and reduced distress and stress, increased social functioning and increased vitality.
- Sport may be associated with improved psychosocial health in addition to improvements attributable to participation in physical activity.
- Specifically, club-based or team-based sport seems to be associated with improved health outcomes compared to individual activities, due to the social nature of the participation.

Conclusion

It is recommended that participation in sport is advocated as a form of leisure-time physical activity for adults, which can produce a range of health benefits.

Contribution of sport participation to overall health

Using the ERASS data, the contribution of sport participation to overall health-enhancing leisure-time physical activity (HELPA) in people aged 15+ years was investigated (Figs 23–25) (Eime et al. 2015c).

- 82% of respondents reported participating in some leisure-time physical activity in the previous year.
- Of all activities reported, 94% were HELPA.
- Of HELPA, 71% were non-organised, 11% were organised but not sport club-based, and 18% were sport club-based.
- Of all sport activities, 52% were HELPA.
- Of sport HELPA, 33% were club-based and 78% were undertaken 12 times or more in the past year.

Conclusion

Club sport participation contributes considerably to leisure-time physical activity at health-enhancing levels. Health promotion and more specifically physical activity policy should emphasise the role of sport in enhancing health. Sport policy should recognise the health-promoting role of sport in addition to the elite pathways.

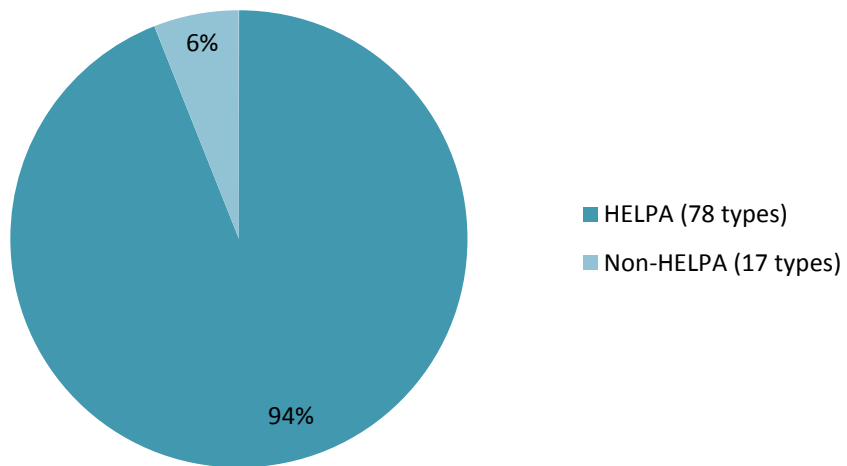


Figure 23: Proportions of non-health-enhancing and health-enhancing leisure-time physical activities (HELPA)

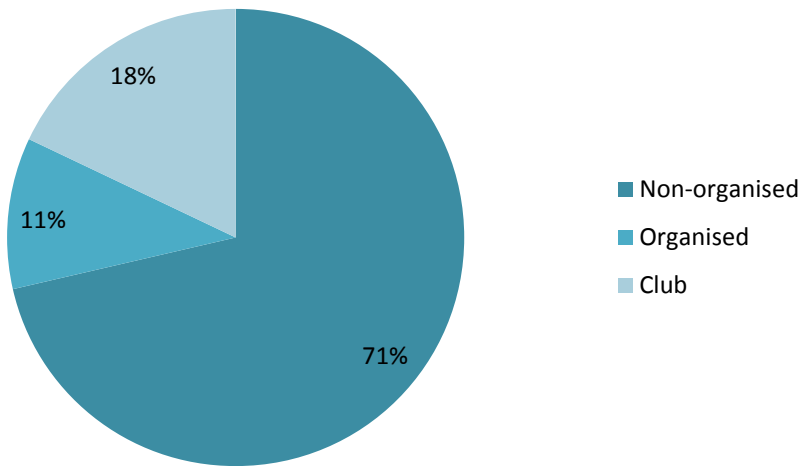


Figure 24: Health-enhancing leisure-time physical activities, by context

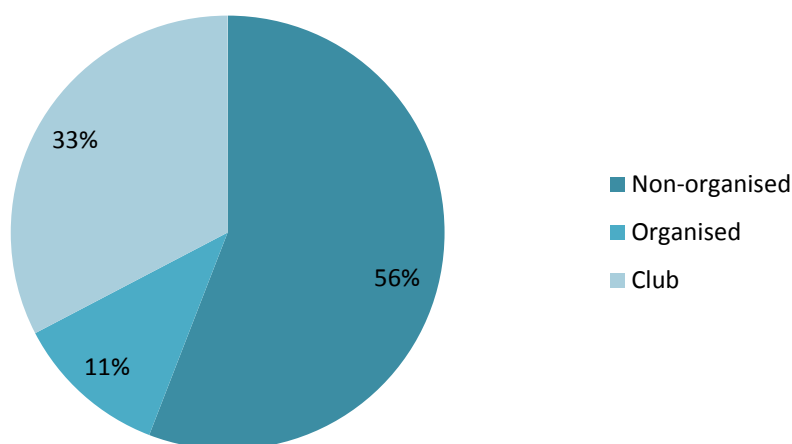


Figure 25: Health-enhancing leisure-time physical activity sports, by context

Correlations between sport participation and health

An analysis of relationships at the local government area level between a range of indicators of participation in physical activity and sport, demographic characteristics and indicators of health was conducted (Eime et al. 2014b).

- Participation in leisure-time physical activity is associated with lower prevalence of overweight and obesity.
- Participation in sport by children aged 5–9 years is associated with lower overall (all-age) prevalence of overweight and obesity.
- Participation in leisure-time physical activity and sport is associated with lower prevalence of type 2 diabetes.
- Participation in leisure-time physical activity and sport is associated with lower prevalence of child development vulnerability in the domains of physical health and wellbeing, social competence, emotional maturity, language and cognition, and communication and general knowledge.
- Participation in leisure-time physical activity and sport is associated with lower prevalence of psychological distress.
- The association between participation in leisure-time physical activity and sport and better overall (all-age) health outcomes was stronger for participation among younger age groups (<20 years) than for participation among older age groups.

Conclusion

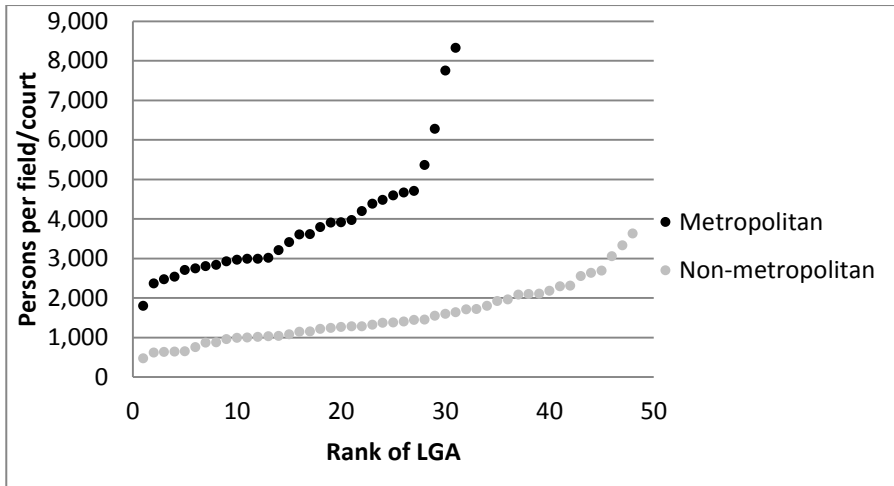
Overall, it seems that any form of participation in physical activity, whether it be general leisure-time physical activity or more specifically sport participation, is associated with better all-age, across-community health outcomes, and specifically for type 2 diabetes, child vulnerability and psychological distress.

Places to play – the nexus between facilities and participation

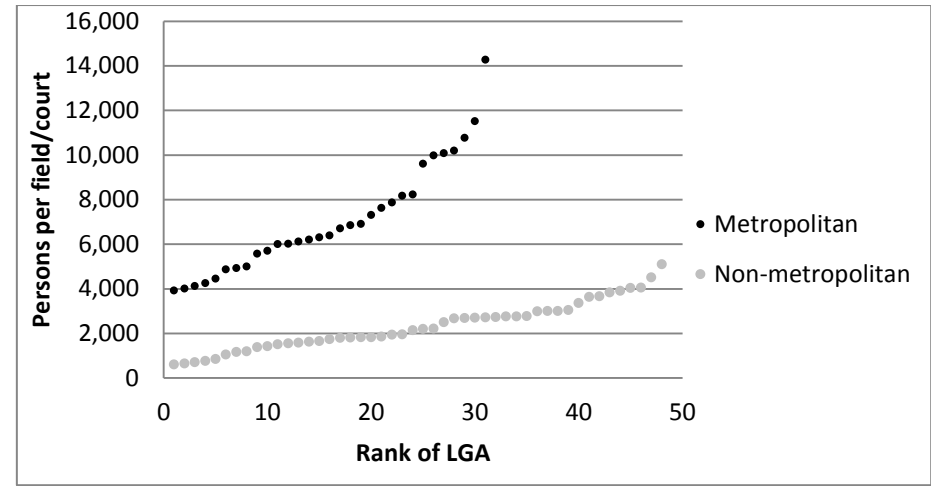
Location of sports facilities and sport participation: a geographical analysis

The geographical association between participation in sport and provision of sports facilities was conducted (Fig. 26).

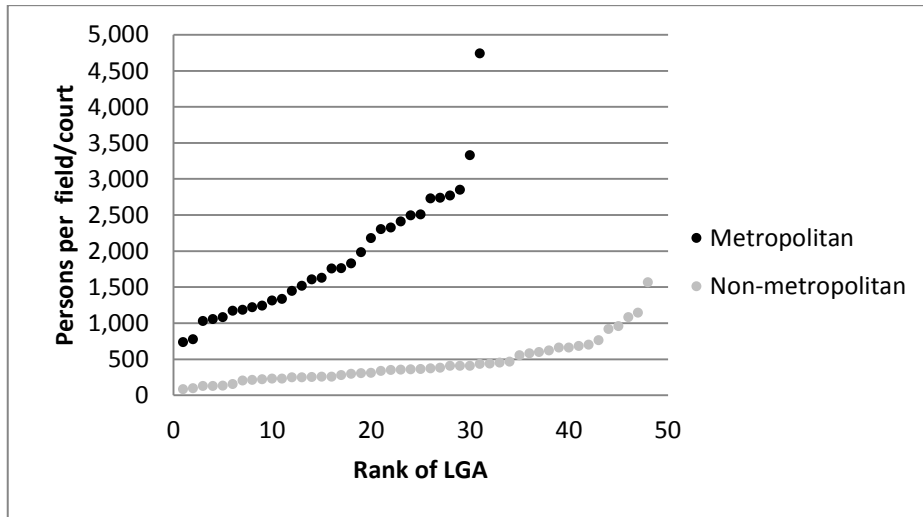
- The mean number of participations per 1000 persons ranged from 16 to 50 across the four different sports (Australian football, cricket, netball, tennis).
- There were marked differences between sports in the overall level of facility provision, as indicated by the mean number of persons per field/court (Sport A: 2450; Sport B: 4188; Sport C: 1017; Sport D 5045).
- The non-metropolitan region had higher participation rates and better provision of facilities than the metropolitan region.
- In general, higher/lower levels of facility provision and fields/courts in an LGA are associated with higher/lower levels of sport participation.
- The sports in this study have been provided with a breakdown of the mean number of facilities required per 1000 persons within an LGA that is associated with medium-high participation. This indicated clearly where the most need is in terms of facility provision for each sport across Victoria, and provides robust evidence to support decision making for future facility investments.



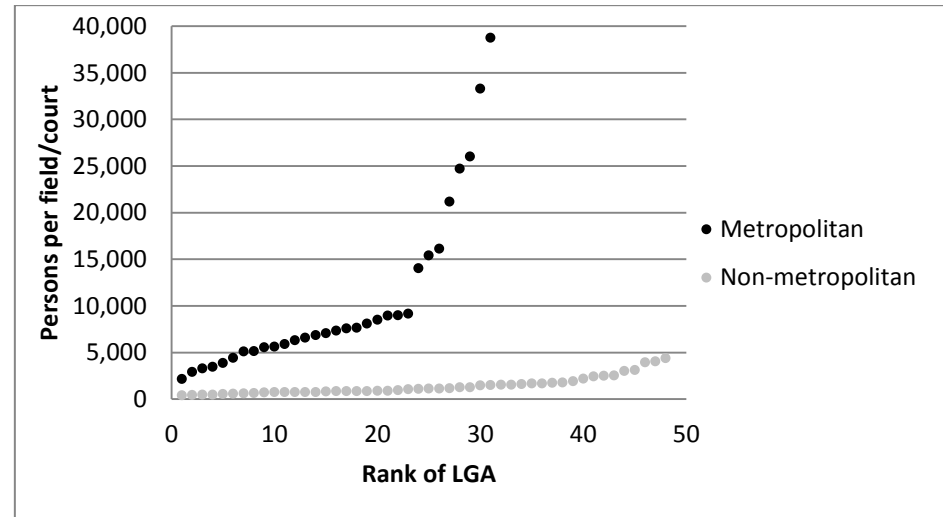
a. Sport A



b. Sport B



c. Sport C



d. Sport D

Figure 26: Provision of sports facilities across local government areas (LGA), by region

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Appendix 1: Sport and Recreation Spatial – geographic information system

Sport and Recreation Spatial is Australia's largest data repository of sport-related data, providing an interactive GIS tool for the sports, providing them with easily accessible knowledge to inform their strategic decisions.

The dedicated website provides information about the project in general, data sources, partners, new items, access to research outputs, and individual sport logins to tailored GIS.

The screenshot shows the homepage of the Sport & Recreation Spatial website. At the top left is the logo, which consists of a stylized blue figure in a circle next to the text 'Sport & Recreation Spatial'. To the right of the logo is a navigation menu with buttons for 'Home', 'About', 'Research', 'Partners', 'Maps', and 'Staff'. Below the navigation menu is a search bar with the text 'Search this site' and a magnifying glass icon. A tagline 'more people more active more often' is positioned below the navigation menu. The main content area features a large heading 'Welcome to Sport and Recreation Spatial' followed by a paragraph describing the GIS system. To the right of this text is a map of Australia with various regions highlighted in different colors. Below the map is a 'News / Events' section with a list of bullet points. At the bottom of the main content area is a 'Our partners' section with logos for VicHealth, Australian Government, Victoria, vicsport, VICTORIA UNIVERSITY, ISEAL, and Federation University Australia.

Home About Research Partners Maps Staff

Sport & Recreation Spatial

more people more active more often

Search this site

Welcome to Sport and Recreation Spatial

Sport and Recreation Spatial provides a national geographic information system (GIS) for presenting spatial data relevant to all levels of the sport and recreation sector. This will provide the sport and recreation sector with increased capacity for research, strategic planning, and development of participation programs and facilities. [more details](#)

Key focuses

- Participation levels and trends
- Influences on participation
- Value of sport: the health benefits of participation
- Places to play: the nexus between facilities and participation

News / Events

- * Sport programs can produce psychosocial benefits
- * Sport for the psychosocial development of children and youth
- * Sport now included in Blueprint for an Active Australia
- * Factors associated with participation in sport for adolescent girls
- * More news ...

Our partners

VicHealth Australian Government Victoria vicsport VICTORIA UNIVERSITY ISEAL INSTITUTE OF SPORT, EXERCISE AND ACTIVE LIVING Federation UNIVERSITY AUSTRALIA

Individual sport dashboard

Each individual sport logs into their own dashboard and portal with their own participant, coach and umpire data overlaid with population census data and sports facility data.

Welcome to the latest version of Sport and Recreation Spatial

We have made many improvements, aimed to greatly improve the usability and capability of the system. The underlying technology has been updated to allow a map that is more interactive and adaptable to a broader range of portable devices such as tablets.

[Read more](#)

Current sport



Explore



Either build your own map by selecting Participant, Umpire or Coach, or load a feature map to see one that has been generated from typical data queries.

[Participant](#) [Umpire](#) [Coach](#)

Recently bookmarked

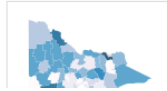
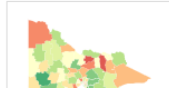
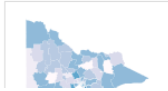


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Featured maps

Featured maps have been generated for common maps of interest such as participation, programs, and facilities.



Reports and exports

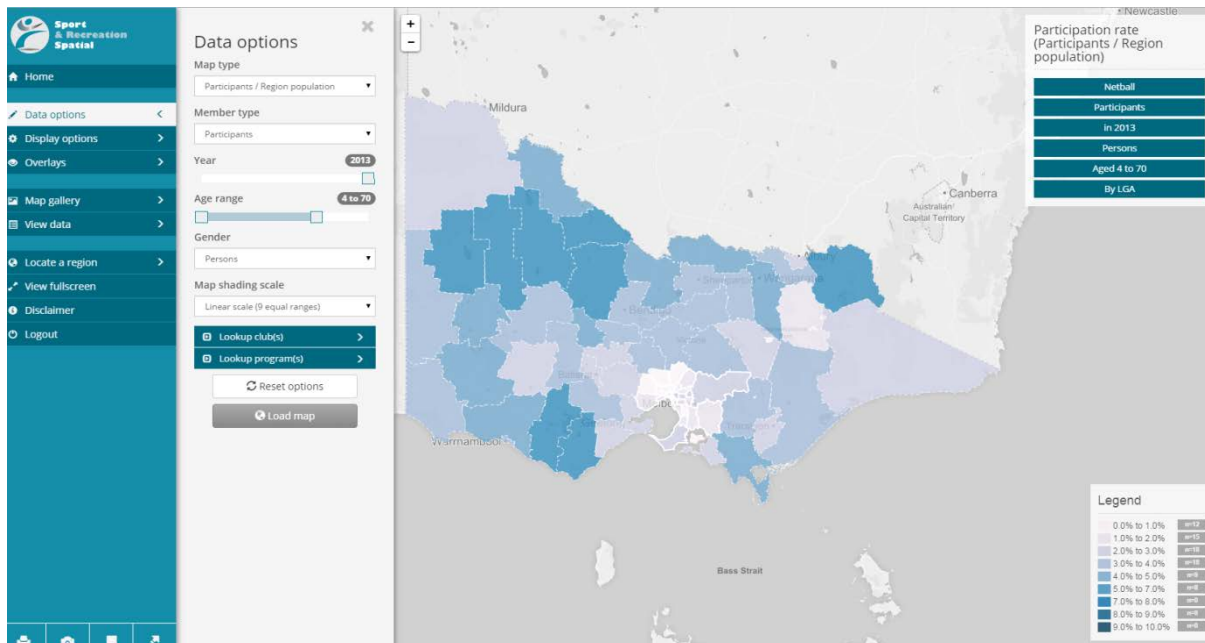
[2009 to 2013 LGA summary report](#)

[2009 to 2013 Postcode summary report](#)

[2009 to 2013 SA2 summary report](#)

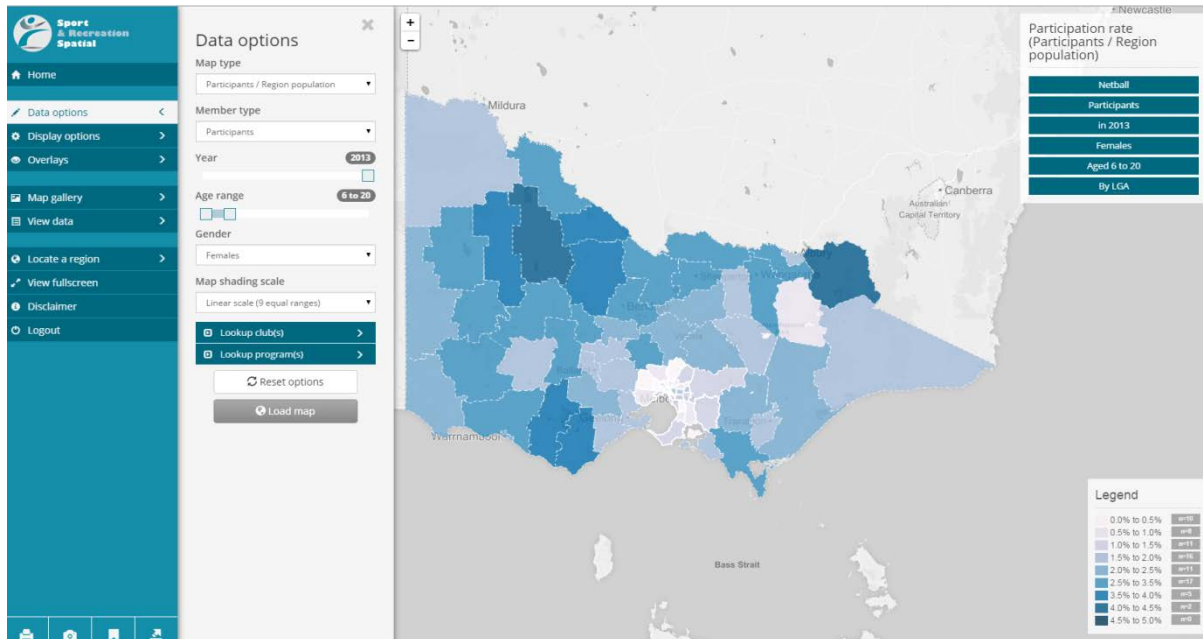
Understanding participation rates

The dynamic GIS allows for many different combinations of searchers of information and associated data, for example participation rates of all participants across different regions.



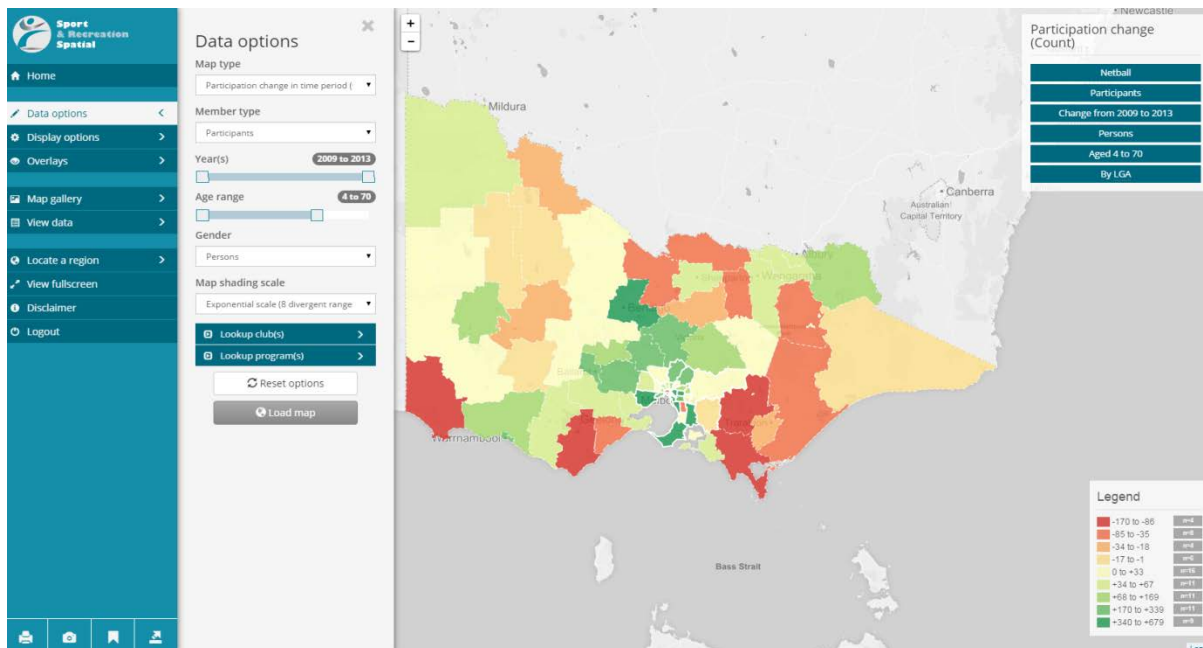
Understanding participation rates by age and gender

In addition to sport participation counts, participation rates for specific age ranges and gender can be seen.



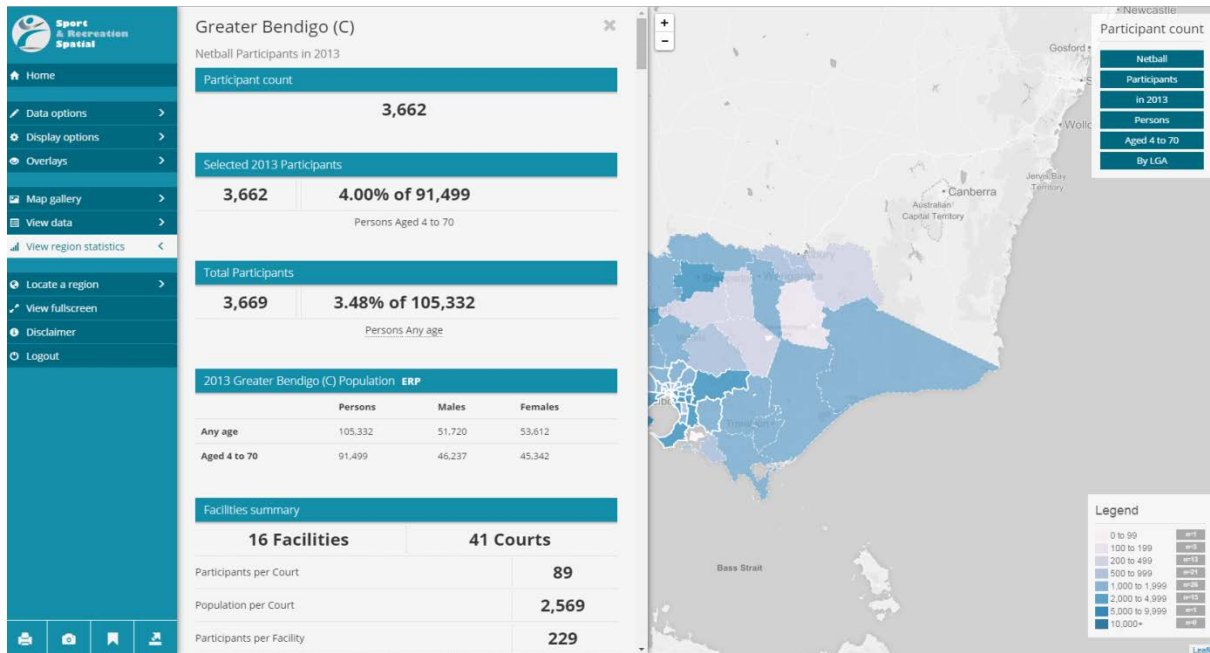
Understanding participation changes over time

The system allows for investigation of changes in participation counts and rates over time.



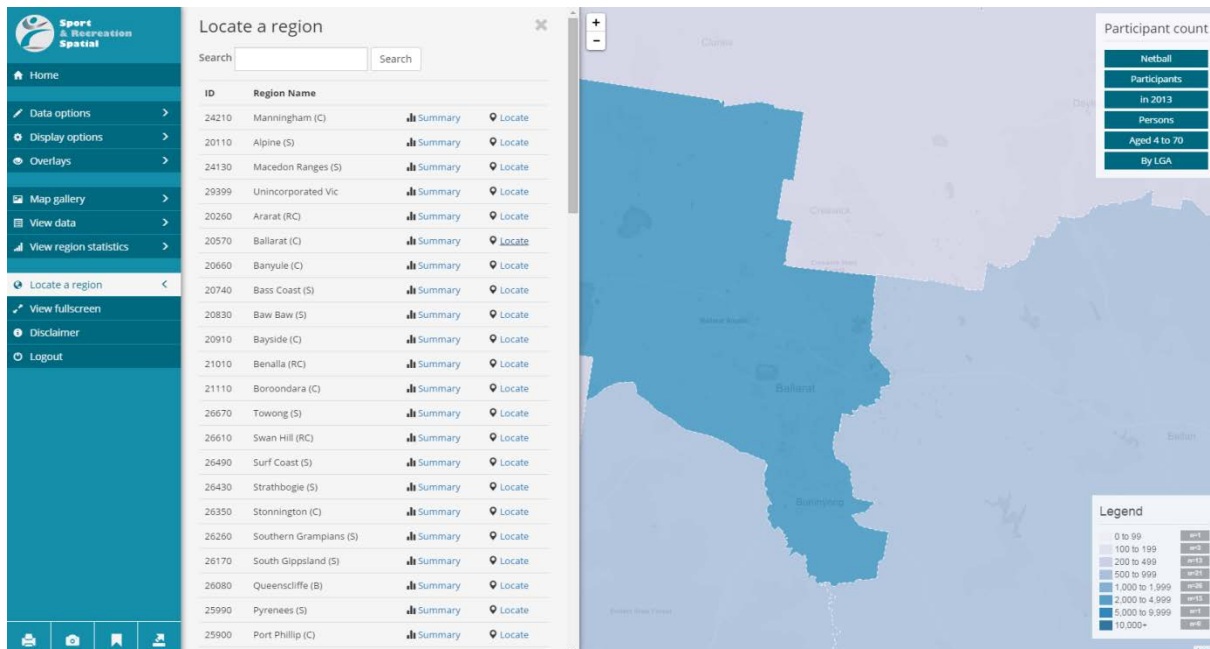
Regional summaries

For each query, regional summaries are provided.



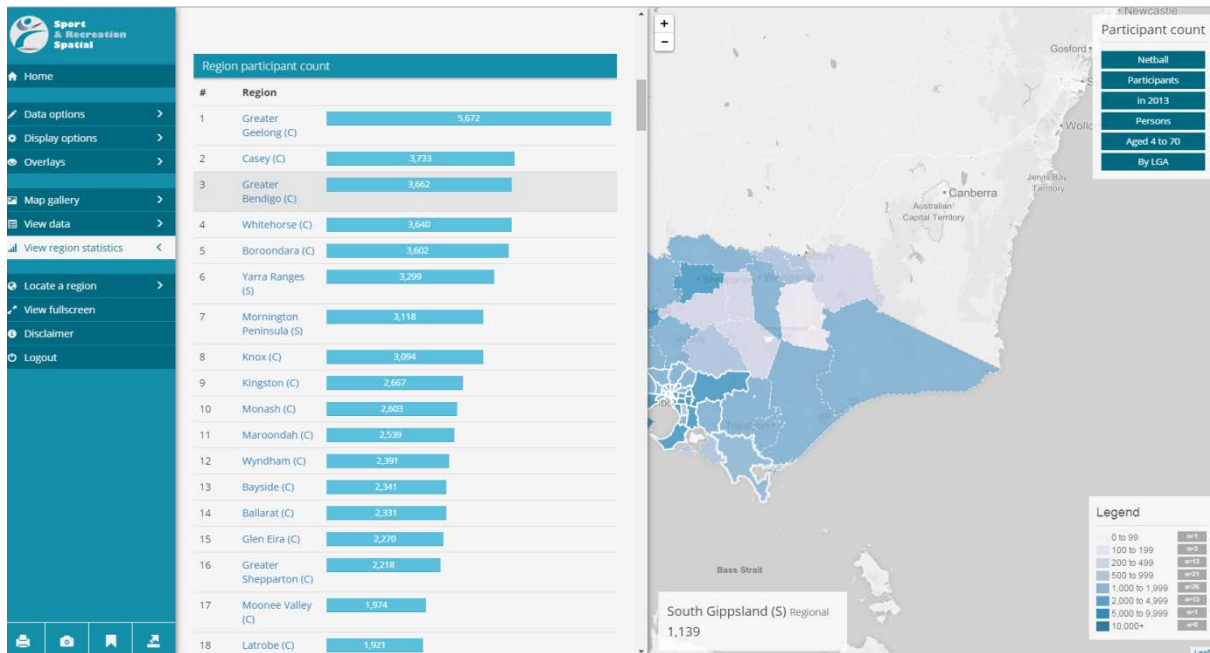
Locating specific regions

Specific regions can be looked up easily.



Benchmarks of regions

For each query region benchmarks are provided.



Viewing summary data

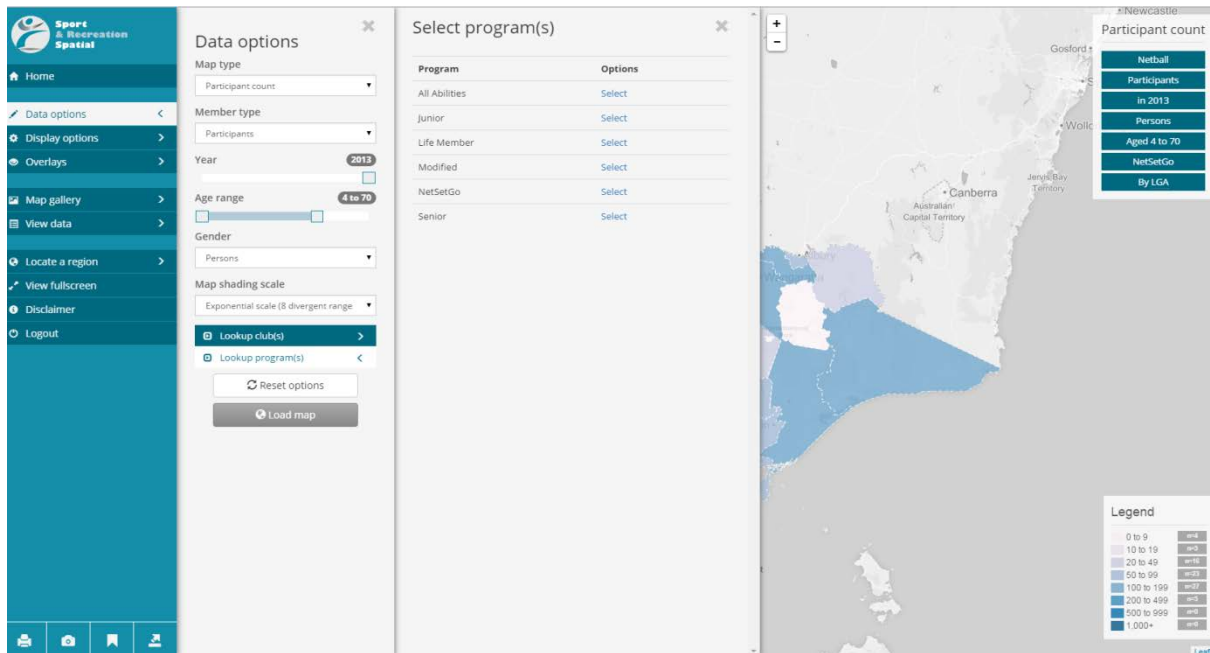
The raw data can easily be viewed and exported.

The screenshot displays the 'Sport & Recreation Spatial' dashboard with a detailed data table. The table has the following columns: Region Name, Selected (2009), Selected (2013), Change, Population Persons, Population Males, Population Females, Population 4-70, Facilities, and Playing fields.

Region Name	Selected (2009)	Selected (2013)	Change	Population Persons	Population Males	Population Females	Population 4-70	Facilities	Playing fields
Alpine (S)	195	129	-66	12044	6018	6026	10538	4	4
Ararat (RC)	334	318	-16	11207	5791	5416	9815	6	9
Ballarat (C)	2025	2331	+306	98684	48086	50598	86844	14	22
Banyule (C)	1246	1267	+21	124475	60707	63768	111201	3	5
Bass Coast (S)	730	787	+57	31010	15560	15450	25933	7	17
Baw Baw (S)	1650	1524	-126	45205	22436	22769	41449	13	35
Bayside (C)	1762	2341	+579	98368	47182	51186	87728	1	6
Benalla (RC)	485	425	-60	13719	6802	6917	11309	6	16
Boroondara (C)	3190	3602	+412	170553	82574	87979	156581	3	12
Brimbank (C)	1123	1123	0	195469	98008	97461	176679	2	5
Buloke (S)	409	403	-6	6221	3159	3062	4699	9	15
Campaspe (S)	1713	1629	-84	36919	18531	18388	31678	20	58
Cardinia (S)	1647	1633	-14	84065	41680	42385	77970	15	37
Casey (C)	3216	3733	+517	275116	137202	137914	255767	15	35
Central Goldfields (S)	478	509	+31	12602	6280	6322	10454	9	17
Colac-Otway (S)	1191	1102	-89	20694	10437	10257	17532	10	19
Corangamite (S)	875	938	+63	16137	8266	7871	13853	13	37
Darebin (C)	871	968	+97	146797	71516	75281	117750	7	16
East Gippsland (S)	1187	1177	-10	43413	21594	21819	38100	15	27
Frankston (C)	1652	1663	+11	133560	65823	67737	118824	4	20
Gannawarra (S)	565	587	+22	10326	5169	5157	9013	9	14
Glen Eira (C)	1594	2270	+676	141519	69364	72155	112345	2	9
Glenelg (S)	850	700	-150	19521	9940	9581	17636	10	28
Golden Plains (S)	577	638	+61	20151	10354	9797	19021	9	18

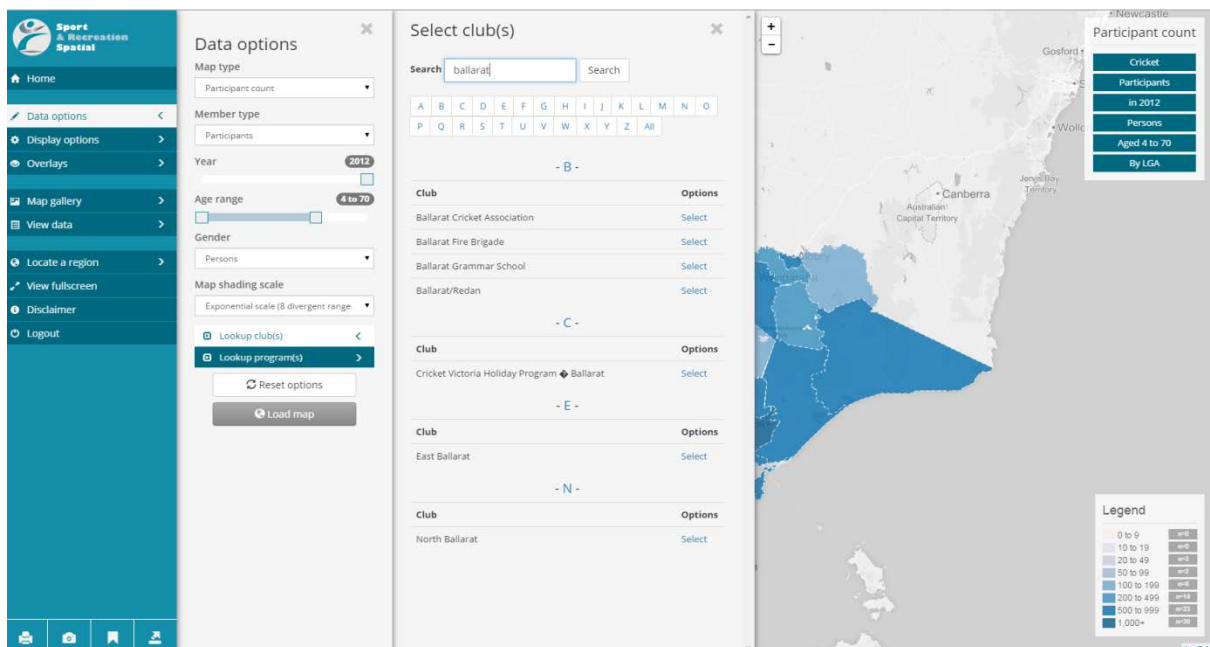
Viewing participation in a specialised program

Specific sport programs can be investigated.



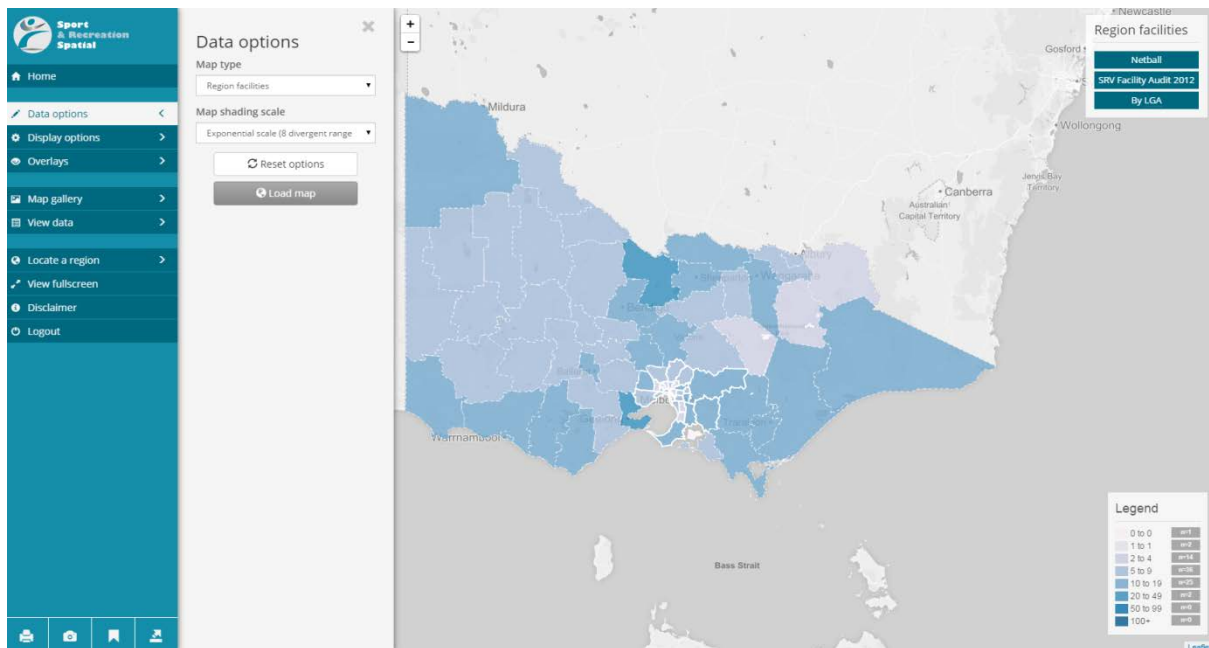
Looking up a specific club

Details relating to a specific sports clubs can be investigated.



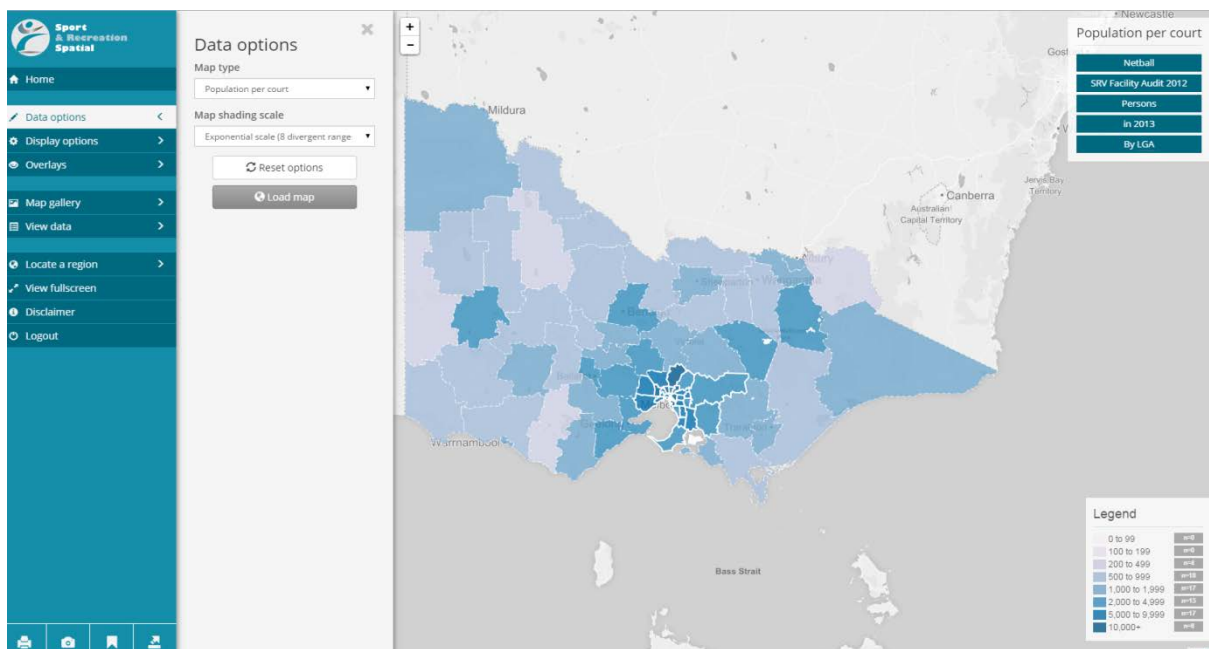
Viewing the number of facilities for each region

The provision of facilities per regions can be viewed.



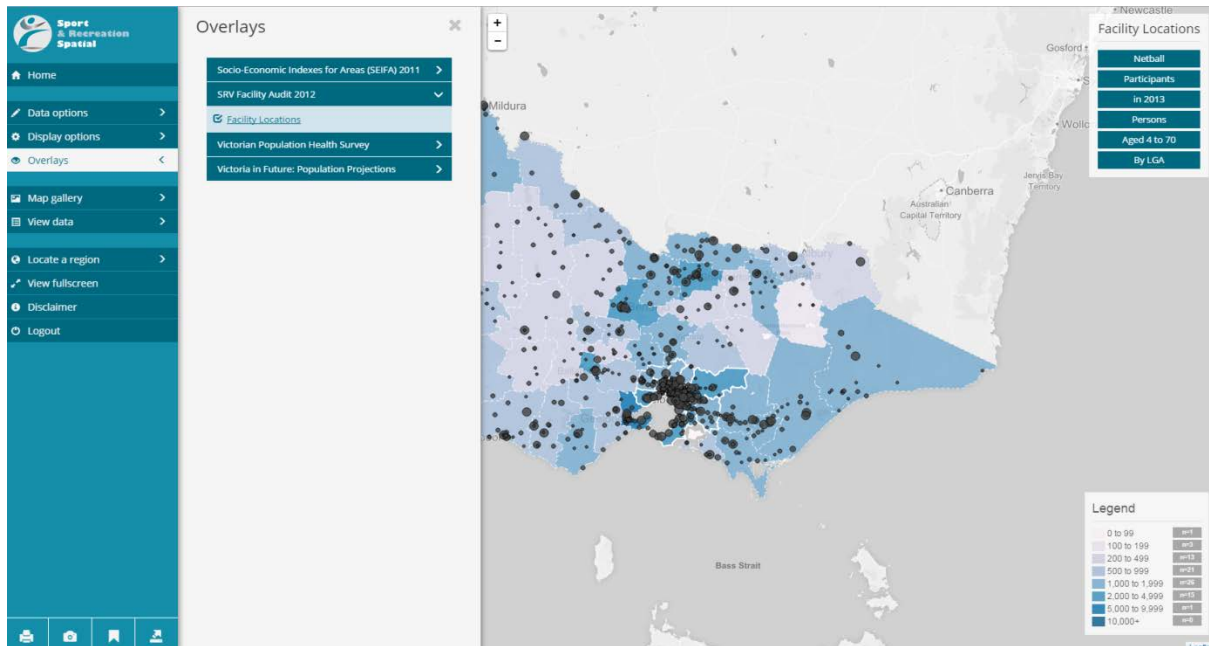
Counts of people per facility/court

The number of people within a specific region per sports facility or per sports court can be viewed.



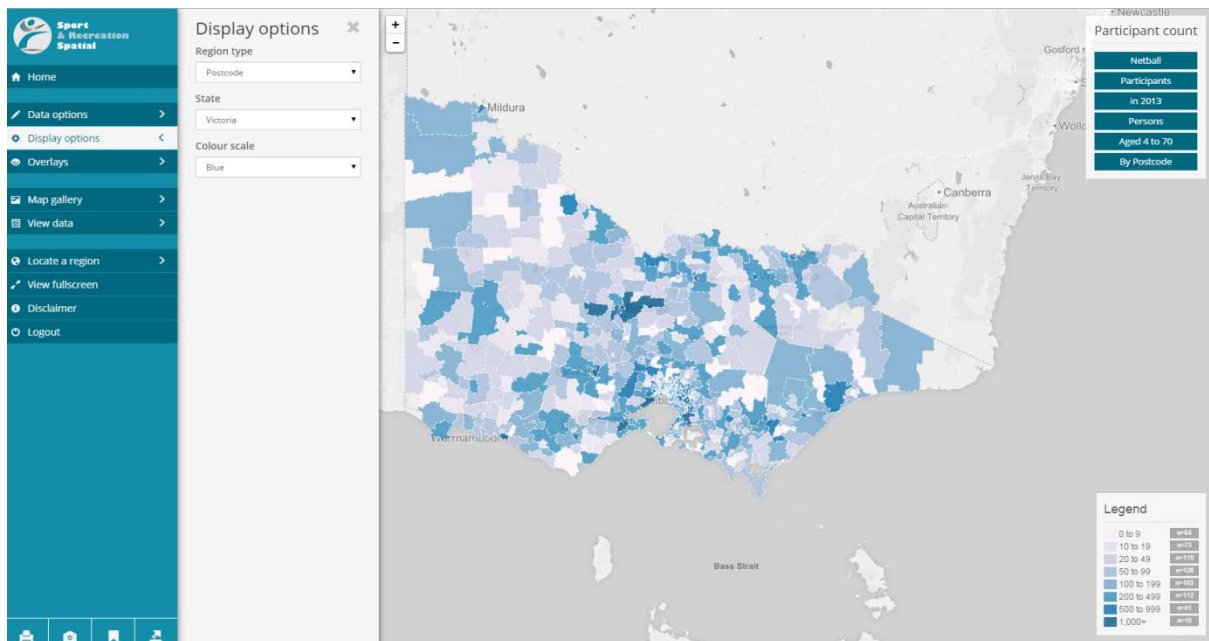
Sports facility locations

The specific locations of sports facilities and details of the facilities are provided.



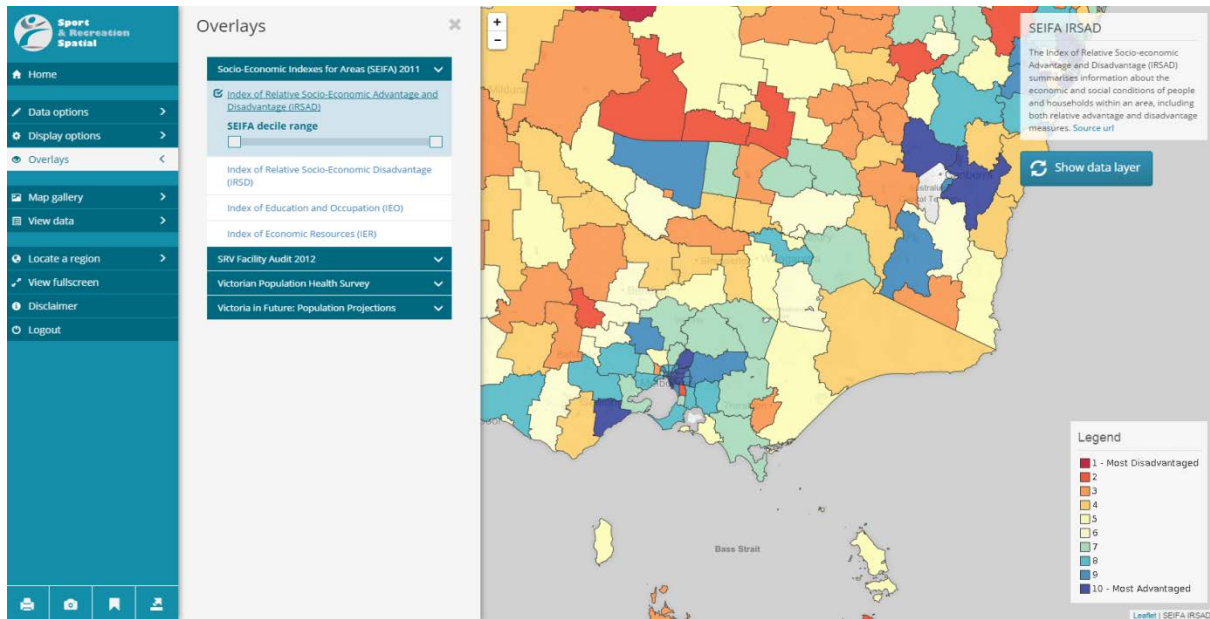
Other geographical regions

Geographical regions can be explored in different ways: by postcode, local government area, statistical area levels 2, 3 and 4, Greater Capital City Statistical Area, and metropolitan/regional.



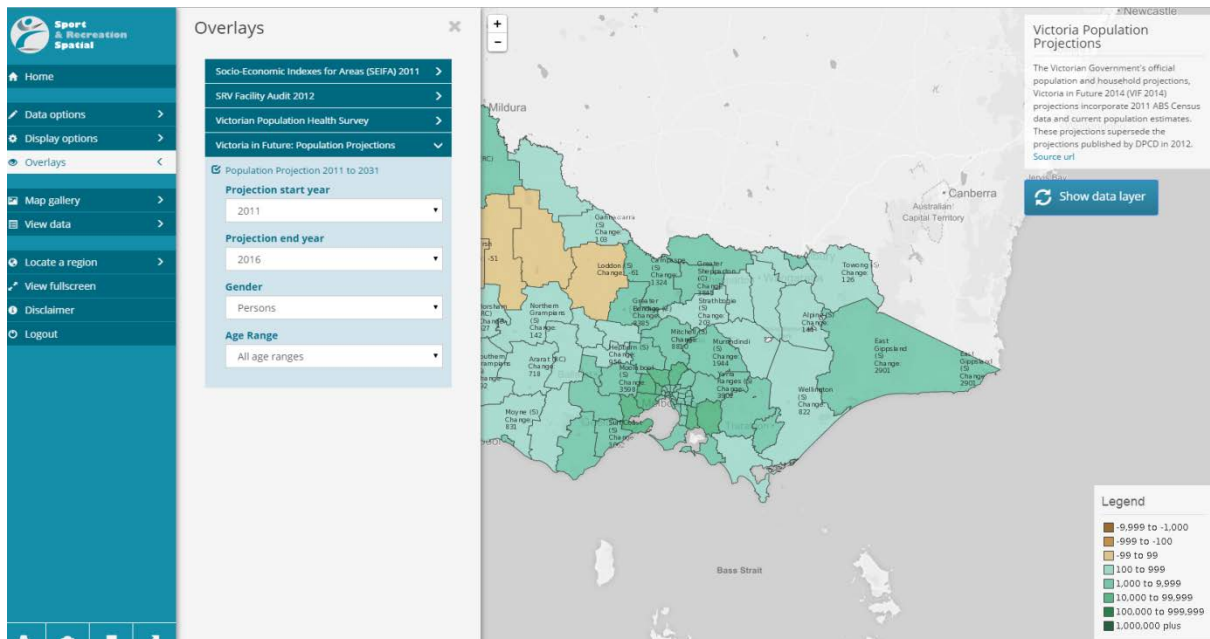
Socio-economic status

Participant data can be overlaid with measures of socio-economic status.



Population projections

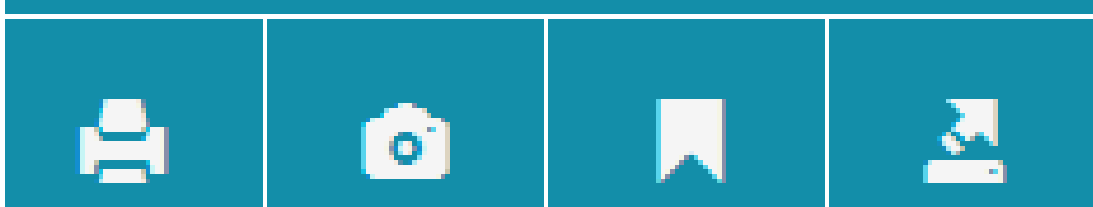
Future population projection data to 2031 are available.



Other features

It is possible to:

- print a map image
- copy a map image
- bookmark a map image
- export data into a spreadsheet.



Appendix 2: Summary of data definitions and sources

Indicator	Definition	Primary and immediate data source
Sport participation and physical activity		
Sport participation	<p>A sport participant was defined as a registered member of a club or program affiliated with at least one of seven major State Sporting Associations (SSAs) in Victoria, in 2012. The sports included were Australian football, basketball, cricket, hockey, bowls, netball and tennis. Data for a wide range of other sports, including popular sports such as football (soccer), were not available for inclusion. The measure of participation used is the total number of registrations in the seven sports per 100 persons in the population. Because individuals can participate in more than one sport, this is not strictly a participation rate or a percentage. It can be regarded as a weighted participation rate, with each person's participation weighted by the number of sports for which they are registered.</p> <p>Because the registration data are de-identified, the proportion registered in more than one sport cannot be determined exactly, but based on geographical analysis it is estimated to be around 12% across Victoria.</p>	Membership databases of state sporting associations and 2012 Estimated Resident Population, Australian Bureau of Statistics.

Indicator	Definition	Primary and immediate data source
Sport coaching	<p>A sport coach was defined as a coach registered with one of seven major state sporting associations in Victoria in 2012. The measure of coaching used is the total number of registrations in the seven sports per 1000 persons in the population. Because individuals can coach in more than one sport, this is not strictly a participation rate or a percentage. It can be regarded as a weighted participation rate, with each person's participation weighted by the number of sports for which they are registered.</p>	<p>Membership databases of state sporting associations and 2012 Estimated Resident Population, Australian Bureau of Statistics.</p>
Sports facilities, playing fields and courts	<p>A sporting facility is defined as a facility associated with one of seven state sporting associations in Victoria in 2012. The measure of facility provision used is the total number of facilities associated with the seven sports per 10,000 persons in the population, referred to as the rate of provision of facilities.</p> <p>Facilities such as ovals that are used by more than one sport were counted once for each associated sport.</p> <p>Facilities for some sports often provide multiple playing fields or courts. The measure of provision of playing fields and courts used is the total number of playing fields and courts associated with the seven sports per 10,000 persons in the population, referred to as the rate of provision of playing fields and courts.</p> <p>Facilities such as ovals that are used by more than one sport were counted once for each associated sport.</p>	<p>Facilities data collected during 2011–2012 by Sport and Recreation Victoria, Department of Transport, Planning and Local Infrastructure, and validated by local government authorities; and 2012 Estimated Resident Population, Australian Bureau of Statistics.</p>

Indicator	Definition	Primary and immediate data source
Meeting physical activity guidelines	This is the proportion of people aged 18 or over who did meet the National Physical Activity Guidelines for Australians, developed by the Department of Health and Aged Care in 1999. These guidelines recommend at least 30 minutes of moderate intensity physical exercise on most, and preferably all, days.	Victorian Population Health Survey, 2008. Immediate data source: Department of Health, Victoria – 2012 local government area profiles.
Leisure-time physical activity	A participant is defined as a person who participated at least once in any LTPA in the 12 months prior to being interviewed in the 2010 national ERASS. The survey was limited to people aged 15+ years, and encompassed 95 different types of LTPA.	Australian Sports Commission.
Organised leisure-time physical activity	A participant in organised LTPA is defined as a person who participated at least once in the 12 months prior to being interviewed in the 2010 national ERASS, in LTPA organised by a club, association or any other type of organisation. The survey was limited to people aged 15+ years, and encompassed 95 different types of LTPA.	Australian Sports Commission.
Club-based leisure-time physical activity	A participant in club-based LTPA is defined as a person who participated at least once in the 12 months prior to being interviewed in the 2010 national ERASS, in LTPA organised by a sport or recreation club or association that required payment of membership, fees or registration. The survey was limited to people aged 15+ years, and encompassed 95 different types of LTPA.	Australian Sports Commission.

Indicator	Definition	Primary and immediate data source
Regular leisure-time physical activity – past 12 months	<p>A regular participant is defined as a person who participated at least 12 times in any LTPA in the 12 months prior to being interviewed in the 2010 national ERASS, i.e. participated at least monthly on average. The survey was limited to people aged 15+ years, and encompassed 95 different types of LTPA.</p>	Australian Sports Commission.
Regular health-enhancing leisure-time physical activity – past 12 months	<p>Each of the 95 of the LTPA types encompassed by the national ERASS was allocated to either a HELPA group or a non-HELPA group according to the Metabolic Equivalent of Task (MET) of the activity.</p> <p>A regular HELPA participant was defined as a person who participated at least 12 times in HELPA in the 12 months prior to being interviewed in the 2010 ERASS survey.</p> <p>A recent HELPA participant was defined as a person who participated in HELPA in the two weeks prior to being interviewed in the 2010 ERASS.</p> <p>The survey was limited to people aged 15+ years.</p>	Australian Sports Commission.

Indicator	Definition	Primary and immediate data source
Recent health-enhancing leisure-time physical activity – past two weeks	<p>Each of the 95 of the LTPA types encompassed by the national ERASS was allocated to either a HELPA group or a non-HELPA group according to the Metabolic Equivalent of Task (MET) of the activity.</p> <p>A regular HELPA participant was defined as a person who participated at least 12 times in HELPA in the 12 months prior to being interviewed in the 2010 ERASS survey.</p> <p>A recent HELPA participant was defined as a person who participated in HELPA in the two weeks prior to being interviewed in the 2010 ERASS.</p> <p>The survey was limited to people aged 15+ years.</p>	Australian Sports Commission.
Health		
Overweight and obesity	<p>An individual has been defined as being overweight or obese by calculating their BMI, which is a measure used to estimate levels of unhealthy weight in a population. BMI is calculated as weight in kilograms divided by height in metres squared. A BMI score of 25.0–29.9 is classified as overweight and BMI scores above 30.0 are considered obese.</p>	Victorian Population Health Survey, 2008, self-reported height and weight of people aged 18 years or over. Immediate data source: Department of Health, Victoria – 2012 local government area profiles.
Type 2 diabetes	<p>The proportion of people aged 18+ years who reported that they had been told by a doctor that they had type 2 diabetes.</p>	Victorian Population Health Survey, 2008. Immediate data source: Department of Health, Victoria – 2012 local government area profiles.

Indicator	Definition	Primary and immediate data source
Child development vulnerability	The Australian Early Development Census is a population measure of how young children are developing in Australian communities, as they begin school, across the five domains of early childhood development: physical health and wellbeing, social competence, emotional maturity, language and cognition, and communication and general knowledge. Children in the lowest 10% of all Australian children in any of these domains are considered 'developmentally vulnerable'.	Australian Early Development Census conducted by the Department of Education and Early Childhood Development, 2009, which is based on a survey of children in their first full-time year of school. Immediate data source: Public Health Information Dissemination Unit Social Health Atlas of Australia.
Psychological distress	Psychological distress was measured using the Kessler 10 Psychological Distress Scale (K10), a set of 10 questions designed to categorise the level of psychological distress over a four-week period. The K10 covers dimensions of depression and anxiety. Individuals are categorised into four levels of psychological distress based on their score: low (10–15), moderate (16–21), high (22–29) and very high (30–50). The indicator in this report is the proportion of people aged 18+ years who reported a high (or very high) level of psychological distress.	Victorian Population Health Survey, 2008. Immediate data source: Department of Health, Victoria – 2012 local government area profiles.

BMI, body mass index. ERASS, Exercise, Recreation and Sport Survey. HELPA, health-enhancing leisure-time physical activity. LTPA, leisure-time physical activity.