

Active and Inactive Young Australians

An Independent Review of Research into Enablers and Barriers to Participation in Sport, Active Recreation and Physical Activity among Children and Adolescents.

SPRINTER Research Group
Prevention Research Collaboration
Sydney School of Public Health
Charles Perkins Centre
The University of Sydney

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The contributions of the following in providing advice and/ or reviewing earlier drafts of the report and are gratefully acknowledged:

Dr Phil Hamdorf
Mr Peter McCue

NSW Office of Sport

Professor Emmanuel Stamatakis
Professor Adrian Bauman

The University of Sydney

Bridget Foley
Katherine Owen

SPRINTER Research Group, Prevention Research Collaboration
Charles Perkins Centre, The University of Sydney

Committee members

Committee of Australian Sport and Recreation Officials (CASRO)

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Glossary of Terms

This glossary adopts (and expands on) conventions and terms used by the World Health Organisation in the Global Action Plan on Physical Activity 2018-2030.

Active recreation ^a	Outdoor recreational activities that can be considered as physical activity, including walking, sports, play, and dance. These activities usually take place in public spaces such as parks and plazas.
Correlate of PA ^b	Term used to describe statistical associations or correlations between measured variables and participation in physical activity.
Fundamental Movement Skills ^c	Fundamental Movement Skills (FMS) are the “building blocks” of more advanced, complex movements required to participate in games, sports or other context specific physical activity, comprising a variety of skill categories such as object control/ball skills, locomotor, or balance/stability skills.
Human Movement Continuum	The term ‘Human movement’ and ‘physical activity’ are used interchangeably as a generic and inclusive term for all movement. It denotes ‘any form of bodily movement performed by skeletal muscles that result in an increase in energy expenditure’ (glossary). This broad concept of human movement includes Active play, FMS, Sport, Recreational and other forms of PA.
Intersectoral Approach	Intersectoral approach means conceptualisation and coordination of actions affecting specified outcomes undertaken by sectors external to one’s own sector. For example, health outcomes arising from physical activity delivered through coordinated action involving sport, health, education, transport and planning sectors.
Life Course Approach	A conceptual approach to physical activity and sports participation that considers the long-term determinants and correlates of physical activity from birth, for the whole span of life. The determinants and correlates are factors related to demographic, biological, psychological, behavioral, socio-cultural, and physical environmental influences on participation. Cross-sectional factors and experiences in different phases of life accumulate longitudinally in later life. Transitions, for example, developing from adolescence to adulthood, retirement or other life changes, are critical points for positive and negative changes in physical activity.

^a Note that some organisations will include what we have defined as ‘recreational physical activity’ under a broader category of ‘active recreation’ without an indoor/outdoor distinction.

^b For more detail refer to [Bauman \(2002\)](#)

^c For more detail refer to [Logan et al \(2018\)](#)

Light-intensity PA ^d Moderate-intensity PA Vigorous-intensity PA	<p>Light-intensity activities are defined as 1.1 MET to 2.9 METs.</p> <p>Moderate-intensity activities are defined as 3.0 to 5.9 METs. Walking at 3.0 miles per hour requires 3.3 METs of energy expenditure and is therefore considered a moderate-intensity activity.</p> <p>Vigorous-intensity activities are defined as 6.0 METs or more. Running at 10 minutes per mile (6.0 mph) is a 10 MET activity and is therefore classified as vigorous intensity.</p> <p>Met classification of activity for adults: is available here</p> <p>Met classification for children and adolescents is available here</p>
MET (Metabolic equivalent)	A MET is defined as the resting metabolic rate, that is, the amount of oxygen consumed at rest, sitting quietly in a chair, approximately 3.5 ml O ₂ /kg/min (1.2 kcal/min for a 70-kg person). As such, work at 2 METS requires twice the resting metabolism or 7.0 ml O ₂ /kg/min and three METS requires three times the resting metabolism (10.5 ml O ₂ /kg/min), and so on.
Physical Activity (PA) [Human Movement]	Any form of bodily movement performed by skeletal muscles that result in an increase in energy expenditure. Examples of common types of activity are walking, running, dancing, swimming, yoga, and gardening. <i>Used interchangeably with 'human movement'.</i>
Physical inactivity	An absence or an insufficient level of physical activity required to meet the current physical activity recommendations.
Physical Literacy ^c	Physical literacy comprises physical, psychological, social and cognitive domains and is about building the skills, knowledge and behaviours to lead an active life. ^e
Recreational physical activity ^a	Physical activity performed by an individual that is not required as an essential activity of daily living and is performed at the discretion of the individual. Such activities include sports participation, exercise conditioning or training, such as going for a walk, dancing, and gardening.
Sport	An activity involving physical exertion, skill and/or hand-eye coordination as the primary focus of the activity, with elements of competition where rules and patterns of behaviour governing the activity exist formally through organizations; and may be participated in either individually or as a team.
Sedentary behaviour	Any waking behaviour characterized by an energy expenditure less than 1.5 metabolic equivalents (METs), while in a sitting, reclining or lying posture. Common sedentary behaviours include TV viewing, video game playing, computer use (collectively termed "screen time"), driving automobiles, and reading.
Whole-of-System Approach to PA	Using a conceptual framework for understanding inter-relationships, interactions and various perspectives in the PA system of influences, allowing better understanding of how different parts of the system work and interact, as well as where and how to intervene to improve PA and other complementary outcomes. Typically, a process of collaborating with others from different sectors to develop a consensus mapping of the nature of the problem and to engage around the policy responses required, and the opportunities for collaborative action.

^d See <https://health.gov/paguidelines/2008/appendix1.aspx>

^e For a more detailed definition refer to the [Sport Australia Framework and Position Statement](#)

Executive summary

The purpose of this review is to identify what is known about barriers and enablers of participation in physical activity (including sport and active recreation) among children and young people aged 3-18 years, living in Australia. It has been compiled at the request of the NSW Office of Sport and primarily for consideration by the Committee of Australian Sport and Recreation Officials (CASRO).

During childhood and adolescence, physical activity (PA) is important for motor and cognitive development, as well as psychosocial and cardiometabolic health. Movement skills and experiences in childhood and adolescence lay the foundation for participation in PA and sport in those formative years and across the life course. Yet many Australian children are missing out on these benefits; Australian Institute of Health and Welfare (AIHW) data show that overall, 30% of children aged 2–17 are not achieving the levels of PA recommended in Australia’s PA and Sedentary Behaviour Guidelines.

The reviewed evidence indicates that PA barriers, preferences, personal level motivations and enablers vary:

- across the life course;
- by gender;
- at family / household level;
- by socio-economic status; and
- by cultural and linguistic diversity (CALD).

Strategies, policies, plans and programs purporting to promote and increase PA through the life course, including childhood and adolescence, need to reflect this diversity in barriers/enablers and to tailor strategies according to the particular populations being served (target group segmentation) – life course stage, female gender, lower SES background, CALD communities.

Research studies identify barriers and enablers at the individual, family and household levels, but also at *higher levels of influence*, including policy, program, organisation and environment; to increase participation, the strategy levers at these higher levels of influence must be targeted in a comprehensive, intersectoral and whole-of-system approach. Some studies describe ‘modifiable’ and ‘non-modifiable’ barriers; for example, age and gender are ‘non-modifiable’ in research studies which focus on the *individual*. The key proposition that emerges from the evidence is that organisational, policy and service responses **are** modifiable. **These** are the higher-level factors that can and need to be prioritised for strategic action. Current World Health Organization [WHO]-led research states that the problem of insufficient PA is global and recommends that urgent scaling up is needed of known effective policies and programs to increase PA in adolescents. Multisectoral action is needed to offer opportunities for young people to be active, involving education, urban planning, road safety and other key actors.

Specific transition points during the life course are associated with changes in PA and/or sedentary behaviour; the change can be positive or negative. For example, sedentary behaviour tracks from early to middle childhood (the 0-5-year old period) suggesting the need to intervene early. Evidence points to two key windows of opportunity for early intervention: (i) the after childcare/school period, and (ii) the transition from childcare to school. Three enabling approaches for this transition period are recommended:

- “goals and planning” (using behavioural contracting);
- “repetition and substitution” (using graded task-setting); and
- “reward and treat” (incorporating incentives).

The adolescence-to-adulthood transition is an important window for intervention. Participation in PA and especially in sport is lower in adulthood than in childhood and adolescence. The steepest declines in participation occur during later adolescence. This is a transition period in which to target policy actions and interventions - positive behaviours established in this stage have the potential to last into later adulthood.

In the Australian research evidence into barriers to participation, a key finding is the apparent lack of age-appropriate or engaging service offerings in organised sport and PA outside of school hours for children under 8 years of age and for teenagers. The lack of age-appropriate offerings affects 85% of 0-4-year-olds and 22% of 5-8-year-olds, whilst 37% of 12-14-year-olds dislike the sport and PA options available.

Several recent reports and frameworks produced by the Australian Government have been noted in this review and provide a sound basis for action; an example is the *Drivers of Participation Framework and Toolkit*. Similarly, one international and two Australian case studies are provided to showcase concrete examples of relevant policy actions.

Based on the reviewed evidence, five strategic principles and ten policy options are recommended for consideration by Australian State and Territory governments.

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Introduction

Strategic context

In the national sports plan, Sport 2030, the Australian Government has a clear and bold vision for sport in Australia — to ensure we are the world’s most active and healthy nation, known for our integrity and sporting success. But fewer Australians are playing sport and engaging in PA — a trend we need to reverse. Towards achieving this, Sport 2030 set a clear goal, in alignment with the WHO Global Action Plan on Physical Activity, to reduce physical inactivity in Australia by 15%, by 2030. Under the strategic priority of ‘building a more active Australia’, the Australian Government has made a commitment to promote sport and PA participation in the following ways:

- › Drive movement for life through sport and physical activity participation for all Australians
- › Ensure all Australian children have the skills, confidence and motivation to be active for life and safe in the water
- › Reduce barriers to sport and physical activity participation, including swimming, and actively promote incentives for participation
- › Coordinated investment in sport and recreation facilities to achieve sustainable outcomes for communities, with a focus on universal design to ensure sport is accessible to all Australians.

To focus our understanding of barriers to sport and PA participation among Australian children, the Committee of Australian Sport and Recreation Officials (CASRO) requested a review of what is known about such barriers. This request was taken forward by Dr Phil Hamdorf of the NSW Office of Sport, in commissioning the *SPRINTER*^f research group at the University of Sydney to undertake this rapid review.

This research was timely: during preparation of the report WHO-led research provided the first ever global trends for adolescent insufficient PA showing that urgent action is needed to increase PA levels in girls and boys aged 11 to 17 years. The study, published in *The Lancet Child & Adolescent Health* journal, found that more than 80% of school-going adolescents globally did not meet current recommendations of at least one hour of PA per day – including 85% of girls and 78% of boys. The authors concluded that urgent scaling up is needed of known effective policies and programs to increase PA in adolescents; multisectoral action is needed to offer opportunities for young people to be active, involving education, urban planning, road safety and others.

Purpose of this review

The purpose of this review is to identify what is known about barriers and enablers of participation in PA (including sport and active recreation) among children and young people aged 3-18 years, living in Australia. A sound understanding of barriers and motivators is an essential ingredient of successful interventions. The research team were asked to examine the issue of financial cost as a barrier.

^f Sport and Recreation INTervention and Epidemiology Research

Key Strategic Principles

Five ‘key principles’ emerged from the evidence reviewed. These are presented to underpin the overall findings and recommendations presented in the report. They are intended to guide and assist the selection of strategic and operational responses by Australian governments. The principles relate to and expand on the *principles for action* set out in *Sport 2030*.[§] The key strategic principles identified for *this* report *Active and Inactive Young Australians* are:

1. Human movement continuum;
2. Intersectoral approach;
3. Life course approach;
4. Whole-of-society benefit; and
5. Whole-of-system approach

Principle 1: Human movement continuum

A continuum of all human movement from play to organised sport to active living
Physical literacy is used as the overarching organising framework in the report with ‘human movement’ and ‘physical activity’ used interchangeably as a generic and inclusive term. The term Physical Activity is used in this report to denote ‘any form of bodily movement performed by skeletal muscles that result in an increase in energy expenditure’ (glossary). This broad concept of human movement includes sport and active recreation (see Figure 1). The continuum uses Physical Literacy as its overall framework, based on the [2019 Position Statement from Sport Australia](#)¹ and the Australian [Physical Literacy Framework](#).² Technical information on the human movement continuum and Figure 1 is provided in Appendix 3.

Principle 2: Intersectoral approach

Joined up working for coverage, impact and efficiency

Policy influences that can impact PA and inactivity exist beyond the sport and active recreation industry/sector. Policy actions require an intersectoral approach which go beyond the identification of participation barriers, enablers or correlates and mapping the important systems influences, and the intervention points outside sport and active recreation, as well as within it. Effective action requires an integrated, system-wide approach, in consultation with policymakers and stakeholders from *multiple* sectors. While examining the influences on participation in sport and PA it becomes apparent very quickly that many sectors *beyond* the sport or health sectors have a vital role to play.

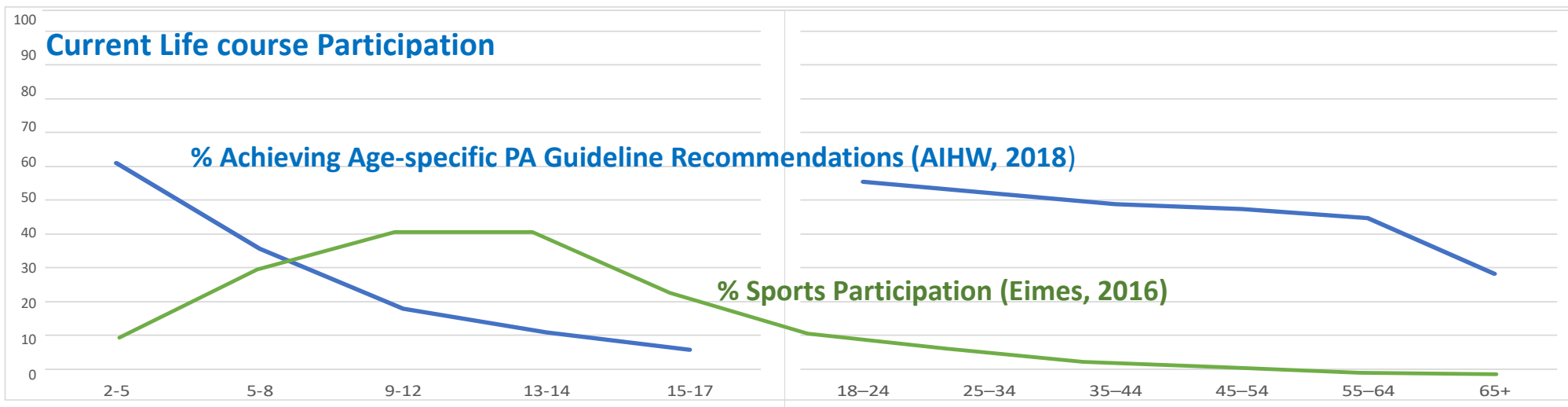
Principle 3: Life course approach

Catering for movement needs from early years to older age

National and global guidelines for PA reflect how our needs for body movement vary across the lifespan. The composition of the systems that influence movement also varies across the lifespan. For example, parents, schools, sporting organisations, safe routes to school are very important influences for school aged children and young people but become less relevant for older individuals. The workplace setting may feature more prominently in the systems influences for adults. This does not mean that we should not prioritise any given phase of the life course, such as early years or childhood and adolescence. What it does mean is that we need to recognise that gains in societal levels of human movement achieved at one stage, may be vulnerable at another stage if our movement policies and environments are weak. Whilst the population of focus in this report is children and young people up to the age of 18 years, there is little point in succeeding with participation strategies at one life stage only to lose these gains through dropping out at subsequent stages – whether this is in late childhood – during the transition to adulthood, during the early years of parenting, in mid-life or later.

[§] [Sport 2030](#) Especially - Principles #1: *Sport and physical activity for all, for life*; #4: *Collaboration and partnership*; #5: *Learn, adapt and evolve*

The Human Movement Continuum – Physical Literacy and Physical Activity throughout life



Framework for Life course Participation

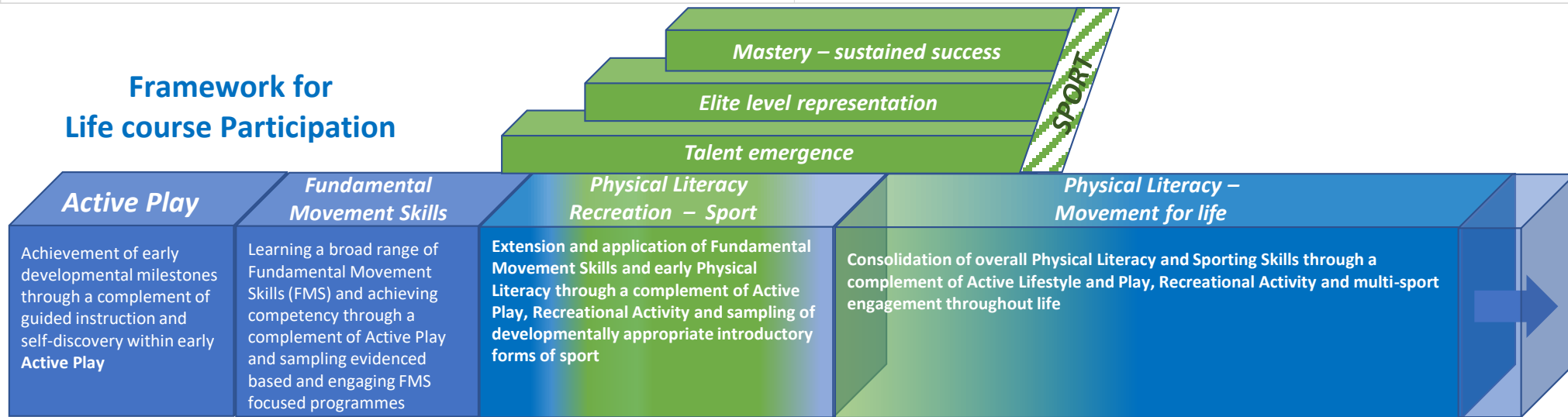


Figure 1 The Human Movement Continuum – Physical Literacy and Physical Activity throughout life

[Adapted from: [NSW FTEM Participant Framework \(2019\)](#), [AIHW Physical Activity across the Life Stages \(2018\)](#), [Population levels of sport participation \(2016\)](#)

Principle 4: Whole-of-society benefit

Sport for all; movement for the many – not for the few

In the context of this report, inequity refers to differences in the distribution of the benefits that accrue from participation across the movement continuum for reasons that are avoidable or unfair. The ‘avoidable and unfair’ aspect is shown by the striking differences in participation rates among girls and young women, those from poorer socio-economic background, from rural and remote communities, from particular culturally and linguistically diverse groups and among Indigenous Australians (see Part 2: Australian evidence perspectives).

Principle 5: Whole-of-System approach

From ‘barriers, enablers or correlates’ to ‘whole-of-system thinking’

There is growing recognition that many complex public health problems, such as obesity and physical inactivity, are not amenable to simple, single solutions. This has led to increasing interest in whole of system approaches (WSAs), to identify effective mechanisms for tackling them. Effective action requires an integrated, system-wide approach in consultation with policymakers and stakeholders from multiple sectors³. WSAs are at the heart of the WHO Global Action Plan on Physical Activity 2018 – 2030 (GAPPA) – Objective 4 of the plan is “create active systems”⁴. A whole-of-system approach provides a conceptual framework for understanding inter-relationships, interactions and various perspectives in the PA system, allowing policy makers to better understand how different parts of the system currently work and interact, and where and how to intervene to improve PA and other complementary outcomes. The process of collaborating with others from different sectors to develop a whole-of-system map for PA can help build consensus around the nature of the problem and stimulate engagement around the policy responses required, and opportunities for collaborative action.

The [Australian Systems Approaches to Physical Activity \(ASAPa\)](#) project is a national initiative to support a whole of system approach (WSA) to the development and alignment of policies, programs and surveillance addressing PA at the population level. Taking account of feedback from national stakeholders, existing WSAs described by public health researchers and policymakers^{3,5}, and work related to PA (whether directly or as a discussion of obesity)⁶⁻⁸, the project team developed a WSA conceptual map for PA – see Figure 2⁹.

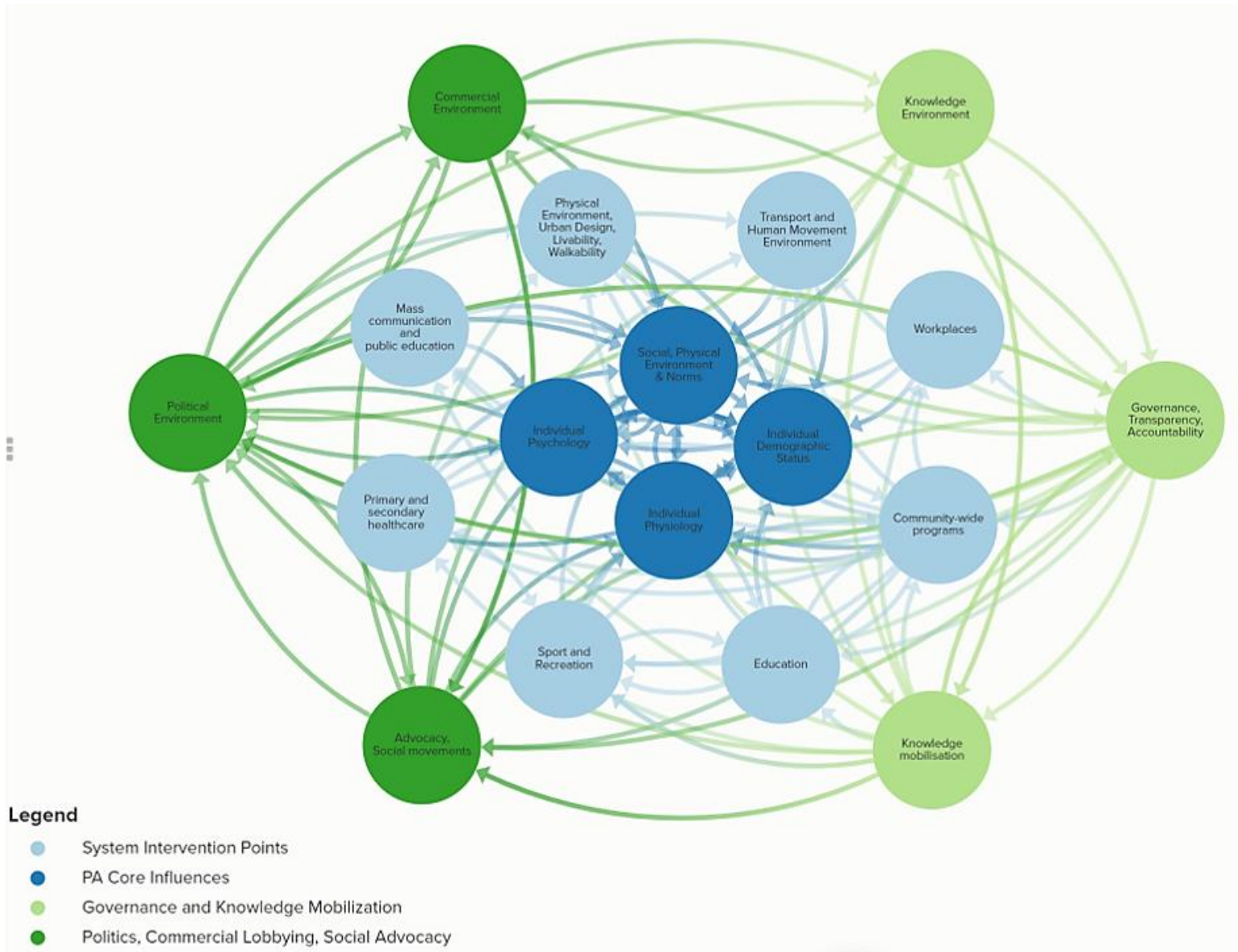


Figure 2 Initial Whole of System Map of Physical Activity (ASAPa Project)

The Policy Options

Noting the proposed five 'Key Strategic Principles' underpinning them, ten policy options are provided for consideration by Australian governments:

- i. Develop standardised surveillance of PA and sedentary behaviour in all Australian States and Territories and at Commonwealth level; monitor population participation rates of all Australians in human movement, including (i) age-specific guideline recommended physical activity, (ii) sport and (iii) active recreation
- ii. Develop a long-term investment strategy to implement the Australian government *Drivers of Participation* and *Physical Literacy Frameworks*
- iii. Support early intervention pre-school programs for 3-5-year-olds to build Fundamental Movement Skills [FMS] and for primary school-aged children to consolidate and strengthen FMS acquisition
- iv. Evaluate a pilot program of specialist primary school physical education teachers, in coordination with high schools as appropriate, across the three sectors (Government, Independent and Catholic)
- v. Provide incentives to boost the delivery standards of Physical Education in Australian schools; in particular, encourage more schools to achieve the recommended standard of adolescents being physically active for at least 50% of allocated PE time, as recommended by Australian experts, US Centers for Disease Control and Prevention and the UK Associations for Physical Education
- vi. Provide targeted support to support the teaching of physical education for schools in disadvantaged areas
- vii. Promote membership of sports clubs, social sport and enjoyable activities to older Australian adolescents as they transition to adulthood; ensure that the products and services meet the needs and interests of these young adults
- viii. Develop family-based policies and interventions taking account of recent evidence on the effectiveness of these approaches
- ix. Address inequity in participation, including initiatives to address the financial barriers to participation in sport such as voucher schemes
- x. Ensure program research and evaluation to support the goals of Sport 2030 (including, when developed, the national Physical Activity strategy); conduct specific evaluation studies to determine the effectiveness of newly introduced policies and programs.

Methods

In keeping with rapid review, we used systematic review methods to search *existing* research review evidence about barriers and enablers to participation (i.e. a 'review of reviews').¹⁰ We made every effort to conduct a thorough and systematic search within the time constraints.

Using the PICOS framework (Population, Intervention, Comparison, Outcome, Study type), preferred for rapid reviews,¹¹ we defined the components as follows

Population:	Children and young people in Australia aged 3-18 years
Intervention [Phenomenon of Interest]:	Barriers to, Enablers of participation participation in PA (including sport, active recreation)
Comparison:	Children/YP undertaking recommended levels of PA; Children/YP participating regularly in Sport/AR; Population mean level of participation; Most active population as reference group No reference group
Outcome:	Meeting guidelines for recommended levels of physical activity. Level of participation in physical activity, including sport and AR (self-report or objective measure)
Study type:	Systematic review, Key Agency Report, Report stipulated by CASRO, Longitudinal study, Qualitative study, other report from Grey Literature.
Electronic databases searched:	Medline, Psych Info, PubMed, SCOPUS, SPORTDiscus, Australian Clearinghouse for Sport and Physical Activity,
Search period:	January 2014 to October 2019
Eligibility criteria:	Available in English language, conducted in Australia or other comparable countries (UK, New Zealand, EU, Canada). Highest available level of evidence. Non duplicative.

Resulting body of evidence considered

Within the methodological limitations of a rapid review, a systematic and rigorous research process was undertaken; 2500 studies were examined from the global database search, of which 311 were shortlisted. After screening, 63 full papers were retrieved and analysed; 55 of these studies were tabulated.¹²⁻⁶⁶ 27 studies and key reports specific to Australia were retained.^{22,40,41,60,67-86}

The search strategy is described in detail in Appendix 2.

International and Australian studies are shown separately in Appendices 4 and 5 respectively.

Part One - International evidence perspectives

Perspectives relating to age group

Sterdt and colleagues systematic review identified correlates consistently associated with PA of children and/or adolescents: gender, age, ethnicity, parental education, family income, socioeconomic status, perceived competence, self-efficacy, goal orientation/motivation, perceived barriers, participation in community sports, parental support, support from significant others, access to sport/recreational facilities and time outdoors.⁶² The overall conclusion from the researchers was to signal the complex and multi-dimensional nature of PA, determined by numerous biological, psychological, sociocultural and environmental factors. In other words, and consistent with most expert opinion as well as the WHO GAPP, ⁸⁷ an ecological / comprehensive view of PA determinants is more useful implying a whole of systems approach rather than a reductionist analysis.⁶²

Certain stages during the life course are associated with decreased PA and/or increased sedentary behaviour. Even when considering the 0-5-year old period, sedentary behaviour tracks from early to middle childhood, suggesting the need to intervene early.⁶⁵ Research indicates two key windows of opportunity: (i) the after childcare/school period, and (ii) the transition from childcare to school. Three enablers for this transition period are recommended: (i) “goals and planning” (i.e. “behavioural contract”), (ii) “repetition and substitution” (i.e. “graded tasks”), and (iii) “reward and treat” (i.e. “incentives”).⁶⁵ The correlates and determinants of PA in 0-6-year olds have been reported by Bingham et al. in a recent systematic review.⁴⁵ Correlates of total PA were gender (male, ++); parental PA (+); parental support (+); and time outdoors (+). Determinants of total PA were gender (+) and time spent playing with parents (+). The only correlate of moderate to vigorous PA was gender (male, ++). A systematic review was conducted to identify positive determinants of fundamental movement skills (FMS) such as stability, locomotor, and manipulative movements in 3-to-6-year olds, on the basis that FMS affect children's physical, social, and cognitive development.⁸⁸ The researchers found 4 categories of determinants: (i) *individual characteristics* (gender, ethnicity, age, PA, physical fitness, and playfulness), (ii) *education-related factors* (programmes promoting PA and motor skill, attendance of physical education lessons, practice schedules), (iii) *social environments* (parent- and family-related variables, older siblings, and sport club participation), and (iv) *physical environment* (population density, size of preschool area, clothing). Age, gender, PA, and preschool-based programmes were all found to be positive determinants of FMS in preschool-aged children.⁸⁸

A multi-country study (6 low-income, 27 lower middle-income, 15 upper middle-income countries) of 12-15-year olds identified important correlates of PA participation - Participation in physical education classes during school days (≥5 days/week) was the key enabler (12% more likely to meet PA guidelines); the main barriers to PA participation for adolescents were food insecurity (15% less likely), low fruit and vegetable intake (32% less likely), low parental support/monitoring (32% less likely), no friends (20% less likely), and experiencing bullying (7% less likely) were less likely to have adequate levels of PA.⁸⁹ A recent French study examined socioeconomic and school factors in adolescents finding parental influence/modelling of PA to be the *only* significant influencing factor.⁹⁰

.....relating to lifecourse transitions and trajectories

Participation in PA and especially in sport is lower in adulthood than in childhood and adolescence. We have noted the importance of the early years for laying the foundation of movement skills and physical literacy.

The transition from adolescence to adulthood is another important period in which to target policy actions and interventions; young people's increasing autonomy and positive behaviours established during this time have the potential to last into later adulthood.¹⁵ There is a need for interventions to prevent declines in PA among school leavers, especially those who do not enter tertiary education. Encouraging sporting club membership during high school might be especially important.⁹¹

Whilst the priority focus of this report was to investigate correlates and determinants of participation among *young* Australians, we include here some findings which apply across the life course. Several studies have taken a life course /life span perspective to this question. These include Bauman and colleagues 2012 Lancet paper,⁶³ followed by life course oriented reviews of policy determinants,²⁹ physical disabilities,^{52,92} socioeconomic position,^{57,93} sociocultural determinants,⁹⁴ disadvantage⁹⁵, physical/built environments^{23,33}, distinct tracking trajectories from childhood to adulthood,¹⁶ sedentary behaviour⁹⁶. Taken together, these research studies show that:

- age, gender, health status, self-efficacy, and motivation are associated with PA⁶³
- ecological models take a broad view of health behaviour causation, with the social and physical environment included as contributors to physical inactivity, particularly those outside the health sector, such as urban planning, transportation systems, and parks and trails⁶³
- community-and street-scale urban design and land use policies positively support PA levels²⁹

.....relating to the family and home environment

Family and parent-related variables are identified as important influences; A meta-analysis of parental correlates in child and adolescent PA indicates that whilst real, the evidence for the effect size of parental support and modelling has yet to be precisely determined⁹⁷ – i.e. it may be a more modest effect than the 32% reported in the multi-country study by Vancampfort.⁸⁹ Marzi and colleagues systematic review examined social and physical environmental correlates of independent mobility in children (CIM), reinforcing the role of parents but also signalling the importance of neighbourhood safety, fear of crime and stranger and perception of traffic; car ownership, distance to amenity, and neighbourhood design were relevant physical environmental attributes.²⁵ Recent systematic review evidence provides guidance on intervention design. Brown and colleagues reported their meta-analysis of family-based interventions to increase PA in 2016.⁴⁶ About two-thirds of research studies into family-based PA intervention show a positive result, but the increases in PA are modest. The researchers make four recommendations for policy: (i) Family-based interventions should be tailored to the context within which they are delivered, most notably the ethnicity, motivation and time constraints of the family; (ii) Combining goal-setting and reinforcement techniques should be considered to improve PA through increased motivation; (iii) Where a lack of resources and/or understanding for how to change behaviour exists, educational strategies should be employed to increase knowledge. However, these strategies should be combined with other intervention approaches to be successful in improving PA (knowledge alone does **not** change PA behaviour); (iv) Targeting improvements to the family psychosocial environment should be considered when designing interventions to increase both child and family PA. These should also include a focus on the *child* as the agent of change.⁴⁶

.....relating to the school setting

The vital importance of school physical education was suggested in the multi-country study noted above.⁸⁹ Two recent systematic reviews have examined this issue specifically.^{20,98,99} Zhou et al found 11 variables which were consistently associated with participation in MVPA: gender (boys), ethnicity (white), gender (boys-only class), PE activities (team games), lesson location (outdoors), expectancy beliefs, subjective task values, and enjoyment. Other variables, namely, gender (girls-only class), PE activities (movement activities), and lesson context (knowledge), were consistently and negatively related to MVPA. The research concluded that interventions focusing on these variables are needed to build active lesson time in PE.²⁰

Martins and colleagues systematic review had both quantitative⁹⁸ and qualitative⁹⁹ components. The main correlates of PA for children and adolescents were: gender (male), age (inverse association), self-efficacy, previous PA, time spent outside (children), parental support, and access to facilities/programs of PA. The implications for PE were developed in five themes: (1) active PE, (2) learning focused PE and PA for life, (3) motivational climate in PE and students' psychosocial profiles, (4) family and friends, and (5) comprehensive school PA promotion. The researchers concluded that efforts to increase school and PE effectiveness by promoting active lifestyles require a comprehensive approach, and should be based on the design of PE and PA programs and the implementation of strategies that build on the main multilevel correlates of PA.⁹⁸

The Physical Activity in Linguistically Diverse Communities (PALDC) study examined evidence-based physical education opportunities and barriers at six culturally and linguistically diverse high schools in New South Wales, Australia.⁵⁵ PALDC researchers noted that less than 60% of children enter secondary school with 12 of the assessed fundamental movement skills necessary for participation in youth sport and organized PA and that this figure appeared to be on a downward trend. The recommendations from the research were: (i) school PE should promote and encourage active play and engagement. PE teachers should be encouraged and supported to keep adolescents physically active for at least 50% of allocated PE time (other systematic review evidence shows the proportion of PE spent in MVPA is 40.5% - below the 50% recommended by PALDC, the US Centers for Disease Control and Prevention and the UK Associations for Physical Education⁶⁴); (ii) noting that PE is not the sole source of PA in the school day, cross-curricular mapping of potential sources and support for student PA should be undertaken and the opportunities leveraged; (iii) student enjoyment of PE needs to be nurture and facilitated more than is currently the case; School policies (such as changing into PE uniforms) for PE should not restrict participation in these lessons. School psychologists could assist PE teachers to ensure that group allocations and the actions of teachers during PE are promoting strong and significant social relationships.⁵⁵

.....relating to financial barriers

The research team was asked specifically to examine the issue of cost as a barrier; supplementary searches were undertaken to address this theme. The combined searches generated 21 studies deemed relevant to this question covering entrance/service fees^{83,100-105}, socioeconomic disadvantage^{39,57,67,103,105-108}, financial incentives and strategies^{60,83,101,102,104,105,109-115}. Overall, the evidence from these global studies tells us convincingly, that socioeconomic status is a powerful influence financial cost *is* a real barrier to participation in sport and PA. For Australia, AusPlay data clearly show (Figure 2) that cost can present a barrier to participation for children from low income families.⁷⁷ 58% of children from low income families participate in organised PA outside of school compared to 73% of children from middle income families and 84% of children from high income families.

.....relating to young people with disabilities

Systematic reviews of correlates and determinants of PA for children and adolescents with disabilities. These include physical disabilities overall^{51,52,92,116-120}, cerebral palsy^{121,122}, autism¹²³, attention deficit hyperactivity disorder (ADHD)¹²⁴. The correlates of PA in children and adolescents with disabilities are multifaceted and on many dimensions. Several modifiable physical, psychological, and environmental correlates were consistently and positively associated with PA in children with physical disabilities. Some non-modifiable correlates (e.g., intellectual ability, parents' ethnicity) were found to be consistently and negatively associated with PA.¹¹⁶ An awareness of and increased policy focus on providing appropriate equipment and adapted sports in the immediate environment of children and adolescents was deemed a promising approach to increasing PA levels.⁹² In the case of cerebral palsy, one study identified facilitators as: appropriateness of assistive devices, support and acceptance from family, friends, and society, health services, willingness, and self-acceptance. Identified barriers included: inappropriate design and facilities, overprotection of family, nonacceptance from family, friends, and society, inconvenient transportation, financial problems, limited health services.¹²¹

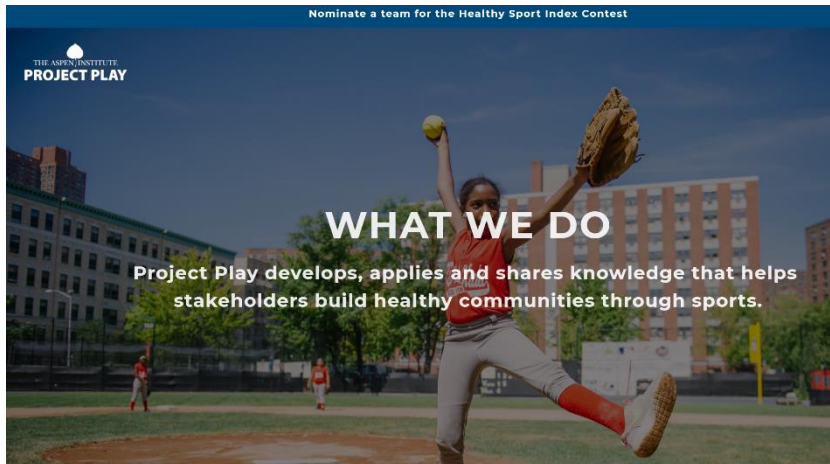
Looking beyond childhood and adolescence and across the life course, there are several factors which can be modified to remove barriers to PA for people with disabilities; relevant recommendations include:⁵²

- strategies should not focus only on people with disabilities (i.e., at the intrapersonal level) but should target each level in the social ecological model and the key stakeholders operating within those levels (e.g., peers, coaches, rehabilitation specialists, programme administrators);
- at the intrapersonal level, intervention development should focus on improving negative emotions, attitudes, and self-perceptions, and teaching behaviour change strategies.
- at the interpersonal, institutional, and community levels, intervention development must focus on improving societal attitudes toward Leisure Time Physical Activity [LTPA] for people with disabilities, enhancing practitioner knowledge, and building social networks to provide the informational and other LTPA supports required by people with disabilities.
- at the institutional, community, and policy levels, interventions and organisational and public policies are needed to circumvent and alleviate transportation and financial cost barriers
- an increased awareness of and focus on providing appropriate equipment and adapted sports in the adult's own environment⁹²

International Case Study: Project Play (The Aspen Institute, USA)

<https://www.aspenprojectplay.org/>

In 2015, Project Play released a report that represented the first (USA) national framework on how to provide all children 12-and-under access to quality, affordable sport activity. [Sport for All, Play for Life: A Playbook to Get Every Kid in the Game](#), a unifying document aggregating the most promising opportunities to emerge from two years of roundtables with 250+ experts, offers a model based on the values of health and inclusion, with eight strategies, or Plays, for the **8 PLAYS** that touch the lives of children.



PLAY 1 Ask Kids What They Want	PLAY 2 Reintroduce Free Play
PLAY 3 Encourage Sport Sampling	PLAY 4 Revitalize In-Town Leagues
PLAY 5 Think Small	PLAY 6 Design for Development
PLAY 7 Train All Coaches	PLAY 8 Emphasize Prevention



[Interactive links](#)



Project Play has also developed the highly regarded model and strategic plan: [Physical Literacy in the United States](#).

Part Two - Australian evidence perspectives

27 studies and key reports specific to Australia were retained.^{22,40,41,60,67-83,85,86,125-128} All of the Australian studies are tabulated in detail in Appendix 5

Preliminary note on surveillance: *An overarching urgent need for Australia is to have standardised surveillance for physical activity, across the life course.* AIHW notes that the most recent data available on PA among children and adolescents is the ABS 2011–12 National Nutrition and Physical Activity Survey.¹²⁹ The establishment of a consistent national approach to regular measuring of children’s height and weight, fundamental movement skills (FMS) and PA at key stages of primary and secondary schools, with 'opt-out' (passive) consent is overdue. For adults, Australian states and territories undertake Computer Assisted Telephone Interview (CATI) surveys with nutrition and PA components; they are compromised by inconsistent data collection methodology and the fact that data are self-reported and limited in scope. These issues are not addressed in AusPlay, which however provides **very** valuable data.

Available, appropriate, policy and program solutions are yet to be fully implemented

Particularly noteworthy are the recent reports and frameworks produced by the Australian Government and which provide much of the information asked of the research team undertaking this rapid review:

- Children’s Participation in Organised Physical Activity Outside of School Hours;⁷³
- The Drivers of Participation Framework⁷⁸ and Toolkit;⁷⁹
- Findings from the Youth Participation Research Project: addressing the decline in sport participation in secondary schools;⁴⁰
- Summary of key initiatives that address the ‘Cost of Participation in Sport’^h; ⁶⁰
- Market segmentation for sport participation: children;⁸² and
- The Australian Physical Literacy Framework.²

Other Australian studies addressed issues including: guidelines for selecting measures of physical literacy,¹²⁵ barriers/enablers in the early years (0-6),^{68,69,71,75} voucher incentives to promote children’s participation in community sport in Australia,⁸⁴ Fundamental Motor Skills,^{22,41,70,71} the strategic importance of eye-hand coordination and how it underpins later PA development and sports participation,¹²⁷ Children’s Independent Mobility (CIM),⁸¹ PA among Indigenous children and young people^{74,76} a randomised trial of the impact of specialist PE teachers in primary schools,¹²⁶ analysis of why girls are less active than boys,¹²⁸ and an important policy paper from Mitchell Institute/ Victoria University on ‘how to get more Australians moving’.⁸⁵

^h Produced by CASRO

Some gains in organised participation outside school hours - more needed

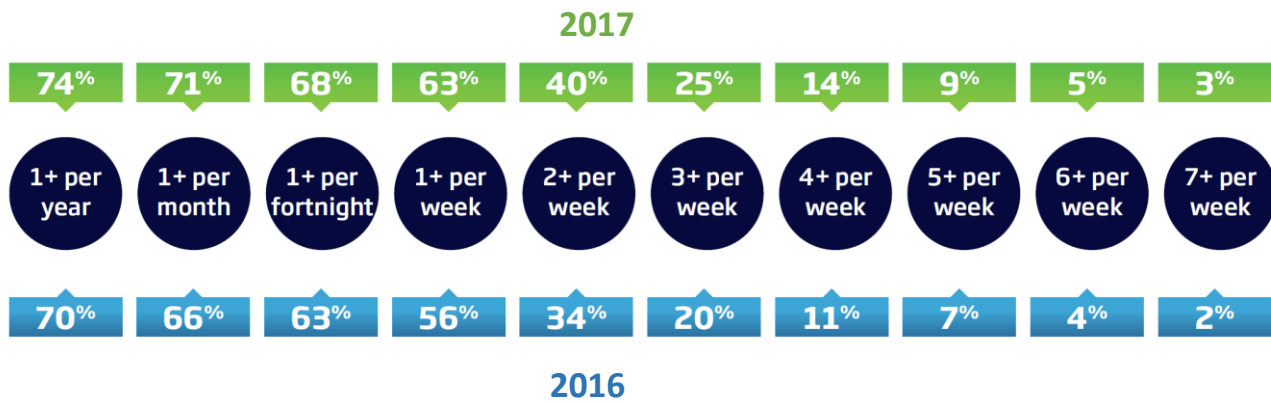


Figure 3 Participation in organised sport and physical activity outside of school hours amongst Australian children, 2016 and 2017

The frequency of organised (formally arranged by a club, association, school or other type of organisation) participation, outside of school hours (outside school hours on weekdays or any time on the weekend or during school holidays) is shown in Figure 3, based on the AusPlay report *Children’s Participation in Organised Physical Activity Outside of School Hours*.⁷³ This telephone survey provides data on children aged under 15 years, as reported by a parent or guardian. Overall child participation in organised out-of-school sport and PA rose from 70% in 2016 to 74% in 2017 – driven by a strong rise in children’s sport participation (up from 66% in 2016 to 70% in 2017).

Lack of engaging service offerings sport/PA the main barrier for under 8's and teenagers
 The top five barriers to participation, stratified by age, are shown in Figure 4, again based on AusPlay.⁷³
 There is an apparent dearth of age-appropriate opportunities for 0-4-years olds (85%) and 5-8-year-olds (22%), whilst failure to engage children as indicated by reported lack of enjoyment of PA ("don't like") rises from 12% among 5-8-year-olds to 17% among 9-11-year-olds, rising astronomically to 37% of 12-14-year-olds.

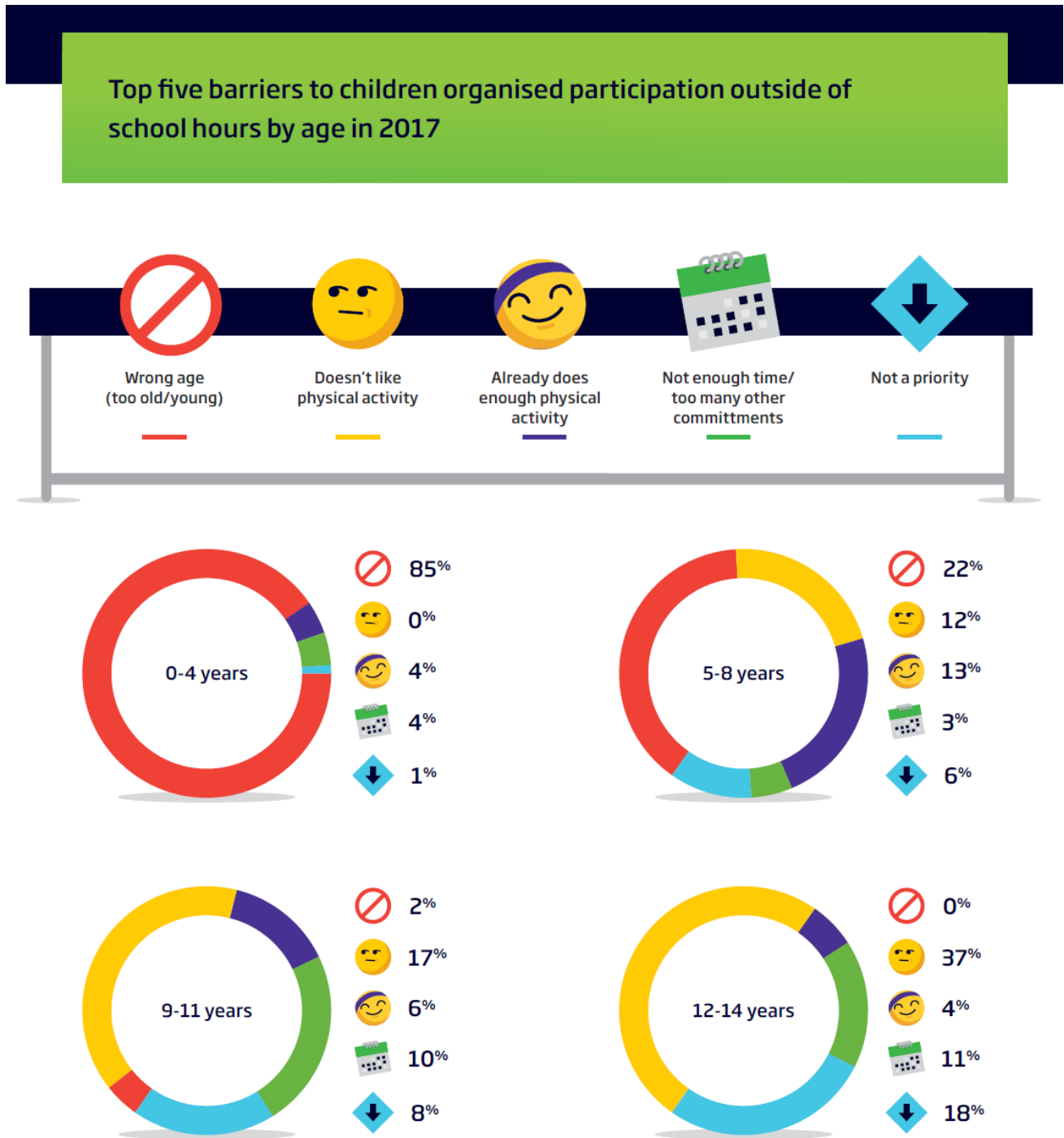


Figure 4 Barriers vary by age: top five barriers to children organised participation outside of school hours by age in 2017

Source: AusPlay Focus, 2018

Lower family income is a barrier to participation – cost is an issue

The effect of family income level on child participation rate is shown in Figure 5, which presents data according to tertiles of family income. Whilst the rate is 84% for high income families it is 16% lower, at 58% among low income families. In other words, children from families with high income are 40% more likely to participate than are those from low income families.⁷³ According to the Australian Council of Social Services (ACOSS) 2018 report Poverty in Australia, 17% of all children were living in households experiencing poverty (50% of median household income) as shown in Figure 5; the risk of poverty is highest for children in sole parent families (39% and 52% respectively). The risk of poverty for children in sole parent families is three times that for children in couple families, based on the 50% poverty line (39% compared with 13%).

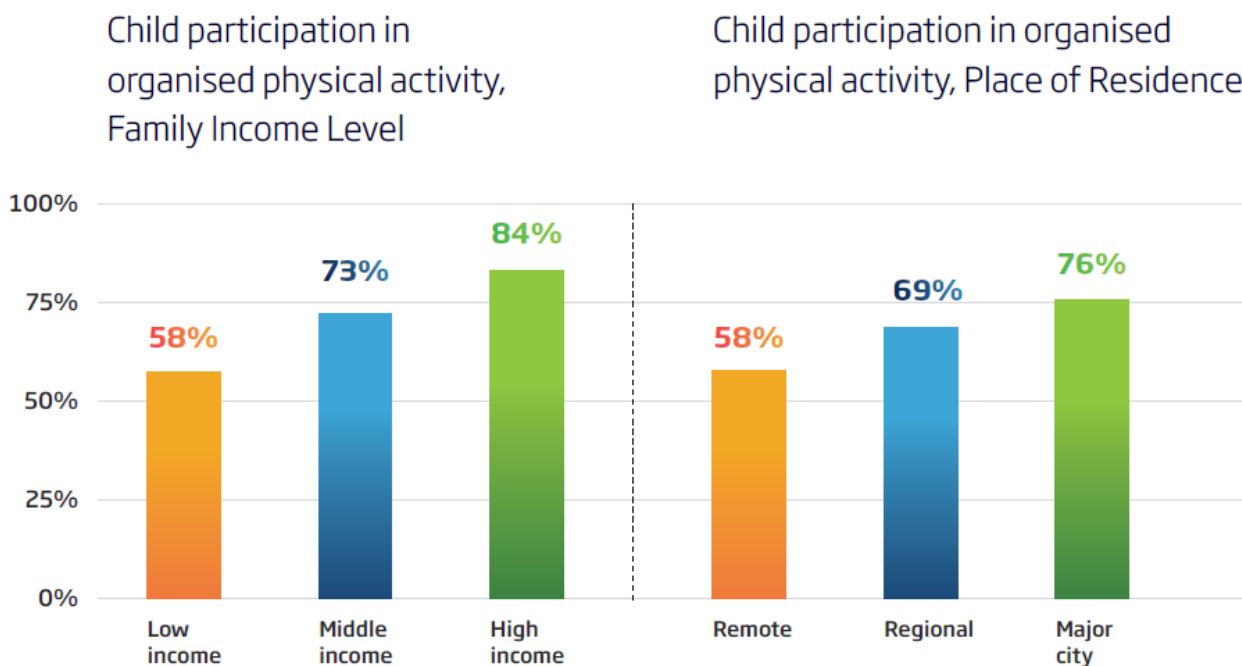


Figure 5 Child participation in organised PA by family income level and by place of residence.

Source: AusPlay Focus, 2018

Compared with children living in metropolitan areas, children in regional and remote areas of Australia typically have access to a more limited range of organised sports and physical activities. It can also be more difficult for parents to transport children to activities in regional and remote areas given the distances involved. 58% of children from remote areas participate in organised PA outside of school, compared to 69% of children in regional areas and 76% of children living in major cities of Australia.⁷⁷

AusPlay data⁷⁷ indicate (Figure 7) that children are more likely to **participate** in organised PA outside school hours if:

- a parent participates in sports or PA
- they come from a high-income family
- they have 1 or 2 siblings

They are less **likely to participate** if:

- they come from a low-income family
- they live in a remote area
- a parent speaks a Language Other Than English (LOTE) at home
- they have 3 or more siblings
- they live in a regional area



Figure 6 Poverty in Australia: 17.3% (1 in 6) children live in poverty

Parent participation enables child participation

The global evidence indicates that parent and family influences on participation are important; ⁴⁶Ausplay data are consistent with this finding (Figure 7) suggesting that parent participation *doubles* the likelihood of child participation in organised PA.

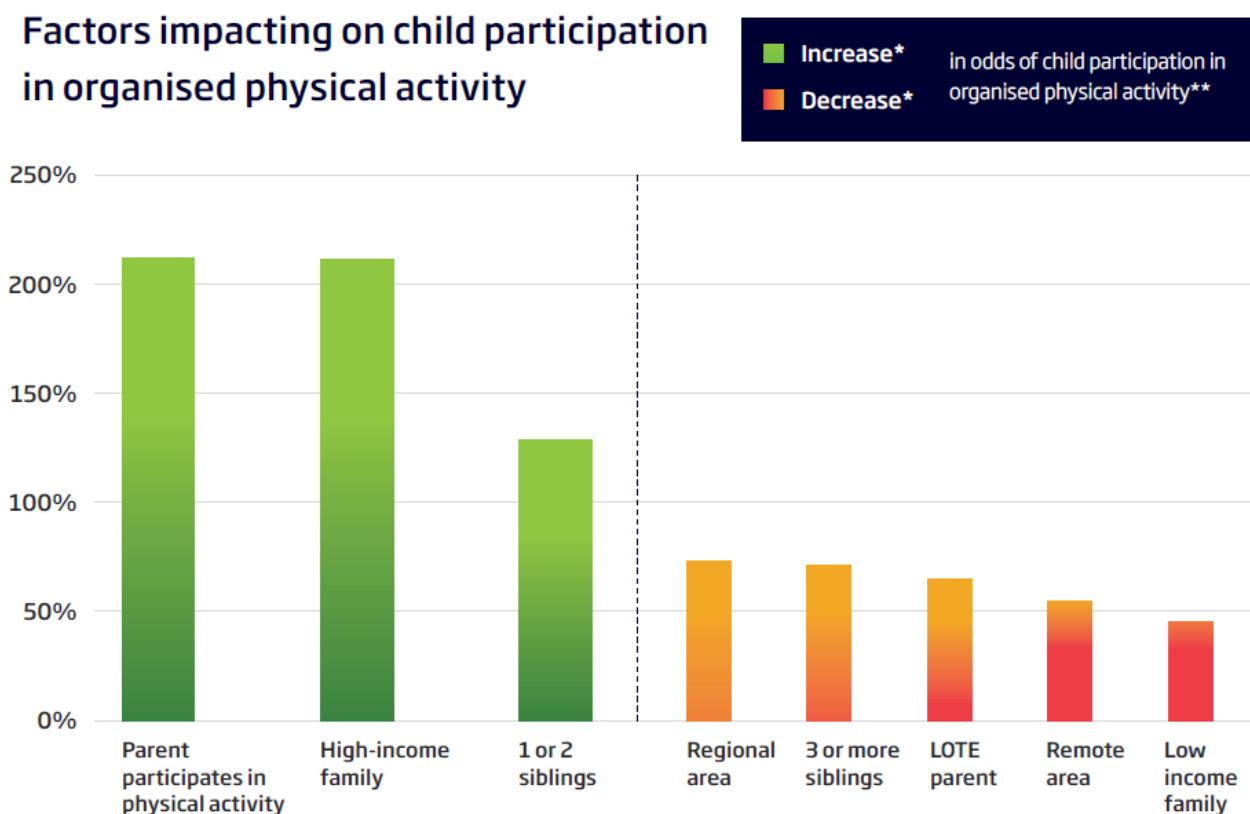


Figure 7 Factors impacting on child participation in organised PA

Source: AusPlay Focus, 2018

Rurality and Remoteness, Larger family size, CALD status – all affect participation

AusPlay also shows the impact of other variables as barriers to participation;⁷⁷

- **Rurality and remoteness:** Rurality and remoteness appear to act as barriers - 58% of children from remote areas participate in organised PA outside of school, compared to 69% of children in regional areas and 76% of children living in major cities of Australia.
- **Family size:** Larger family size may be a factor - 76% of children with 1 or 2 siblings (i.e. 2 – 3 child families) participate in organised PA outside of school, while 69% of children with 3 or more than siblings (i.e. 4+ children families) participate in organised PA outside of school.
- **Cultural and linguistic diversity (CALD):** this was operationalised in AusPlay as ‘language other than English spoken at home’ (LOTE). 68% of children with a parent who speaks a language other than English (LOTE) at home parents participate in organised PA outside school, compared to 75% of children with a non-LOTE parent.

Australian Case Study: Drivers of Participation Toolkit (Sport Australia)

https://www.sportaus.gov.au/participation_drivers



The framework and toolkit are a co-production of the Australian Government and the sport sector in Australia. Desk and qualitative research were undertaken, leading to an iterative process which resulted in the final framework of nine drivers which create the positive and negative outcomes occurring at an organisation- and consumer-level. The stated purpose of this initiative is to enhance sports' participation strategies and improve the coalescence of stakeholders (sporting organisations and governments) around participation plans.



Model: the 9 Drivers of Participation



Framework



Market Insights

Ensuring that all decisions are based on data and evidence about the market.



Product Design

Developing products with benefits and features to meet consumer needs and wants.



Workforce

How products are delivered to the market.



Marketing & Communications

Messaging and methods used to communicate internally and to consumers.



Infrastructure & Equipment

Providing appropriate, accessible and affordable infrastructure and equipment.



Commercial

Developing sustainable participation products and commercialising related assets.



Governance

A strong governance structure, committed to achieving participation outcomes.



Unified Behaviours

A whole-of-sport approach to participation.



Management

The experience, expertise and performance of the management team.







Australian Case Study: Doing Sport Differently (Victorian Health Promotion Foundation)

<https://www.vichealth.vic.gov.au/media-and-resources/doingsportdifferently>

The Victorian Health Promotion Foundation (VicHealth) and La Trobe University have developed resources built on six key principles to guide the design and delivery of sport-based programs that target less-active people. The web-based toolkit highlights these six principles and provides high-level guidance to build the capacity of the sports sector to create participation opportunities. The initiative is designed to support organisations through four phases of implementing a new 'social sport' participation opportunity or adapting an existing one. "Social sport is less structured than traditional sport. It has fewer rules and more flexibility but is more structured than active recreation activities. Social sport can be designed and delivered by an organisation (e.g. state sporting association), sport club, local council or other individuals and groups. Social sport places a greater emphasis on fun, social interaction and enjoyment than on performance, results and competition" (VicHealth).

Implementing a new social sport opportunity to:
engage participants | deliver quality programs | build a sustainable approach

BASED ON 6 PRINCIPLES

 1 Engage with the target market throughout the design process to reduce barriers and fulfil motivations	 2 Think about participants as customers and consider their total experience	 3 Participation should cater to different levels of skill, ability and fitness	 4 The deliverer is the most vital person to participants' experience and retention	 5 Participants need a clear pathway for retention or transition as their skill, fitness or interest changes	 6 Best-practice project management and delivery will enable scale and sustainability
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THROUGH 4 PHASES

1. Design the concept
2. Develop strategy and resources
3. Test, refine and roll out the program
4. Deliver at scale

Discussion

Evidence from global studies tells us convincingly that socioeconomic status is a powerful influence and that financial cost is a real barrier to participation in sport and PA, reinforced by complex social inequity. For Australia more specifically, AusPlay data clearly show that cost can present a barrier to participation for children from low income families. 58% of children from low income families participate in organised PA outside of school compared to 73% of children from middle income families and 84% of children from high income families. This is consistent with Reece and colleagues analysis of voucher incentives for Australian children show a continuous linear increase in participation both annually and weekly in areas of increased socio-economic advantaged. The difference nationally between the most and least disadvantaged areas in annual and weekly participation is 17% where those living in the most disadvantaged regions participated substantially less. The proportion of financial support benefit derived from sports vouchers (median value AU\$150) increased considerably with social disadvantage, rising to over 60% of total expenditure in the most disadvantaged populations.⁸⁴

Cultural and linguistic diversity is an important factor, with children from homes where a language other than English is primarily spoken having below average participation rates. The family is identified an important avenue for policy and program innovation. Rurality, remoteness, Indigenous status and gender all emerge clearly as factors which policymakers and planners must account for in aspiring to the type of goal and objectives set out for Australia in Sport 2030 (Figure 8).

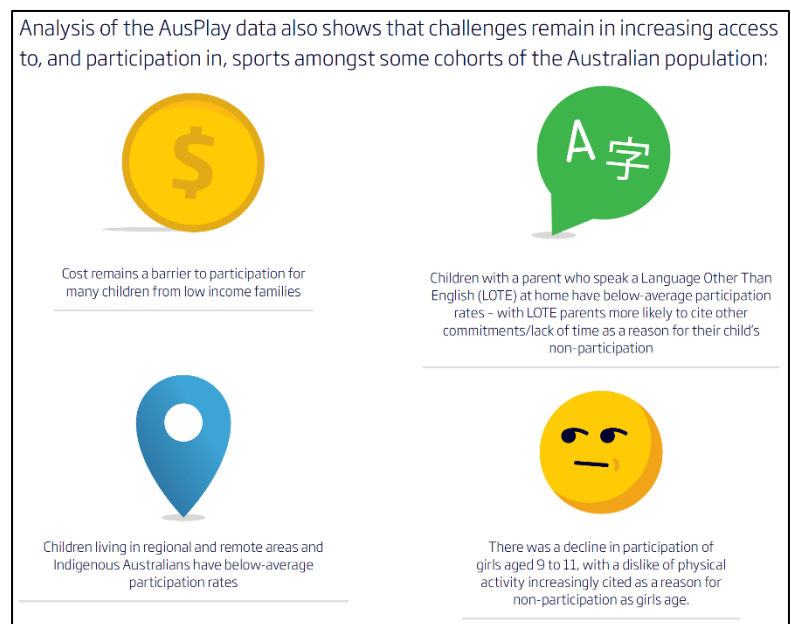


Figure 8 Cost, Language, Remoteness, Indigenous status and Gender Barriers to participation

Australia can point to some participation gains. According to Ausplay, In 2017, 3.5 million children (74%) participated at least once in some form of organised sport or PA outside of school hours over the past 12 months, compared with 3.2 million children (70%) in 2016.⁷⁷ However sport alone cannot deliver the level of PA participation required to meet at the whole population level, the age-specific national guidelines recommendations for PA as shown in recent research,^{130,131} so that a multi-strategic effort is needed.

Recent WHO-led research has reported that the problem of insufficient PA is global; the study recommends that urgent scaling up is needed of known effective policies and programs to increase PA in adolescents; multisectoral action is needed to offer opportunities for young people to be active, involving education, urban planning, road safety and other key actors.¹³²

Many studies discuss 'modifiable' and 'non-modifiable' barriers; for example, age and gender are 'non-modifiable' in this type of analysis which looks at the *individual level*. Self-determined motivation in children and adolescents does have an influence on participation in PA, but a systematic review conducted by Owen noted even the strongest effects of motivation were weak to moderate in size, suggesting that factors other than motivation are important correlates of PA behavior;⁶⁶ we have emphasised that the organisational,

policy and service responses **are** modifiable – these are the variables that need to change. This report has identified barriers and enablers at the individual level, but also at wider levels of influence, including policy, program, organisation and environment, as part of more comprehensive intersectoral and whole systems approach.

In the Australian research evidence into barriers to participation, a key finding is the apparent lack of age-appropriate or engaging service offerings in organised sport and PA outside of school hours for children under 8 years of age and for teenagers. The lack of age-appropriate offerings affects 85% of 0-4-year-olds and 22% of 5-8-year-olds, whilst 37% of 12-14-year-olds dislike the sport and PA options available.

Recent reports and frameworks produced by the Australian Government provide insights and a basis for action:

- Children’s Participation in Organised Physical Activity Outside of School Hours;
- The Drivers of Participation Framework and Toolkit;
- Findings from the Youth Participation Research Project: addressing the decline in sport participation in secondary schools;
- Summary of key initiatives that address the ‘Cost of Participation in Sport’;
- Market segmentation for sport participation: children; and
- The Australian Physical Literacy Framework.

Based on the reviewed evidence, five strategic principles and ten policy options are recommended for consideration by Australian State and Territory governments; these are set out in the conclusions and recommendations section.

Conclusions and recommendations

Key Strategic Principles

Five 'key principles' emerged from the evidence reviewed. These are presented to underpin the overall findings and recommendations presented in this report. They are intended to guide and assist the selection of strategic and operational responses by Australian governments. The principles relate to, and expand on the *principles for action* set out in *Sport 2030*.ⁱ The key strategic principles identified for *this* report *Active and Inactive Young Australians* are:

1. Human movement continuum;
2. Intersectoral approach;
3. Life course approach;
4. Whole-of-society benefit; and
5. Whole-of-system approach

Policy Options

Noting the proposed five 'Key Strategic Principles' underpinning them, ten policy options are offered for consideration by Australian governments:

- i. Develop standardised surveillance of PA and sedentary behaviour in all Australian States and Territories and at Commonwealth level; monitor population participation rates of all Australians in human movement, including (i) age-specific guideline recommended physical activity, (ii) sport and (iii) active recreation;
- ii. Develop a long-term investment strategy to implement the Australian government *Drivers of Participation and Physical Literacy Frameworks*;
- iii. Support early intervention pre-school programs for 3-5-year-olds to build Fundamental Movement Skills [FMS] and for primary school-aged children to consolidate and strengthen FMS acquisition;
- iv. Evaluate a pilot program of specialist primary school physical education teachers, in coordination with high schools as appropriate, across the three sectors (Government, Independent and Catholic);
- v. Provide incentives to boost the delivery standards of Physical Education in Australian schools; in particular, encourage more schools to achieve the recommended standard of adolescents being physically active for at least 50% of allocated PE time, as recommended by Australian experts, US Centers for Disease Control and Prevention and the UK Associations for Physical Education;
- vi. Provide targeted support to support the teaching of physical education for schools in disadvantaged areas;
- vii. Promote membership of sports clubs, social sport and enjoyable activities to older Australian adolescents as they transition to adulthood; ensure that the products and services meet the needs and interests of these young adults;
- viii. Develop family-based policies and interventions taking account of recent evidence on the effectiveness of these approaches;
- ix. Address inequity in participation, including initiatives to address the financial barriers to participation in sport such as voucher schemes; and
- x. Ensure program research and evaluation to support the goals of Sport 2030 (including, when developed, the national Physical Activity strategy); conduct specific evaluation studies to determine the effectiveness of newly introduced policies and programs.

ⁱ [Sport 2030](#) Especially - Principles #1: *Sport and physical activity for all, for life*; #4: *Collaboration and partnership*; #5: *Learn, adapt and evolve*

Appendices

Appendix 1 Terms of Reference for this Rapid Review

In September 2010 the Committee of Australian Sport and Recreation Officials (CASRO) generated a request, minuted as follows: “*Prepare a paper that collates what is known about the barriers to junior sport through the work done by KPMG, the Nielson Report and the University of Sydney.*” It was subsequently agreed that Dr Phil Hamdorf ask the SPRINTER Research Group to undertake a rapid review.

Scope of Work

- Rapid Review methodology
- Reporting Format to be ‘1-3-25’ (Canadian Institute Style): approximately
1 Page Exec Summary; 3-page Key Findings At-a-Glance; 25 pages
Intro/Methods/Results/Conclusions; additional pages as required for References and Appendices
- ‘Barriers to participation’ – definition for purposes of this study:
 - Participation in physical activity, including organised forms of sport and recreation
 - ‘junior’ to be defined as early years (3+), primary and secondary school-aged children AND children and young people aged 3-18 years
 - Examination of barriers to include specifically the barrier of cost (additional request)
 - Focus on Australian evidence, supplemented as appropriate with insights (major reports or reviews) from other comparable countries (UK, New Zealand, EU, Canada)
- Estimated work time required: 4 weeks (20 FTE days)

Appendix 2 Search strategy

Peer Review literature

We searched Medline, PsychInfo, Cochrane Database, SCOPUS, SPORTDiscus. The Australian Clearinghouse for Sport and Physical Activity was also examined.

Key words relating to behavior(s) (i.e., physical activity, exercise, play, physical fitness, physical inactivity, sedentary, sitting, sport, health behavior, motor movement) in conjunction with population (i.e., child, children, kindergarten, preschool, early years, infant, toddler) were used for the search.

OID [Medline, PsychInfo, Cochrane Database]

Population

Field A

“early years” OR “toddler” OR “toddlers” OR “child” OR “children” OR “early child” OR “early children” OR “young child” OR “young children” OR “preschool” OR “preschools” OR “preschooler” OR “preschoolers” OR “pre-school” OR “pre-schools” OR “pre-schooler” OR “pre-schoolers” OR “kindergarten” OR “kindergartens” OR “childcare” OR “childcares” OR “child-care” OR “child-cares” OR “child care” OR “child cares” OR “day care” OR “day cares” OR “head start” OR “head starts” OR “nursery” OR “nurseries” “adolescents” OR “youth” OR “young people” OR “teenage”

Result N= 903215

Outcome of interest

Field B

“physical activity” OR “exercise” OR “play” OR “physical fitness” OR “physical inactivity” OR “sedentary”, OR “sitting” OR “sport” OR “motor” OR “movement” OR “sedentary” OR “sedentary behaviour” OR “sedentary behavior” OR “sitting”

Result N= 655272

Field C

“correlates” OR “determinants” OR “mediators” OR “moderators” OR “facilitators” OR “barriers” OR “enablers” OR “motivation” OR “influence” OR “predictor” OR “associated” OR “association” OR “driver”

Result N=270,1760

Study type

Field D

“review” OR “systematic review” OR “meta-analysis” OR [OR “cohort” OR Longitudinal” OR Prospective]

Result N=284,401

A AND B Result N= 97,529 [= E]

C AND D Result N= 115,821 [= F]

E AND F Result N= 2650 Duplicates removed **2369**

2369



106 [Ovid]

Screening by title (basic relevance) N= 106 [Ovid]

SCOPUS

Physical Activity Sport Review Determinant Barrier Correlate

Supplementary search for “cost” “financial barriers” “financial incentives” “incentives”

N = 113 duplicates removed

113 [Scopus]

Grey literature

We searched Grey literature using selected key words within the advance search functions of Google / Google Scholar. These searches were limited to the first 200 results, in keeping with recognised guidance for grey literature searches.¹³³

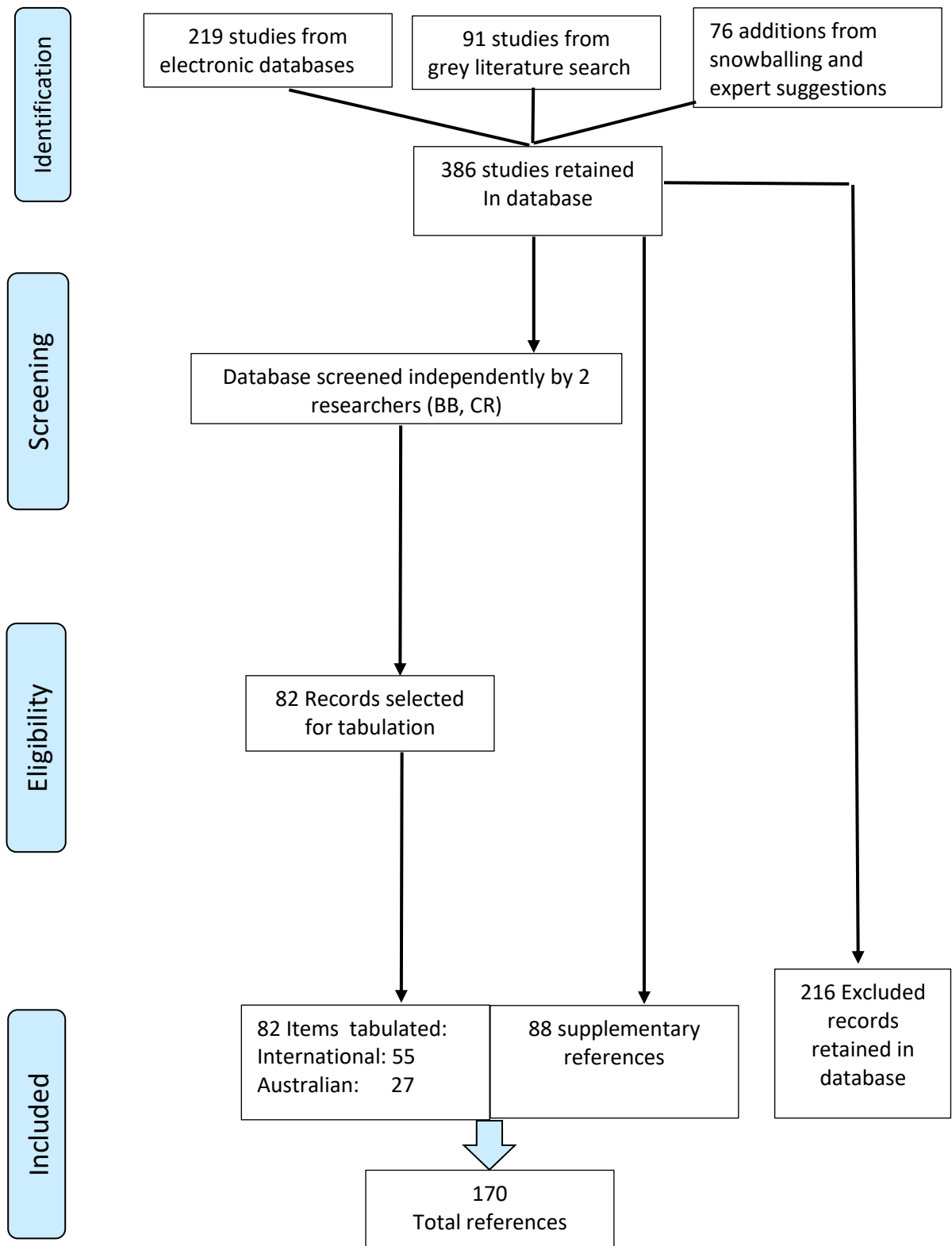
Physical Activity Sport Recreation Play Participation Sedentary Inactive Active	Barriers Enablers Engagement Correlate Determinant Predictor Associated Association	Infants Children Young people Adolescent Juniors Australia	Guidelines Sufficient Adequate	Systematic Review Meta-analysis Cohort Longitudinal Qualitative Focus group
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1. barrier enabler participation children young people sport physical activity Australia
2. correlate determinant association participation sport physical activity children young people Australia
3. review correlates children adolescent participation sport physical activity active inactive sedentary
4. predictor participation junior sport Australia barrier enabler physical activity

Google / Google Scholar N= 91

Snowballing, addition of records for context etc N= 76

106 (Ovid) + 113 (Scopus) + 91 (Google) + 76 (Snowballing, extras) = 386



Appendix 3 Human movement continuum – technical notes

Human movement continuum is identified as the first of five ‘key principles’ in the report. This appendix provides technical on the continuum, shown in Figure 1

This report addresses the enablers and barriers to Sport, Active Recreation and PA among Children and Young People in Australia – an important and formative stage of life. To show this life stage in context, a targeted literature search on physical literacy, fundamental movement skills and participation across the life stages was undertaken to develop a model which was inclusive of all forms of human movement, including Sport, Active Recreation and PA.^{47,54,131,134-157} The resulting whole of life course continuum of human movement is shown in Figure 1 (based in particular on the NSW FTEM Framework,¹⁵³ AIHW report on PA across the life stages¹³¹ as well as the Eime’s analysis of population levels of sport participation¹⁵⁸ and Koort’s analysis of the contribution of sport to overall physical activity.⁸⁶

The Human Movement Continuum includes the following characteristics:

- The continuum uses Physical Literacy as its overall framework, based on the [2019 Position Statement from Sport Australia](#)¹ and the Australian [Physical Literacy Framework](#)²
- The current reality of participation across the life course is captured: the proportion of the Australian population meeting the age-specific guideline recommendations for PA¹⁵⁹ is shown across the whole life course, using data from AIHW;¹³¹ the proportion of the population participating in organised sport and recreation across the life course is shown, using data from Eime and colleagues;¹⁵⁸
- The foundations and developmental stages of sport participation are shown using the NSW FTEM (Foundation, Talent, Elite, Mastery) Framework;¹⁵³

Fundamental Movement Skills (FMS) are included, based on their recognition in government frameworks^{2,153} as well as the evidence on the centrality of FMS to participation in all forms of movement, including sport and active recreation^{22,41,42,67,135,141,144-146,148-152,155,156,160-170}

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
Azevedo et al., 2019	Identify determinants of change in accelerometer-assessed sedentary behaviour in young children	Systematic review	0-6y	Sedentary behaviour	Benefits of early intervention to reduce SB may carry over into school age. "Behavioural contracts" (goals and planning), "graded tasks" (repetition and substitution), and "incentives" (reward and treat) were associated with decreases in sedentary behaviour. After school period has large impact on SB, as does transition from childcare to formal school.
Boxburger et al., 2019	Provide an overview of parental correlates of outdoor play.	Systematic review	0-12y	Outdoor play	Parents as role models & gatekeepers. Evidence found for mothers' ethnicity (ethnic=less play) & employment status (employed = less play), and parent's education level (high=less play; more likely to participate in structured sport). Out of psychological, cognitive & emotional factors, only parents' perception of importance of outdoor play was sig. Parent's perception of social safety of neighbourhood important, although only sig. factor is the availability of suitable play facilities. Parents more likely to restrict unsupervised outdoor play in girls than boys – intervention projects should work to encourage parents to support outdoor play in girls.
Buck et al., 2019	investigate and map the interdependencies between factors associated with SB through the life course from large scale empirical data.	Bayesian network analysis	Young (15-25y), adult (26-44y), and middle-aged (45-64y), older adult (65+) groups	Sedentary behaviour (SB)	In young (15-25y), adult (26-44y), and middle-aged (45-64y) groups, occupation level was directly associated with SB. Consistently, social class & education level were indirectly associated in male adult groups, while women in factors of the family context were indirectly associated with SB. Factors of the built environment were only relevant in SB of older adults. Strong association b/w SB & institution & home settings in 3 adult groups, while factors of home & institutional settings were less important compared to younger age groups.; environmental and municipal support seems to replace the social. Need objective measures of sedentary time. Psychological & behavioural factors that are most often targeted by interventions appeared not to be the factors most closely related to SB.

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Corder et al., 2019	To systematically review and meta-analyse how physical activity (PA) changes from adolescence to early adulthood (13–30 years).	Systematic review	Adolescence to early adulthood (13-30y). Inclusion criteria required mean age of adolescence to be b/w 13-19y and young adulthood 16-30y.	Physical activity	Overall PA declined over transition from adolescence to adulthood. Daily MVPA (measured by self-report) declined by a mean of 5.2min/day (13% mean baseline value) over a mean duration of 3.4y (± 2.9). Slightly greater decline observed in males (-6.5 vs -5.5min/day). w/ accelerometers, decline 7.4min/17% of daily MVPA over 4.3y ± 2.9 . Large heterogeneity (random effects analysis should mitigate some of this limitation). Lack of knowledge on PA requirements. PA declines through 1 st decades of life & preventing declines in this period could be valuable for behaviour change
Lounassalo et al., 2019	This study systematically reviewed the articles identifying longitudinal PA trajectory classes and the related factors (e.g., determinants, predictors, and outcomes) in the general population during different life phases.	Systematic review	Results organised into 3 age groups, young (4-14y at baseline, with oldest 22y at follow-up), middle (adults 9-90y), and oldest (35-60+ middle aged & older).	Physical activity, sport or exercise	PA trajectories describing change more frequent in young group than older groups which, for the most part, were more consistent. Inactive trajectories were more consistent in general. Numerous trajectories indicate PA behaviour doesn't develop uniformly between individuals (why finite mixture modelling is an appropriate measure). Young group: most (39-100%): ↓ from moderate/active OR low-active PA. More than ½ reported a decline in PA level. No clear trajectories of constantly increasing PA. PA of those in high/mod usually didn't fall to inactive level. Middle group: Largest proportion (43-86%) either persistent PA, inactivity, or low PA. In decreasing PA trajectories, only 1 fell to inactive levels. Oldest group largest proportion (14-51%), in inactive and low-active trajectory classes. PA of those following inactive trajectories fell to inactive level. Decline in PA with older age, although evidence for some increasing trajectories also. Factors affecting trajectory include education, income, SES, family/social support, sociodemographic characteristics, health behaviours, & and health-related variables. Active trajectories more positive in men than women.

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Michael et al., 2019	Identify facilitators and barriers to movement integration (MI) in elementary school classrooms.	Systematic review	5-11yrs, primary/elementary school	Physical activity	Institutional Factors: MI facilitators: administrative support & availability of resources. MI barriers: lack of time, resources, space & administrative support. Interpersonal Factors: MI facilitators: perception that PA is valuable, perceived ease of implementation, teacher confidence. MI barriers: implementation barriers, lack of teacher motivation, lack of training. Beyond increasing administrative support, suggest sharing resources within/between schools, MI activities that don't require equipment, and seek funding. Further, efforts to help teachers view MI as a noncompetitor to other school priorities, i.e. integrate into learning.
Narcisco et al., 2019	To identify and assess the peer-reviewed scientific literature on the behavioural, contextual and biological factors associated with obesity in adolescents.	Systematic review	10-18yrs	Physical activity	Genetic & social-environmental factors lead to the development of obesity. Positive consistent association b/w genetic factors & obesity during adolescence, SES & obesity. Remaining factors, evidence was conflicting/limited/non-existent. PA studies used self-reported measures & were inconsistent. 2 cohort studies found a weak protective association between BF% & PA. Mixed results may be due to inconsistent methods of measuring PA & overreliance on self-reporting & effect of different intensities of activity on adiposity
Umstattd Meyer, et al., 2019	Examine how Play Streets impact opportunities for children & adolescents engage in safe active play and PA	Systematic review	Children &/ adolescents	Active recreation, play	Around half of participants were boys, one third LSE, mean age 9yo. Play Streets increased MVPA by 9.1min/day & reduced sedentary behaviour by 8.6min/day compared to youth in control group. Knowledge Gap re effective implementation & impacts. Potential to increase active play & PA opportunities for children & possibly adolescents. Evidence suggests children & adolescents more likely to meet PA guidelines by participating in Play Street but requires evidence.
Zhou et al., 2019	To systematically summarise the existing literature, which investigated correlates of MVPA of	Systematic review	Secondary school students	P.E. activities, physical activity as measured by questionnaires,	Boys more active than girls, predominantly due to stereotyped masculine traits (e.g. activeness, bravery, aggressiveness, perseverance) more closely to participation in PA. Teenage years & increasing gender differences may make girls more uncomfortable to participate. Most MVPA time in team games.

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	secondary school students during their PE lessons.			observed, HR monitors, pedometers, accelerometers	
Craike et al., 2018	Aim to examine the effectiveness of interventions to improve participation in physical activity among socioeconomically disadvantaged groups, examine the characteristics of effective interventions, & provide recommendations for future research.	Umbrella review	All age groups (focus on low SES)	Physical activity	Children & Adolescents (<18y): Interventions targeting parents likely to be effective, particularly community-based setting. Some evidence for comprehensive school-based interventions, particularly embedded into curriculum. Few studies in adolescents retrieved, found that group-based interventions were ineffective. Adults (>18y): Behavioural interventions found small positive effect, however not found to last long term. For all obesity-related behaviours (incl PA), no clear patterns of policy that positively or negatively impacted inequities were found to be effective. Interventions solely targeting PA more effective than targeting multiple behaviours. Intensive & group-based interventions were more effective. Methodological problems highlighted as an issue. Older adults (>50y): More intensive interventions more effective. Effectiveness of interventions didn't differ according to level of education. All age groups: Found experiential activities (group exercise & interactive videos) successful in overcoming barriers, as well as use of incentives in influencing uptake & maintenance of PA. Evidence for community settings as effective for low SES.
Engel et al. 2018	To evaluate interventions for improving FMS and PA levels in children aged 3-5 years and 5-12 years; determine, if there is a similar relationship between change in FMS and	Systematic review 18 studies met inclusion criteria	children aged 3-5 years and 5-12 years;	Fundamental movement skills (FMS); PA	There are limited studies measuring both FMS and PA following an FMS intervention, especially in school-aged children. Results indicate that training pre-schoolers at least three times a week in FMS can improve proficiency, increase intensity of PA, and reduce SB, possibly helping to reduce the burden of childhood obesity and its associated health risks. Significant improvement in FMS with TL interventions of three or more sessions per week (standardised mean difference = 0.23 [0.11-0.36]; p = 0.0002). In TL interventions, there was a strong negative correlation between moderate-vigorous physical activity (MVPA) and sedentary behaviour (SB) (r = - 0.969; p = 0.031).

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	change in PA across both age groups.				
Kärmeniemi et al. 2018	to identify determinants of the built environment associated with physical activity and to evaluate how changes in the built environment are associated with changes in physical activity.	Systematic review of longitudinal studies and natural experiments,	Whole population The study population consisted of adults in 35 studies, children and adolescents in six studies and elderly people in two studies; eight studies did not use age restrictions. All the studies were conducted from 2003 to 2015. All were conducted in high-income economies (28 in North America, 11 in Europe, nine in Australia, two in Asia and one in New Zealand). The setting was urban in 38 studies, suburban or rural in	PA change in PA was the primary outcome, including self-reported or objectively measured (a) overall PA, (b) transportation-related PA, and (c) leisure time PA	High-quality evidence showed that changes in the built environment were associated with increased transportation-related and overall physical activity. A considerable number of studies indicated that creating new infrastructure for walking, cycling, and public transportation were related to increased physical activity. The findings were most consistent for transportation-related and overall physical activity, which were especially associated with the creation of new trails for walking and cycling. In addition to increased physical activity, new infrastructure for walking, cycling, and public transportation was associated with decreased use of private cars in four studies. Park and playground improvements seem to be a feasible strategy to enhance overall physical activity. However, these studies suffered from methodological weaknesses.

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			<p>six and not stated in seven.</p> <p>21 prospective cohort studies and 30 natural experiments were included in the review.</p>		
Kracht et al., 2018	To synthesise literature and describe the influence of siblings on objectively measured physical activity and sedentary behaviour of children (2–18y)	Meta-analysis and systematic review	Children (2-18y)	Physical activity (objectively measured with accelerometers etc)	Children with siblings had healthier PA patterns, as measured by accelerometer or pedometer, than did only children. May be a possible dose response, more siblings may result in more PA opportunities, and there were no differences by age or gender of the child. Siblings have a positive influence, with most signifying that sibling's existing sports participation positively influences the child's involvement in sports. In the longitudinal studies, there was no consistent direction on sibling's influence on change in PA. Qualitative synthesis reporting mixed results between the groups on LPA and sedentary behaviour. Children inferred siblings preference for SB, & incompatible skill levels, a deterrent to PA. Suggested mechanisms include peer modelling, encouraging active transport and sports participation, opportunity for playmate and serving as additional caregivers.
Marzi et al. 2018	To provide an overview of gender-specific socio-ecological correlates of children's independent mobility (CIM).	Systematic review	<p>3-12 year-olds</p> <p>More than 80% of the selected studies were cross-sectional, two were longitudinal and another two studies were longitudinal</p>	CIM defined as "the freedom of children to travel around their neighbourhood or city without adult supervision	<p>Associations of Children's Independent Mobility (CIM): Overall, the synthesis revealed that neighbourhood safety, fear of crime and strangers, parental support and perception of traffic are significant social correlates. Furthermore, car ownership, distance, and neighbourhood design belong to physical environmental attributes, which influence CIM.</p> <p>To possibly address factors, such as neighbourhood safety or fear of crime, which are limitedly modifiable and more determined by political decisions concerning the domestic security, intervention programs</p>

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			including cross-section analyses. Nearly half of the studies were conducted in Europe, with 10 from either Australia or New Zealand, five from North America or Canada and one from Asia.		<p>should focus on the interaction between social and physical environment. Promoting children to walk or cycle to school together with other children instead of walking alone and promoting their competence to travel safely could be one way to deter parent's concerns about safety in the neighbourhood and to expand mobility licenses.</p> <p>Strength of evidence, due to study design and methodological heterogeneity, was weak.</p>
McGarty et al., 2018	This study aimed to systematically review parental perceptions of facilitators and barriers to physical activity for children with ID.	Mixed methods systematic review	Children with intellectual disability	Physical activity	<p>Family: Parents have an important role in supporting activity in children with ID. 2/10 collected articles found activity levels & beliefs of family important in terms of being models for activity. Time demands required to enable activity highlighted as a barrier, as were cost & travel requirements, and parental over protection. Child Factors: related to cognitive abilities, psychological factors, behavioural problems and physical characteristics. Wider PA ability gap between children with ID and regularly developing children – parents perceive child lacks necessary skills to be active. Acknowledgement of basic physical and cognitive abilities of child required for inclusion in PA & positive encouragement from others should be facilitators. Child's experience of PA: Participation provides opportunities for success & development, positive experiences at an early age can foster longevity of involvement, whereas negative experiences can become a barrier. Social motivation: Social interaction & interactions with peers a key motivator. Without social ties, children with ID less likely to participate. Inclusive programmes and facilities: A lack of appropriate programs is a barrier (lack of staff time/understanding of integration & other's negative stereotyped opinions about children with ID.</p>

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					All these themes can be facilitators or barriers, depending on information and education of parents, educators, coaches etc.
Nathan et al., 2018	This review aimed to describe factors (barriers and facilitators) that may influence the implementation of school physical activity policies which specify the time or intensity that physical activity should be implemented and to map these factors to a theoretical framework	Systematic review	School aged children (5-18y)	Physical activity	Main factors identified as barriers in school include 'environmental context and resources' (lack of equipment, time, staff, facilities) and 'social influences' (perceptions that parents, students, school administrators, school-board members not supportive of policy). Others included 'goals' (e.g., the perceived priority of the policy in the school), and 'skills' (e.g., teachers' ability to implement the policy). Qualitative studies identified 'professional role and identity', as domains impeding implementation and 'professional role and identity', and 'emotions' as important domains enabling implementation
O'Donoghue et al., 2018	To provide an overview of research to assess the importance & strength of evidence related to socioeconomic correlates and determinants of PA behaviours across the life course	Umbrella literature review	All age groups	Physical activity	Children & adolescents (3-18y): Overall SES unrelated to PA & MVPA. Limited & inconclusive evidence shows an effect for school break time PA associated with SES, however SES not associated with school PA in girls. No association was found between parental education level or parental working hours and overall PA. Payment of fees or equipment required for PA showed divergent results with limited suggestive evidence. Adults (>18y): SES was sole correlate in majority of studies, especially in relation to leisure time (positive relationship) and occupational PA (negative relationship). Mixed results in relation to individual income & overall PA.

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Puggina et al., 2018	To provide an overview of the studies investigating policy determinants influencing PA across the life course by systematically reviewing and evaluating the available evidence from existing SLRs and meta-analyses (MAs) of primary observational studies.	Umbrella systematic review	All age groups	Physical activity	<p>Children (3-12y): Time spent outdoors positively related to overall PA and acute PA. Inconclusive results regarding PA-related home activity, parenting styles. PA-related school policies, & organised activities positively related to PA. Children & Adolescents (5-12y & 13-18y): PA school policy positive association with PA. Inconclusive findings concerning recess duration, however class time vs recess was negatively associated with PA, and fitness break vs recess was positively associated with PA. Adolescents: no evidence on association b/w parenting styles and PA. Probable evidence for school type and overall PA. Adults (>18y): long work hours negatively associated with PA. Negative association b/w inflexible work environment and PA, positive relationship with program availability at church/community (limited evidence from 2 studies in African American participants & rural women). Older adults (>50y), negative association with inflexible work environment, and positive association with program availability at church/community. Whole population: street scale urban design & land use policies & community-scale urban design and land use policies positively associated with PA. Limited & inconclusive evidence for transportation & travel policies, and for mass media campaigns.</p> <p>Very few SLRs and no MA have investigated solely the policy determinants of PA, most analysed policy determinants as a category of environmental determinants of PA.</p>
Somerset et al. 2018	To identify barriers to children's participation in sport	Systematic review Both qualitative and quantitative studies were included.	4 ≤ 18 years	Sport	<p>The major barriers identified in this review in both qualitative and quantitative studies were 'time' and 'cost'. barriers identified in addition to these in the qualitative studies were 'not being good at sport', 'fear of being judged/embarrassed' and 'conforming to a gender stereotype'. Children who were not good at sport (or who felt they were not good at sport) were less likely to participate. 'Fear of judgement' or 'gender stereotype' has also been identified in <i>other studies</i>. Evidence shows that girls are less physically active than boys regardless of age. The reasons for this discrepancy have been linked to gender stereotypes</p>

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					Studies specifically investigating barriers to participation in sport, as opposed to broader constructs such as physical activity, are few. The quantitative studies included took place in France (n =1), Australia (n =3), USA (n =4) and Spain (n =1). The qualitative studies included were conducted in Australia (n =3), Brazil (n =1), Canada (n =1), Ireland (n =1), UK (n =5) and USA (n =4). Across all studies participants ranged in age from 4 to 19 years.
Zhang et al., 2018	Summarize early childhood education and care (ECEC) environmental correlates of weight status in children under the age of 6 years.	Systematic review	0-6y	Active recreation, sedentary opportunities, active play	ECEC attendance has been associated with young children's weight status & weight-related behaviours such as dietary intake, PA & sleep. Physical environment: Higher quality active environment, consisting of "portable & fixed play equipment" & "suitability of indoor space for play" less likely to be associated with overweight in pre-schoolers. Political environment: "active playtime" negatively associated w/ overweight likelihoods but dependent on schedules of ECEC programmes, outdoor play inconsistent. Sociocultural environment: educators' weight status & PA status potential correlates w/ students overweight. Heterogeneity in studies, variations in term definitions, no studies on economic environmental characteristic.
An et al. 2017	To investigate the influence of neighbourhood safety on childhood physical activity and obesity	Systematic review and meta-analysis of longitudinal studies	22 studies included; Most (n = 15) studies recruited children aged 4–11 years at baseline. Three studies recruited adolescents aged 12–17 years. Mean follow-up period was 4.5 years		The meta-analysis found that living in unsafe neighbourhoods was associated with a reduction in children's physical activity by 0.13 hours/week. Living in unsafe neighbourhoods predicted a trivial (but statistically significant) gain in BMI but no change in childhood overweight/obesity risk. Current research indicates a limited influence of neighbourhood safety on childhood obesity; this finding could be partially due to measurement problems. Twenty-two prospective cohort studies conducted in seven countries were identified. The median sample size was 1,104, and the median follow-up was 3.5 years. Sixteen studies used parent- and/or child-reported neighbourhood safety measures, and six adopted some objective measures (e.g., county crime

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			Half of studies were conducted in the U.S. (n = 11), and the remaining studies were conducted in Australia (n = 4), Canada (n = 2), the U.K. (n = 2), Germany (n = 1), the Netherlands (n = 1), and Vietnam (n = 1).		rate, interviewers' block observations). Future longitudinal studies should adopt validated neighbourhood safety measures.
Carlin et al., 2017	To identify the physical environmental determinants that influence PA across the life course.	Systematic review	All age groups	Physical activity	Among preschool children, a positive association was reported between availability of backyard space and outdoor toys/equipment in the home and overall physical activity. The availability of physical activity programs and equipment within schools, and neighbourhood features such as pedestrian and cyclist safety structure were positively associated with physical activity in children and adolescents. Negative street characteristics, for example, lack of sidewalks and streetlights, were negatively associated with physical activity in adults. Inconsistent associations were reported for most reviewed determinants in adults.
Condello et al., 2017	The aim of this umbrella systematic literature review (SLR) was to summarize the evidence on the behavioural determinants of PA across the life course.	Systematic review	All age groups	Physical activity	High heterogeneity in studies. For youth, the most relevant evidence obtained by this umbrella SLR revealed the importance of being physically active in the early years, the necessity to increase active transportation to/from school, independent mobility, and the importance of being involved in 'free-range activities' that are away from adult supervision. Screen time is thought to negatively influence PA. For adult populations, PA behaviours are mostly influenced by the life events (transition to university, pregnancy, time limitation, language difficulties,

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					smoking etc), which represent constraints (often time constraints) for possible involvement in PA.
Figuroa et al., 2017	This study reviews scientific evidence on the relationship between motor skill competence and physical activity among pre-schoolers.	Systematic review	Children (3-5yrs)	Physical activity	An association has been consistently documented between motor skill competence and physical activity. The specific pattern and strength of the relationship may differ by gender, measurement of the variable, physical activity intensity, motor skill type, and day of the week. The relationship between motor skill competence and physical activity documented in the studies included in the review is largely cross-sectional and observational. Implications of the findings would include further exploration of whether preschool children as part of these types of studies are given opportunities to meet physical activity guideline recommendations and its effect in the relationship between motor skill competence and physical activity. It remains to demonstrate a causal link between these 2 outcomes of interest independent of potential confounders.
Hesketh et al., 2017	to synthesize qualitative literature exploring barriers and facilitators to activity behaviours (i.e. PA & SB) in young children (0–6 years)	Systematic review	Children (0-6yrs)	Physical activity, sedentary behaviour	Barriers and facilitators were classified into seven broad themes: the child (preferences, down-time, development & learning), the home (role of the parents (activity level & choices for children’s PA), siblings & peers, home environment), out-of-home childcare (resources, education & perspectives of carers on PA, space, safety), parent–childcare provider interactions, environment (resources within community), safety and weather. Parents, care providers and the children themselves most commonly cited influences at the interpersonal and organizational levels as barriers and facilitators. Changing societal norms towards risk-averse behaviours. may impact children’s physical literacy/activity, and their social & motor development through play.

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Hesketh et al., 2017	We aimed to synthesise the evidence around determinants ('preceding predictors') of change in physical activity (PA) in young children (0–6 years of age).	Systematic review	Children (0-6yrs)	Physical activity	Difficulty in implementation is multiple behaviours are often targeted simultaneously. Determinants at the interpersonal & organisational levels were those most commonly evaluated. Parental monitoring showed a consistently positive association with change in PA. Maternal role modelling was positively associated with PA in 3 studies. Environmental childcare determinants showed inconclusive results, yet 8 of 16 interventional studies incorporating provider training noted positive increases in children's activity, MVPA in particular. Interestingly, those interventions showing positive effects often incorporated few additional environmental elements, including providing additional curriculum materials; they did however tend to include motor skill training, or parental elements, and/or allocate additional time for physical activity. Association b/w gender & PA not consistent in this review. Despite identifying a range of determinants that have been assessed, there appears to be little evidence of what elements effect positive change in pre-schoolers' physical activity.
Hollis et al 2017	to determine the proportion of secondary (middle and high) school physical education (PE) lesson time that students spend in moderate to vigorous physical activity (MVPA), and to assess if MVPA was moderated by school level (middle and high school), type of physical activity	Systematic review and meta-analysis	Middle school and High school-aged students	PE MVPA	28 articles representing 25 studies (7 middle and 18 high school) from seven countries were included in the analysis. Meta-analysis of 15 studies found that overall, students spent a mean (95% CI) of 40.5% (34.8-46.2%) of PE in MVPA. Middle school students spent 48.6% (41.3-55.9%) of the lesson in MVPA (n = 5 studies) and high school students 35.9% (28.3-43.6%) (n = 10 studies). Studies measuring MVPA using accelerometers (n = 5) showed that students spent 34.7% (25.1-44.4%) of the lesson in MVPA. The proportion of PE spent in MVPA (40.5%) is below the US Centre for Disease Control and Prevention and the UK Associations for Physical Education recommendation of 50%.

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	measurement and type of PE activities.				
Kelly et al., 2017	To assess published findings regarding mediators of adolescent energy balance behaviours	Systematic review	Adolescents	Physical activity	Significant mediators for physical activity included goal intention and decreased perceived barriers with outcome expectations, self-efficacy, and autonomous motivation indirectly mediating (n = 1) and perceived environmental barrier (n = 1). Targeting individual levels of the ecological model was favourable and included cognitions, behavioural skills, and social support. The gaps in the literature from the systematic review demonstrated a need to target all levels of the ecological model and mental health/cognitive beliefs.
Langøien et al., 2017	The aim of this study was to systematically review the literature that has identified factors influencing PA and SB across the life course among ethnic minority groups living in Europe, uncover gaps in the literature and suggest priorities for future research.	Systematic mapping review	All age groups	Physical activity, sedentary behaviour	Multiple (183) factors identified as influencing PA & SB across some ethnic minority & religious (Muslim) groups living in Europe. Cultural & religious issues, particularly related to gender, were recurring factors across clusters. Most factors influencing PA & SB were within social & cultural environment cluster, followed by psychosocial (cultural ideas of the body, body image, relationship & knowledge b/w PA & health), physical environment & accessibility (culturally sensitive facilities), migration context (language barriers), institutional environment (priorities in school/work), social & material resources (practicalities & responsibilities within the family/community), health & health communication & political environment.
Mielke et al., 2017.	Assess whether (1) the associations between SES and sedentary behaviour are consistent in adolescents from low middle-income and from high-income countries, (2) the	Systematic review & meta-analysis	10-19y	Sedentary behaviour (SB)	Associations b/w SES & SB differ b/w high- and low-middle-income countries & vary by domain of SB. In high-income countries, strong & consistent inverse association b/w SES & total screen & TV time. In contrast, low-middle-income countries, low SES not associated with increased screen/TV time, but positive correlation with “other screen time”. Potentially due to differences in access to TVs and computers. May require different approaches for low-middle and high-income countries for reducing SB in adolescents. Challenge in study is high variation & determination of “high” vs “low” levels of in SB.

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	associations vary by domain of sedentary behaviour, and (3) the associations vary by SES measure				
Nicholson et al 2017 for Sport Australia (Australian Sports Commission)	to better understand: <ul style="list-style-type: none"> what the barriers to sport participation are for disengaged students, and what interventions would effectively address these barriers, and sustainably engage and motivate youth to continue to participate in sport and physical activity. 	Mixed methods research incl 32 case studies; 15 individual sport studies; 95 teacher interviews; 6,600 student surveys; 566 students in focus group research; 36 NSO interviews	Secondary school age children		The research identified: <ul style="list-style-type: none"> the groups of disengaged students, who they are, their barriers and motivations. the value of the sport-in-school relationship and how to build it. strategies to enhance engagement through program delivery, deliverer and design. And collated: <ul style="list-style-type: none"> 10 Recommended development areas for sporting organisations currently delivering in secondary schools 14 Program design and delivery principles for creating new secondary school sport programs
Van Capelle et al., 2017	to evaluate interventions for improving FMS as well as PA.	Systematic review & meta-analysis	3-5y	Fundamental movement skills, physical activity	For children aged 3–18 years, there is a positive correlation between competency in FMS and PA levels and an inverse correlation between FMS and weight status. Longitudinal study showed +ive correlation b/w motor skill proficiency at age 6, and PA levels at age 26. Structured interventions led by qualified teachers with parental involvement may be a more effective means of improving FMS in pre-school aged children, and more study in this area is warranted.

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Wick et al., 2017	To assess the effects of fundamental movement skills (FMS) interventions on actual FMS, targeting typically developing young children.	Systematic review & meta-analysis	2-6y	Fundamental movement skills, physical activity	FMS should be trained & enhanced at an early age, related to lifelong engagement in PA to maintain health & support cognitive & social development. Interventions improving FMS in children (2-6y) shows beneficial effects on overall FMS, locomotion & object control skills. However more high-quality research with reduced bias is needed. Shorter studies (loss of compliance/motivation suggested barrier) and the integration of external experts resulted in higher effect sizes.
Arundell et al, 2016	Review the correlates of children's and adolescents' after-school SB.	Systematic review	5-18 years	After-school Sed behaviour	Only two correlates have been investigated frequently enough to determine an overall association; neither correlate (age, gender) is modifiable. Due to the lack of consistent investigation of potential correlates, further evidence is required to accurately identify potential intervention targets.
Barnett et al 2016	To identify the potential correlates of gross motor competence in typically developing children and adolescents (aged 3–18 years) using an ecological approach.	Systematic Review and Meta-Analysis. 59 studies were identified from 22 different countries	3-18 years	Gross motor skill competence in developing children	Physical activity and sport participation constituted the majority of investigations in the behavioral attributes and skills category. Whilst we found physical activity to be a positive correlate of skill composite (i.e. composite score in skill tests) and motor coordination, we also found indeterminate evidence for physical activity being a correlate of object control or locomotor skill competence. Few studies investigated cognitive, emotional and psychological factors, cultural and social factors or physical environment factors as correlates of motor competence. Reportedly the first review to investigate correlates of gross motor competence in children and adolescents.
Bingham et al 2016	To review studies investigating potential	Systematic review	0-6 years	MVPA and light PA	Correlates of total PA were gender (male, ++); parental PA (+); parental support (+); and time outdoors (+). Determinants of total PA were

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	correlates and determinants of PA during the early years.	130 studies All from high-income countries; few (6%) of high quality			gender (+) and time spent playing with parents (+). The only correlate of moderate to vigorous PA was gender (male, ++). No determinants of moderate to vigorous or light PA were found. PA correlates/determinants were relatively consistent between objective and subjective PA measures. A small number of demographic/biological and social/cultural factors were associated with PA. There is a need for high-quality studies exploring correlates/determinants across all domains of the ecologic model.
Brown et. Al 2016	To review family-based interventions to increase physical activity in children	Systematic review and meta-analysis	Children aged 5-12 years and their families/carers	PA	<ul style="list-style-type: none"> • Family-based interventions should be tailored to the context within which they are delivered, most notably the ethnicity, motivation and time constraints of the family. • Combining goal setting and reinforcement techniques should be considered to improve physical activity through increased motivation. • Where a lack of resources and/or understanding for how to change behaviour exists, educational strategies should be employed to increase knowledge. However, these strategies should be combined with other intervention approaches to be successful in improving physical activity. • Targeting improvements to the family psychosocial environment should be considered when designing interventions to increase both child and family physical activity. These should also include a focus on the child as the agent of change. <p>-----</p> <p>47 studies were included, of which 3 received a 'strong' quality rating, 21 'moderate' and 23 'weak'. Meta-analysis (19 studies) showed a significant small effect in favour of the experimental group (standardized mean difference 0.29 (95%CI 0.14-0.45). Realist synthesis (28 studies)</p>

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
					provided insight into intervention context (particularly, family constraints, ethnicity and parental motivation), and strategies to change PA (notably, goal setting and reinforcement combined).
Buszard et al. 2016	To investigate the scaling of sports equipment and play area (e.g., field size) and children's motor skill acquisition.	Systematic review	4-18-year-olds	Sport PA Motor skills	<ul style="list-style-type: none"> • Scaling constraints in the environment (equipment and play area) allows children to play sport in a manner that more closely represents the adult game. • Evidence suggests that scaling is an effective strategy to enhance skill performance and this seems to aid learning. • Sports authorities should aim to create environments in junior sport that simplify skill performance whilst maintaining perception–action couplings akin to the adult game. <p>25 studies involving 989 children were reviewed. Most of the reviewed studies provided evidence in support of equipment and play area scaling. However, the conclusions are limited by the small number of studies that examined learning (n = 5), poor ecological validity and skills tests of few trials. Studies revealed that children preferred using scaled equipment over adult equipment (n = 3), were more engaged in the task (n = 1) and had greater self-efficacy to execute skills (n = 2). 18 studies demonstrated that children performed skills better when the equipment and play area were scaled. Children also acquired skills faster in such conditions (n = 2); albeit the practice interventions were relatively short. 5 studies showed that scaling led to children adopting more desirable movement patterns, and one study associated scaling with implicit motor learning.</p>
Cattuzzo et al 2016	to review the scientific evidence on associations between	Systematic review	5-16-year-olds	MC/FMS HRPF-fitness	Reports strong scientific evidence of an inverse association between MC and body weight status (27 out of 33 studies) and a positive association between MC and cardiorespiratory fitness (12 out of 12 studies) and

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
	motor competence (MC) and components of health-related physical fitness (HRPF), in children and adolescents.				musculoskeletal fitness (7 out of 11 studies). The relationship between MC and flexibility was uncertain. Concludes that the development of MC in childhood may both directly and indirectly augment HRPF and may serve to enhance the development of long-term health outcomes in children and adolescents.
Hynynen et al. 2016	To evaluate effectiveness of school-based interventions to increase PA and decrease SB in 15-19-year-old adolescents. Examined behaviour change techniques (BCT)	Systematic review	15-19-year-olds	PA SB	7 out of the 10 retained studies reported significant increases in PA. Effects were generally small and short-term. 2 out of 4 studies that measured SB reported significant reductions in SB. Interventions that increased PA included a higher number of BCTs, specific BCTs (e.g., goal setting, action planning and self-monitoring), and were delivered by research staff. Intervention length and mode of delivery were unrelated to effectiveness. More studies are needed that evaluate long-term intervention effectiveness and target SBs among older adolescents
Laird et al. 2016	To examine (i) the relationship between social support and PA in adolescent girls, (ii) how different types and providers of social support might influence the relationship	Systematic review and meta-analysis	girls between the ages of 10 to 19 year	PA	Small but significant associations between all available providers of total social support (except teachers) and PA ($r = .14-.24$). Small but significant associations for emotional, instrumental and modelling support for some providers of support ($r = .10-.21$). Longitudinal research supported the cross-sectional analyses. Meta-analysis results suggest (with caution, some risk of bias) that social support is not a strong predictor of physical activity in adolescent girls though parents and friends may have a role in enhancing PA.
Li et al., 2016	The purpose of this systematic review was to provide a comprehensive summary of the	Systematic review	Children and adolescents with physical disability (PD)	Physical activity	The most consistent correlates of PA were in the psychological and cognitive and behavioural category, followed by physical and biological factors, environmental and social factors, and parental factors. Preference for PA, mastery motivation, and self-perceived athletic competence showed strong evidence of being associated with PA and

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
	correlates of PA in children with PD				are similar across children with and without disabilities. Physical and biological factors such as physical functioning ability and gross motor function were found to be consistently associated with PA. Demographic variables (age, gender) not consistently correlated with PA.
Martin Ginis et al., 2016	To conduct a systematic review of factors related to leisure time PA among persons with physical disabilities. Objective was to organise information (McLeroy social ecological model) to (a) increase accessibility of info to people working in various sectors, and (b) identify factors that are relevant across sectors.	Systematic review	All age groups, physical disability	Physical activity	Key factors related to barriers/motivators of PA include intrapersonal level : psychological factors –affect & emotion, attitudes/beliefs/perceived benefits & self-perceptions, body functions & structures, employment status. Employment status both negatively and positively associated with PA. Interpersonal level : social support, attitudes of others, social processes e.g. role modelling as a positive association. Support facilitates participation, in contrast people’s negative attitudes a barrier. Institutional level : disability-specific knowledge of people within institutions/ organisations, rehabilitation processes (PA information, counselling and encouragement from professionals), building design & construction, and programme factors (availability & design). Community level : products and technology (products and technology for culture, recreation and sport (i.e. equipment), land development, education), climate, and relationships among groups and organisations. Policy level : health policies (funding of programmes), and transportation services, systems and policies. Also, financial costs to the individual and the need for training of staff/professionals within the organisations identified as barriers to participation
Tonge et al., 2016	To systematically review the correlates of physical activity and sedentary behaviour among children	Systematic review	Children (<5y)	Physical activity	Child variables : gender (boys more PA than girls), age & motor coordination (older & more coordinated = more active). Educator variables : None reported a strong association. Physical environmental variables : positive associations with outdoor environments & size of play space. Organisational variables : active opportunities showed positive associations with children’s PA.

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
	in Early Childhood Education and Care (ECEC) services.				Educators have a critical role in promoting physical activity and reducing sedentary time and have opportunities to support children's activity levels through the effective use of space, time and participating in professional development of teachers.
Brussoni et al. 2015	To examine the relationship between risky outdoor play and health in children	Systematic review Evidence was low-to-moderate quality; results to be interpreted with caution	3-13 years	Play (specified risky play behaviours)	Suggests overall that there may be positive effects of risky outdoor play on a variety of health indicators and behaviours in children aged 3-12 years. Specifically, play where children can disappear/get lost and risky play supportive environments were positively associated with physical activity and social health, and negatively associated with sedentary behaviour. Play at height was not related to fracture frequency and severity. Engaging in rough and tumble play did not increase aggression and was associated with increased social competence for boys and popular children, however results were mixed for other children. There was also an indication that risky play supportive environments promoted increased play time, social interactions, creativity and resilience. These positive results suggest the importance supporting children's risky outdoor play opportunities as a means of promoting children's health and active lifestyles.
Dudley et al. 2015	to develop recommendations on Physical Activity in Linguistically Diverse Communities	Systematic review and Cohort study	Secondary school-aged children and adolescents	PA, school physical education	<ul style="list-style-type: none"> (a) School PE should promote and encourage active play and engagement. School psychologists and leadership should encourage PE teachers to keep adolescents physically active for at least 50% of allocated PE time. (b) Physical Education is not the sole source of PA in the school day. Mapping of PA opportunities across the curriculum and securing wider faculty involvement in promoting student PA should be encouraged. (c) Student enjoyment of PE can be hindered by many existing school policies; this can impact relationships formed with peers and teachers. School policies (such as changing into PE uniforms) for PE should not restrict participation in these lessons. School psychologists could assist PE teachers to ensure that group

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
					allocations and the actions of teachers during PE are promoting strong and significant social relationships
Gray et al 2015	to examine the relationship between outdoor time and: (1) physical activity, (2) cardiorespiratory fitness, (3) musculoskeletal fitness, (4) sedentary behaviour; or (5) motor skill development in children	Systematic review	3-12 years.	PA, Sed, Fitness, Motor skills (Outdoor time)	The systematic review revealed overall positive effects of outdoor time on physical activity, sedentary behaviour, and cardiorespiratory fitness, although causality could not be assumed due to a lack of RCTs. Motor skill development was unrelated to outdoor time; however, this relationship was only examined in a single study of preschool children. No studies were found that examined associations between outdoor time and musculoskeletal fitness.
Juneau et al 2015	to review links between socioeconomic position early in life and physical activity during adulthood	Systematic review	< 18 years -> adulthood and Life course	PA	The bulk of the evidence in this systematic review supported the hypothesis that there is a long-lasting, life course association between socioeconomic position early in life and physical activity during adulthood. This hypothesis was supported more consistently for leisure-time physical activity and in studies using more rigorous methodology
Lee et al. 2015	to review qualitative research examining determinants of independent active free play in children	Systematic review of qualitative research	Populations studies were mostly 6-14-year-olds	Play (independent, active free play)	Identified determinants of independent active free play were: child characteristics (age, competence, and gender), parental restrictions (safety concerns and surveillance), neighbourhood and physical environment (fewer children to play with, differences in preferences for play spaces between parents and children, accessibility and proximity, and maintenance), societal changes (reduced sense of community, good parenting ideal, changing roles of parents, privatization of playtime and play spaces), and policy issues (need to give children voice). Implications:

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
					The research findings show that parents' perceived safety concerns are the primary barrier to children's independent active free play. These safety concerns are moderated by child-level factors (age, competence, gender) and broader societal level issues. Interventions should focus on community-level solutions that include children's perspectives.
Xu et al 2015	to identify current literature investigating associations of parental influences with both PA and screen time in young children	Systematic review	children aged ≤6 years of age	Play, PA Children's PA included parent-reported "outdoor play" or "active play" and objectively measured PA level (e.g., accelerometer)	Findings suggest that parents' encouragement and support can increase children's PA and reducing parents' own screen time can lead to decreased child screen time. Improving parenting practices, parental self-efficacy or changing parenting style may also be promising approaches to increasing PA time and decreasing screen time of young children
Committee of Australian Sport and Recreation Officials (CASRO). 2014	to investigate possible solutions to addressing the issue of cost as a barrier to participation in sport	Research collation; Working Paper of CASRO	5-18 years 18-21 years Families General population	Sport PA	Collation of Australian information in 4 main categories: (i) Initiatives addressing the direct costs to individuals and families of participating in sport and physical activity (ii) Organisational level support to assist with costs of providing a sport and recreation service. (iii) Infrastructure related opportunities to reduce costs in delivering sport. (iv) Initiatives addressing cost of insurance and cost of utilities
Iivonen et al 2014	To identify positive determinants of Fundamental movement skills	Systematic review	3-6-year-olds	FMS, including stability, locomotor, and	29 studies were retained in the analysis. Four categories of determinants were identified: (1) individual characteristics (gender, ethnicity, age, physical activity, physical fitness, and playfulness), (2) education-related (programmes promoting physical activity and motor skill, attendance of

First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
	(FMS) such as stability, locomotor, and manipulative movements in children between the ages of three and six.			manipulative movements	physical education lessons, practice schedules), (3) social environments (parent- and family-related variables, older siblings, and sport club participation), and (4) physical environment (population density, size of preschool area, clothing). Age, gender, physical activity, and preschool-based programmes were positive determinants of FMS in preschool-aged children
O'Driscoll et al., 2014	The aim of this literature review is to present a summary of recent research relating to sport and physical activity participation in CALD migrant populations.	Systematic review	All age groups, CALD migrant populations	Physical activity	<p>The results indicate that some positive correlates of sport and physical activity for CALD migrants are generic, such as self-efficacy, social support, education and motivation. Other correlates are unique to CALD migrant groups and include acculturation, citizenship and command of the English language. Acculturation: Measures varied but greater acculturation results in increased participation in sport & PA incl. longer time spent in country, later generations (not first-generation migrant e.g.), and citizenship. However, PTSD from experiences in home country, lack of access to type of PA performed in home country, more use of cars and less walking in new country result in less PA in new country.</p> <p>Demographic: males more active than females, being unmarried/living alone increased PA rates in females, rural women less active than urban women. Greater education, higher income, and younger age were associated with higher levels of PA & sport participation, as was the type of occupation (blue collar = higher PA than white). Language highlighted as a barrier, as do cultural specifications (i.e. privacy of women).</p> <p>Psychosocial: self-efficacy, social support and attitudes consistent throughout the literature. Higher ability to partake in activity, higher self-esteem, and lower self-consciousness strongly associated with increased participation. Supportive family, friends & peers in community increased PA. Greater number of motives (health, manage chronic disease, socialising etc) to participate, greater participation in PA. Cultural & religious appropriateness of sports (i.e. female participation in sports perceived as non-feminine). Enjoyment, attitudes and knowledge of sport and physical activity were also important predictors, as was</p>

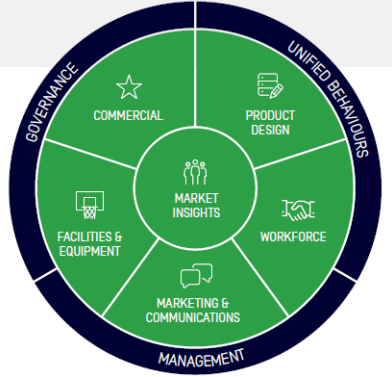
First Author, Year	Aim/Description	Research Category	Population/Age group	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
					previous PA experience. Environmental/organisational: Access to information, lack of time, safety, geographic isolation, walkability (neighbourhood sidewalks, facilities, aesthetics etc.), facilities, weather, type of activity, transport, behaviour of others, and cost. Unfamiliarity with local environment negatively related to PA participation.
Sterdt et al 2014	to identify promoting and inhibiting correlates associated with the physical activity (PA) of children and adolescents	Systematic review	3–18 years	PA	This review found very heterogeneous and inconsistent results regarding correlates of PA of children and adolescents. 16 correlates were identified that were consistently in at least two reviews associated with PA of children and/or adolescents (Table 9 of the paper). Consistent correlates which either promote or inhibit PA can be identified in each of the five correlate categories. The two reviews with a good study quality find consistent positive associations with PA for three variables: socioeconomic status, self-efficacy and attitudes/outcome expectations. The authors infer from the results that PA is determined by numerous complex and multi-dimensional. biological, psychological, sociocultural and environmental correlates. The findings support the increasing interest among public health professionals in socioecological models to promote PA.
Bauman et al 2012	To review and update research into physical activity correlates and determinants, especially in countries of low and middle income.				Research into correlates (factors associated with activity) or determinants (those with a causal relationship) has burgeoned in the past two decades but has mostly focused on individual-level factors in high-income countries. It has shown that age, gender, health status, self-efficacy, and motivation are associated with physical activity. Ecological models take a broad view of health behaviour causation, with the social and physical environment included as contributors to physical inactivity, particularly those outside the health sector, such as urban planning, transportation systems, and parks and trails.

Appendix 5 Tabulation of Australian research studies and reports

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
Reece LJ, McInerney, C., Blazek, K., Foley, B. C., Schmutz, L., Bellew, B., Bauman, A. E. Reducing financial barriers through the implementation of voucher incentives to promote children's participation in community sport in Australia. BMC Public Health. 2020;20(1):19. https://www.ncbi.nlm.nih.gov/pubmed/31910846	To calculate the proportion of total annual expenditure on children's participation in sport supported by sports vouchers. Participation rates using AusPlay data were also estimated by age, sex and socio-economic index (SEIFA) at state and national level for children aged 0-14 years.	Cross-sectional analytic	Australian children up to 14 years of age.	Sport Participation in organised sport at least once per week (AusPlay)	Five States and Territories implemented sports vouchers from 2011 to 2018, with a median value of AU\$150. Nationally, median annual expenditure for children's sport participation was AU\$447 (IQR \$194.2-936), with 27% reported expenditure supported by a sports voucher. The proportion of financial support from sports vouchers increased considerably with social disadvantage, rising to over 60% of total expenditure in the most disadvantaged populations. Socio-economic status was associated with sports-related expenditure and sports participation amongst children. Sport vouchers should target children in the most disadvantaged areas to promote participation in organised sport and physical activity.
Westerbeek H, Eime, R., Biddle, S., Bradley, R., Garnham, A., Olds, T., O'Donnell, B., Schranz, N., Telford, D., Vella, S., Fetherston, H., Calder, R. . Sport participation and play: how to get more Australians moving. Mitchell Institute, Victoria University. Melbourne, Victoria. 2019. https://tinyurl.com/wag8z15	Policy paper designed to contribute to the development of policy support for participation in sport at all ages and in all communities in Australia	Evidence scan and expert consensus.	Australian population.	PA Sport Active recreation	Identifies 5 Policy Objectives : 1. Connected policies to support participation for all 2. Maximise purpose and use of existing and new sport infrastructure and facilities 3. Establish targeted sporting programs for those most at-risk 4. Focus on the early years 5. Build the capacity of sporting organisations and clubs
Peralta LR, Mhrshahi S, Bellew B, Reece LJ, Hardy LL. Influence of School-Level Socioeconomic Status on Children's Physical Activity, Fitness, and Fundamental Movement Skill Levels. Journal of School Health. 2019;89(6):460-467. https://onlinelibrary.wiley.com/doi/abs/10.1111/josh.12761 .	To examine the influence of school-level socioeconomic status (SES) on children's PA, fitness and fundamental movement skill (FMS) levels, and barriers and enablers of child PA.	Cross-sectional analytic study with multiple logistic regression modelling.	Sample was from 86 Australian schools (41 primary, 45 secondary	FMS PA	Children from high SES schools were more likely to achieve the healthy fitness zone for cardiorespiratory fitness; those from low SES schools consistently reported more barriers and fewer enablers than their high SES counterparts. Extra efforts may be required to address school-level barriers and enablers to enhance PA, fitness, and FMS levels for schools in disadvantaged areas.
Koorts H, Timperio, A., Arundell, L., Parker, K., Abbott, G., Salmon, J. Is sport enough? Contribution of sport to overall moderate- to vigorous-intensity physical activity among adolescents. J Sci Med Sport. 2019;22(10):1119-1124. https://www.ncbi.nlm.nih.gov/pubmed/31277920	To examine the contribution of sports participation to overall moderate-to-vigorous physical activity (MVPA) among adolescents and explore potential moderators.	Cross-sectional analytic study using survey and accelerometry data drawn from the NEighbourhood Activity in Youth (NEArby) study.	Adolescents (n=358) were recruited from secondary schools in Melbourne, Australia	PA Sport	Participants (mean 15.3 years, 59% female) spent a mean (SD) of 68.6 (27.4) min/day in MVPA and 50% reported participating in any sport. Those who participated in sport did so 3.4 times/week on average and accumulated 7min/day of MVPA more than those who did no sport. For each additional sport participated in, on average, there were approximately 5 additional min/day of MVPA. The number and frequency of sports participation explained 3.2% and 3.8% of the variance in MVPA respectively. Researchers conclude that sport (alone) appears to make a very small contribution to adolescents' average daily physical activity.

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings																						
Jones J, Wolfenden L, Grady A, et al. Implementation of continuous free play schedules in Australian childcare services: A cross-sectional study. Health Promotion Journal of Australia. 2019. Link click here	To (i) describe the implementation of continuous free play schedules to allow children to access outdoor play areas, consistent with sector guidelines in a national sample of Australian childcare services; (ii) to assess the perceived barriers and enablers to implementation	Cross-sectional	Random sample of 326 centre-based childcare services located across Australia	Continuous free play	<p>62% of service managers reported implementing a continuous free play schedule, for three periods of 126 minutes per period, each day on average. Service type (long day care services), size (services with higher numbers of child enrolments [≥ 80 children]) and socio-economic area (services located in lower socio-economic areas) were associated with implementation.</p> <table border="1"> <thead> <tr> <th></th> <th>Variable</th> <th></th> <th>Odds ratio (95% CI)</th> <th>P-value</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Implementation of a continuous play schedule</td> <td>Type of service</td> <td>Long day care service vs preschool</td> <td>1.68 (1.03-2.74)</td> <td>.04</td> </tr> <tr> <td>Service size (number of child enrolments)</td> <td>Large (≥ 80) vs small (< 80)</td> <td>1.77 (1.08-2.89)</td> <td>.02</td> </tr> <tr> <td>Service socio-economic area</td> <td>Lower vs higher</td> <td>1.87 (1.07-3.26)</td> <td>.03</td> </tr> <tr> <td>Service geographical location</td> <td>Urban vs rural</td> <td>1.69 (0.96-2.98)</td> <td>.07</td> </tr> </tbody> </table> <p>The most prevalent barriers to implementation included insufficient staff to ensure adequate supervision of children (69%) and service layout being unsuitable (65%), while the most prevalent enablers included advice on how to overcome staffing or supervision issues (89%) and to re-orientate the service layout (54%). There is scope to support the implementation of continuous free play schedules consistent with childcare sector guidelines.</p>		Variable		Odds ratio (95% CI)	P-value	Implementation of a continuous play schedule	Type of service	Long day care service vs preschool	1.68 (1.03-2.74)	.04	Service size (number of child enrolments)	Large (≥ 80) vs small (< 80)	1.77 (1.08-2.89)	.02	Service socio-economic area	Lower vs higher	1.87 (1.07-3.26)	.03	Service geographical location	Urban vs rural	1.69 (0.96-2.98)	.07
	Variable		Odds ratio (95% CI)	P-value																							
Implementation of a continuous play schedule	Type of service	Long day care service vs preschool	1.68 (1.03-2.74)	.04																							
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	Service geographical location	Urban vs rural	1.69 (0.96-2.98)	.07																							
Hnatiuk JA, Brown HE, Downing KL, Hinkley T, Salmon J, Hesketh KD. Interventions to increase physical activity in children 0-5 years old: a systematic review, meta-analysis and realist synthesis. Obes Rev. 2019;20(1):75-87.	to evaluate the effectiveness of interventions to increase PA in 0-5-year olds and to determine what works, for whom, in what circumstances.	Systematic review (with Australian authors)	34 studies mostly in preschool/childcare setting. USA (n = 17), with studies from Australia (4), the UK (3), Belgium (2), Canada (2), Germany (2), Netherlands (1), New Zealand (1), Switzerland (1) and Chile (1) also included	PA	<p>Overall, a small, positive intervention effect was observed for children's MVPA. Recommendations for practitioners and policymakers:</p> <ol style="list-style-type: none"> Interventions should be tailored to the target group of parents or care providers, in particular in the form of cultural considerations, community needs and the provision of ongoing support. In the context of the childcare setting, the delivery of structured physical activity sessions that can be easily incorporated into the daily 'routine' and are delivered through a hands-on approach may be most effective at increasing children's MVPA. Programs should focus on changing parent or provider practices to affect change in children's physical activity levels, and also on measuring changes in parent or provider behaviour, to help elucidate the impact of those behaviours on children's PA. 																						
Cairney J, Dudley D, Kwan M, Bulten R, Kriellaars D. Physical Literacy, Physical Activity and Health: Toward an Evidence-Informed Conceptual Model. Sports Medicine. 2019;49(3):371-383.	To present a conceptual model positioning Physical Literacy (PL) as a health determinant, and (2) present evidence in support of PL as a health determinant, drawing on research largely from outside physical education.	Conceptual development - PL	Global research – includes Australian authors	Physical Literacy (PL), PA	<p>Explicit links between PL, PA and health and disease have not previously been comprehensively theorised or tested. Study found that motor competence, motivation and positive affect work in an integrative manner to produce differences in PA and subsequent health outcomes in children. Presents a new model that explicitly links PL to health can lead to the generation of new research questions and the possibility of broadening impact beyond the context of physical education alone</p>																						

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
Barnett LM, Dudley DA, Telford RD, et al. Guidelines for the selection of physical literacy measures in physical education in Australia. <i>Journal of Teaching in Physical Education</i> 38(2), https://journals.humankinetics.com/view/journals/jtpe/38/2/article-p119.xml (2019).	To provide a user's guide for selecting physical literacy assessment instruments appropriate for use in school physical education and sport setting	Guideline	Desk research with scenarios	Physical Literacy (PL)	A decision flow chart has been developed to assist teachers and affiliated school practitioners to select appropriate methods of assessing physical literacy. School physical education and sport scenarios are presented to illustrate this process. It is important that practitioners are empowered to select the most appropriate instrument/s to suit their needs.
Veldman SLC, Jones RA, Santos R, et al. Associations between gross motor skills and physical activity in Australian toddlers. <i>Journal of Science & Medicine in Sport</i> . 2018;21(8):817-821.	The aim of this study was to examine the association between gross motor skills and physical activity in children aged 11-29 months	Cross-sectional	284 children from 30 childcare services in NSW, Australia	PA Gross motor skills	Children spent 53% of their time in PA and 10% in moderate to vigorous physical activity (MVPA). Boys had higher total PA ($p<0.01$) and MVPA ($p<0.01$). The average gross motor skills score was 96.16. Boys scored higher than girls in object manipulation ($p<0.001$). There was no association between gross motor skills and total physical activity or MVPA; stronger associations are apparent in older children so that this single study should not be seen as confirmatory.
Van Hecke L, Ghekiere A, Veitch J, et al. Public open space characteristics influencing adolescents' use and physical activity: A systematic literature review of qualitative and quantitative studies. <i>Health & Place</i> . 2018;51:158-173.	To provide insight into the specific characteristics of public open spaces (POS) associated with adolescents' POS visitation and physical activity (PA).	Systematic review of quantitative <i>and</i> qualitative studies. Team included Australian researcher	Adolescents aged 12- to 16-year (grades 1–4 of secondary school). Studies conducted: USA:12, Canada: 3, Brazil: 1), eight from Europe (Belgium: 2, Scotland: 2, England: 2, Norway: 1, Spain: 1) and six from Oceania (Australia: 5, New Zealand: 1).	Adolescent PA in public open spaces (POS)	This is the first review to provide an overview of qualitative and quantitative studies exploring the association between POS characteristics and POS visitation and PA among adolescents. The presence of trails and walking paths , adventurous playgrounds and specific types of sport fields could drive both POS visitation and PA among adolescents. Aesthetics and safety-related characteristics appear to be less important for adolescent POS visitation and PA. Sport activity zones and recreational facilities (i.e. walking paths, sport courts, BMX trails) were positively associated with green space visitation. The presence of basketball courts was positively associated with objectively measured and preference for park visitation. Presence of volleyball, baseball and handball fields were also positively associated with observed number of park users.

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
<p>Australian Government: Sport Australia. Drivers of Participation Framework. 2018. https://www.sportaus.gov.au/data/assets/pdf_file/0/008/685214/35390_Drivers-of-participation-report_August_access.pdf.</p> <p>The desired outcome: to enhance sports' participation strategies and improve the coalescence of stakeholders (sporting organisations and governments) around participation plans.</p> <p>Australian Government: Sport Australia. Drivers of Participation - Toolkit (web portal). 2018. https://www.sportaus.gov.au/participation_drivers.</p>	<p>To identify, and achieve consensus around, the drivers and barriers for sport participation.</p>	<p>Co-production with the sport sector in Australia, using desk and qualitative research. Iterative process resulted in the final framework of nine drivers which create the positive and negative outcomes occurring at an organisation- and consumer-level.</p>	<p>Sports sector stakeholders The drivers were then tested and further refined with stakeholders from all levels of the sports sector, including the Sport Australia, National Sporting Organisations, State Sporting Organisations, and representatives from community sport.</p>	<p>Framework for drivers of Participation in Sport and PA:</p> <ul style="list-style-type: none"> ▪ Market insights; ▪ Product design; ▪ Workforce; ▪ Marketing/communications ▪ Infrastructure & equipment; ▪ Commercial; ▪ Governance; ▪ Unified behaviours; ▪ Management 	<p style="text-align: right;"><i>Drivers of Participation Framework</i></p> 
<p>Australian Government: Sport Australia. Addressing the decline in sport participation in secondary schools. Findings from the Youth Participation Research Project. 2017. https://www.sportaus.gov.au/data/assets/pdf_file/0/006/678687/34896_Youth_participation_project_full_report_acc2.pdf.</p>	<p>to better understand: (i) what the barriers to sport participation are for disengaged students, and (ii) what interventions would effectively address these barriers, and sustainably engage and motivate youth to continue to participate in sport and physical activity.</p>	<p>ASC engaged La Trobe who conducted a pilot program involving secondary schools (across all Australian states and territories, and with government, independent and catholic education sectors) and sport sector partners, to evaluate, measure and report on the impact of interventions</p>	<p>Secondary age schoolchildren</p> <p>Multi-level, multi-stakeholder, mixed methods research project.</p>	<p>Sport, PA</p>	<p>The research identified:</p> <ul style="list-style-type: none"> ▪ the groups of disengaged students, who they are, their barriers and motivations. ▪ the value of the sport-in-school relationship and how to build it. ▪ strategies to enhance engagement through program delivery, deliverer and design. <p>The research collated:</p> <ul style="list-style-type: none"> ▪ 10 Recommended development areas for sporting organisations currently delivering in secondary schools ▪ 14 Program design and delivery principles for creating new secondary school sport programs

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings																																	
Australian Government, Sports Commission. AusPlay Focus. Children's Participation in Organised Physical Activity Outside of School Hours. 2018. https://www.clearinghouseforsport.gov.au/_data/assets/pdf_file/0006/808683/AusPlay_focus_Children_Participation.pdf .	In 2016, 3,824 parents/guardians who participated in AusPlay provided information about their child's participation in organised physical activities outside school hours over the preceding 12 months. In 2017, 3,209 parents/guardians did so	AusPlay is a national telephone survey funded and led by the Australian Sports Commission.	Each year, 20,000 people aged 15 or over complete this survey. Apart from providing information about their own participation, parents/guardians of children under the age of 15 are asked about the physical activities undertaken by one of their children		<p>Organised PA outside of school hours In 2017, 3.5 million children (74%) participated at least once in some form of organised sport or physical activity outside of school hours over the past 12 months, compared with 3.2 million children (70%) in 2016.</p> <p>Frequency of participation in organised sport or PA (OOS):</p> <table border="1"> <thead> <tr> <th>Frequency Category</th> <th>2017 (%)</th> <th>2016 (%)</th> </tr> </thead> <tbody> <tr> <td>1+ per year</td> <td>74%</td> <td>70%</td> </tr> <tr> <td>1+ per month</td> <td>71%</td> <td>66%</td> </tr> <tr> <td>1+ per fortnight</td> <td>68%</td> <td>63%</td> </tr> <tr> <td>1+ per week</td> <td>63%</td> <td>56%</td> </tr> <tr> <td>2+ per week</td> <td>40%</td> <td>34%</td> </tr> <tr> <td>3+ per week</td> <td>25%</td> <td>20%</td> </tr> <tr> <td>4+ per week</td> <td>14%</td> <td>11%</td> </tr> <tr> <td>5+ per week</td> <td>9%</td> <td>7%</td> </tr> <tr> <td>6+ per week</td> <td>5%</td> <td>4%</td> </tr> <tr> <td>7+ per week</td> <td>3%</td> <td>2%</td> </tr> </tbody> </table>	Frequency Category	2017 (%)	2016 (%)	1+ per year	74%	70%	1+ per month	71%	66%	1+ per fortnight	68%	63%	1+ per week	63%	56%	2+ per week	40%	34%	3+ per week	25%	20%	4+ per week	14%	11%	5+ per week	9%	7%	6+ per week	5%	4%	7+ per week	3%	2%
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Evans JR, Wilson R, Coleman C, Man WYN, Olds T. Physical activity among indigenous Australian children and youth in remote and non-remote areas. Social Science and Medicine. 2018;206:93-99.	To use national survey data from the ABS and examine levels of PA in Indigenous Australians, aged 5–17 years	Cross sectional data Australian Aboriginal and Torres Strait Islander Health Survey 2012-13	These data describe PA levels among Indigenous Australians, aged 5–17 years, in remote and non-remote communities. the relationship between PA and participation in education and self-reported health among 15–17-year olds.	PA	Overall, participation rates appear to be high, with 64–84% of youth reporting at least 60 min of PA on the previous day. A gender gap was also evident, with lower levels of activity among girls. PA decreased with age, particularly at or around the age of puberty. There were no significant associations between PA and either self-reported health or engagement in study. There was a relationship between high PA and low area-level socio-economic status in remote areas, but no association in non-remote areas. The differences between remote and non-remote areas highlight the importance of disaggregated analysis of Indigenous populations and are consistent with qualitative studies identifying locally contextualised factors influential in promoting PA.																																	
Engel AC, Broderick CR, van Doorn N, Hardy LL, Parmenter BJ. Exploring the Relationship Between Fundamental Motor Skill Interventions and Physical Activity Levels in Children: A Systematic Review and Meta-analysis. Sports Medicine. 2018;48(8):1845-1857.	To evaluate interventions for improving FMS and PA levels in children aged 3-5 years and 5-12 years, and secondly to determine, where possible, if there is a similar relationship between change in FMS and change in PA across both age groups.	Systematic review conducted exclusively by Australian researchers	children between the ages of 3 and 12 years	FMS	There was significant improvement in FMS with Teacher-Led (TL) interventions of three or more sessions per week (standardised mean difference = 0.23 [0.11-0.36]; p = 0.0002). In TL interventions, there was a strong negative correlation between moderate-vigorous physical activity (MVPA) and sedentary behaviour (SB) (r = - 0.969; p = 0.031). The findings of this analysis have significant implications for future studies, preschools and parents, as they indicate that children need to practise their FMS skills regularly (≥ 3 times per week) to achieve a significant improvement in FMS , and potentially PA levels. Our analysis also indicates that the best way for children to learn these skills may be by being explicitly taught by a teacher, rather than having the skills included in their everyday pre-school activities .																																	
Downing KL, Hnatiuk JA, Hinkley T, Salmon J, Hesketh KD. Interventions to reduce sedentary behaviour in 0-5-year-olds: a systematic review and meta-analysis of	To evaluate the effectiveness of behavioural interventions in	Systematic review and meta-analysis. Australian researchers	0-5-year-olds Participants were children with a mean age of </=5.9 years	SB	Overall mean difference in screen time outcomes between groups was -17.12 (95% CI -28.82 to -5.42) min/day with a significant overall intervention effect (Z=2.87, p=0.004). The overall mean difference in sedentary time between groups was -18.91 (95% CI -33.31 to -4.51)																																	

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randomised controlled trials. Br J Sports Med. 2018;52(5):314-321.	sedentary behaviour during early childhood		and not yet attending primary/elementary school at post-intervention. Half of the studies (n=15) were conducted in the USA, n=5 in Australia, n=3 in Belgium, n=2 in the UK and one each in Canada, Germany, Switzerland, the Netherlands, Israel and Turkey.		min/day with a significant overall intervention effect (Z=2.57, p=0.01). Subgroup analyses suggest that for screen time, interventions of >/=6 months duration and those conducted in a community-based setting are most effective. For sedentary time, interventions targeting physical activity (and reporting changes in sedentary time) are more effective than those directly targeting sedentary time. Interventions to reduce sedentary behaviour in early childhood show significant reductions, suggesting that this may be an opportune time to intervene.
Dahlberg EE, Hamilton SJ, Hamid F, Thompson SC. Indigenous Australians Perceptions' of Physical Activity: A Qualitative Systematic Review. Int J Environ Res Public Health. 2018;15(7).	To systematically review published qualitative research papers exploring issues related to the perspectives of Indigenous Australians around physical activity	Systematic review of qualitative studies	Australian Indigenous communities	PA	Four major themes emerged: family and community, culture and environment, sport, and gender differences. Men highlighted sport and going on walkabout as preferred types of physical activity while women preferred family-focused activities and activities and support for women's sport. Several studies found exercise was supported when in the context of family and community but was considered shameful when done only for oneself. Sport was regarded as playing an influential role in bringing communities together. Group, community, or family activities were desired forms of physical activity with the environment they are conducted in of high importance.
Van Capelle A, Broderick CR, van Doorn N, Ward RE, Parmenter BJ. Interventions to improve fundamental motor skills in pre-school aged children: A systematic review and meta-analysis. Journal of Science and Medicine in Sport. 2017;20(7):658-666.	to systematically review interventions for improving FMS as well as PA among pre-schoolers	Systematic review and meta-analysis. Australian researchers	3-5-year-olds	FMS PA	PA interventions improve FMS in pre-schoolers Studies were categorised into three groups (i) Teacher-Led (TL)(n = 13); (ii) Child-Centred (CC)(n = 6) and (iii) Parent-Led (PL)(n = 1). Mean age was 4.3 +/- 0.4 years, with equal gender distribution. Interventions ran for 21 +/- 17 weeks, 3 +/- 1 times per week for 35 +/- 17 minutes. TL interventions significantly improved overall FMS (SMD = 0.14[0.06, 0.21]; p = 0.0003), object control (SMD = 0.47[0.15, 0.80]; p = 0.004), and

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					locomotor skills (SMD = 0.44[0.16, 0.73]; p = 0.002), whereas CC interventions were not significant. There was a small, non-significant reduction in sedentary time (SMD = -0.35[-0.80, 0.10]; p = 0.12), and a large non-significant increase in PA (SMD = 0.79[-0.83, 2.41]; p = 0.34). More research needed to elucidate CC.
Daly RM, Ducher G, Hill B, Telford, D. et al. Effects of a Specialist-Led, School Physical Education Program on Bone Mass, Structure, and Strength in Primary School Children: A 4-Year Cluster Randomized Controlled Trial. <i>Journal of Bone and Mineral Research</i> 31(2), https://asbmr.onlinelibrary.wiley.com/doi/full/10.1002/jbmr.2688 (2016).	To investigate the effects of a specialist-taught Primary School physical education (PE) program on bone strength and body composition.	4-year cluster randomized controlled trial	365 boys and 362 girls (mean age 8.1 ± 0.3 years) from grade 2 in 29 primary schools	PE, PA Bone mass, structure, strength	This study indicates that a specialist-led school-based PE program improves cortical bone structure, due to reduced endocortical expansion. Benefits of specialist PE in the primary school were especially marked for girls. This finding challenges the notion that periosteal apposition is the predominant response of bone to loading during the prepubertal and early-pubertal period.
Telford RM, Telford RD, Olive LS, et al. Why are girls less physically active than boys? Findings from the LOOK longitudinal study. <i>PLoS ONE</i> 11(3), https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0150041&type=printable (2016).	To investigate the mechanisms underlying the gender difference in participation in PA in 8-12-year olds	Longitudinal study	Data were collected at age 8 and 12 years (276 boys, 279 girls) from 29 schools as part of the LOOK Longitudinal study.	Pedometer measured PA. Cardio-respiratory fitness (multi-stage run), percent fat (DEXA), eye-hand coordination (throw and catch test) and perceived competence in physical education	Overall Girls PA was less favourably influenced by socio-ecological factors at the individual, family, school and environmental levels. These factors are potentially modifiable suggesting the gap in PA between boys and girls can be reduced. Strategies aiming to increase PA should be multicomponent and take into consideration that pathways to increasing PA are likely to differ among boys and girls. Details: Girls were 19% less active than boys (9420 vs 11360 steps/day, p<0.001, 95%CI [1844, 2626]). Lower PA among girls was associated with weaker influences at the school and family levels and through lower participation in extracurricular sport. School attended explained some of the variation in boys PA (8.4%) but not girls. Girls compared to boys had less favourable individual attributes associated with PA at age 8 years, including 18% lower cardio-respiratory fitness (3.5 vs 4.2, p<0.001, CI [0.5,0.9]), 44% lower eye-hand coordination (11.0 vs 17.3, p<0.001, CI [5.1,9.0]), higher percent body fat (28% vs 23%, p<0.001, CI [3.5,5.7]) and 9% lower perceived competence in physical education (7.7 vs 8.4, p<0.001, CI [0.2,0.9]). Participation in extracurricular sport at either age 8 or 12 years was protective against declines in PA over time among boys but not girls.
Committee of Australian Sport and Recreation Officials (CASRO). Summary of key initiatives that address the 'Cost of Participation in Sport'; CASRO Cost of Participation Working Group - Committee Papers. 2014.	To summarise current information on policy, programs and initiatives that specifically address cost barriers to participation in sport and recreation	Desk research: descriptive study of initiatives under 4 categories. Internal working document of CASRO	Australian children and their families	Sport	Coverage: Section 1: Initiatives addressing the direct costs to individuals and families of participating in sport and physical activity Section 2: Organisational level support to assist with costs of providing a sport and recreation service. Section 3: Infrastructure related opportunities to reduce costs in delivering sport. Section 4: Initiatives addressing cost of insurance and cost of utilities

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Telford RD, Cunningham RB, Telford RM, et al. Benefits of early development of eye-hand coordination: Evidence from the LOOK longitudinal study. <i>Scandinavian Journal of Medicine and Science in Sports</i> 23(5), https://onlinelibrary.wiley.com/doi/full/10.1111/sms.12073 (2013).	To investigate longitudinal and cross-sectional relationships between eye-hand coordination (EHC) and organized sport participation	Longitudinal and Cross-sectional	406 boys and 384 girls at 8 and 10 years of age.	eye-hand coordination (EHC) PA Body composition	Median EHC improved during two years from 18 to 32 (boys) and 9 to 24 (girls), and gender differences and improvements were both significant ($P < 0.001$). Cross-sectional analyses showed that boys and girls with better EHC were fitter ($P < 0.001$), and a longitudinal relationship showed that girls who improved their EHC over the two years became fitter ($P < 0.001$). There was also evidence that children with better EHC possessed a more positive body image ($P = 0.05$ for combined sex data), but there was no evidence of any relationships between EHC and %BF or PA (both $P > 0.3$). Finally, even at age 8 years, boys and girls participating in organized sport possessed better EHC than non-participants. These data provide evidence for the premise that early acquisition of this single motor skill promotes the development of a child's fitness, body image, and participation in sport.
Stanley RM, Boshoff K, Dollman J. A qualitative exploration of the "critical window": factors affecting Australian children's after-school physical activity. <i>J Phys Act Health</i> . 2013;10(1):33-41.	to qualitatively explore children's perceptions of the factors influencing their engagement in physical activity during the after-school period	Qualitative research with Australian children	Fifty-four South Australian children age 10-13 years participated in same gender focus groups.	After school PA	Children identified several factors, including safety in the neighbourhood and home settings, distance to and from places, weather, availability of time, perceived competence , enjoyment of physical activity, peer influence, and parent influence . New insights into bullying and teasing by peers and fear of dangerous animals and objects were revealed. Giving children a voice allowed the emergence of factors which may not be identified using existing survey methods
Carver A, Watson B, Shaw B, Hillman M. A comparison study of children's independent mobility in England and Australia. <i>Children's Geographies</i> . 2013;11(4):461-475. https://doi.org/10.1080/14733285.2013.812303 .	To compare independent mobility among English and Australian schoolchildren	Comparative research study Note: This research identifies a need for intervention and programmes that aim to increase active transport and independent mobility among school-aged children. Research is required to examine social factors that may influence parental restriction of these behaviours, to objectively measure the physical environments in children's neighbourhoods, and to identify what further steps can be taken so that children may once again experience similar levels of independent mobility	10-12-year-olds	Children's independent mobility (freedom to move around a neighbourhood without adult accompaniment)	Among 10–12-year-olds, English children had more licences than Australian children. Mobility licences were directly associated with independent school journeys among primary but not among secondary schoolchildren who travelled further; and inversely associated with parental accompaniment to other destinations. In both England and Australia rates of independent mobility were low for trips to neighbourhood destinations that were within walking distance from home. Walking to school was the most pervasive travel mode in England, while in Australia most children travelled by motorized transport. Over half (51%) of primary schoolchildren in Australia and almost a third (32%) of primary schoolchildren in England were driven to school by car, despite distances to primary school, in general, being relatively short compared with distances to secondary school.

First Author, Year	Aim/Description	Australian Research Category	Population/Age group/ Sample	Movement category (e.g. Sport, Play, PA, Sedentary)	Main Findings
		granted to previous generations.			
<p>Australian Government: Sports Commission. Market segmentation for sport participation: children. 2013. https://www.clearinghouseforsport.gov.au/_data/assets/pdf_file/0011/564068/14066_ASC_Market_Segmentation_Children_FA_WEB.pdf</p>	<p>To develop a needs-based consumer centric Market Segmentation model for Australian sport participants (players) and non-sports participants (non-players).</p>	<p>Qualitative Market research undertaken by private sector - GfK Blue Moon [part of an integrated programme of evidence-based Market Segmentation research for adults, children, disability, volunteers and parents.</p>	<p>Market Segmentation for Children aged 5-13</p> <ul style="list-style-type: none"> ▪ The study provides key insights outlining how the sport sector can influence motivations and behaviours children have towards sport and physical activity. ▪ It describes the segments among children aged five to 13 years, in terms of their attitudes to sport and physical activity, their attitudes to sport club membership, and their membership of sport clubs. ▪ The research highlighted that there needs to be a change away from just elitism to keep children and teens in club sport 	<p>Sport</p>	<p>Recommendations Address the cost and time issues related to children being a club member because these are the main barriers for parents:</p> <ul style="list-style-type: none"> ▪ Providing a variety of pricing packages and different types of membership that allow for flexibility of attendance and time commitment would help. ▪ Identifying the potential for growth opportunities for sport club membership by understanding the needs of different segments and the products they may be attracted to. <p>When provided a list of products and services and asked which would encourage them to join a sport club or association to do physical activity, children showed interest in a range of product offers:</p> <ul style="list-style-type: none"> ▪ Free trials (49%), classes where friends can join (40%) or open days (31%) to provide a means for children and their parents to test the waters. ▪ 'Bring a friend' days, discounts for friends or two for one for new members. ▪ Choices for when to take part (38%) to alleviate concerns for children and parents around flexibility. ▪ Products and services that are inclusive; promote equal treatment; and focus on fun and participation regardless of skill level and ability. ▪ This can be supported via beginner classes (49%), ensuring equal treatment at clubs (46%) about accessing facilities and through, to a lesser degree, more social and less competitive competitions (28%). These would directly address concerns around exclusiveness.
<p>Hoye R. Cost of Participation. Review of Junior Sport Framework Draft Briefing Paper prepared for the Australian Sports Commission. 2012. https://tinyurl.com/yxoambt5.</p>	<p>To examine financial costs of participation in junior sport</p>	<p>Draft briefing paper; private sector – Uniquet for the ASC</p>	<p>Desk research study</p>	<p>Sport</p>	<p>Dearth of knowledge on cost. Recommendations: <i>The Australian Sports Commission should consider:</i></p> <ul style="list-style-type: none"> ▪ Commissioning an independent study of the costs of junior sport participation in Australia aimed at investigating the issues listed in the previous section.

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					<ul style="list-style-type: none"> ▪ Explicitly measuring junior sport participation rates to monitor the effect on participation of any future policies targeted toward the costs of participation. ▪ Along with state/territory departments, continuing to provide grant support and funding to sport organisations and individuals to support the involvement of children in junior representative sporting teams and events. <p><i>Sporting organisations should consider:</i></p> <ul style="list-style-type: none"> ▪ Establishing a sport equipment and uniform “library” to defray the costs of purchasing equipment and uniforms. ▪ Assisting with the coordination and subsidy of travel. ▪ Actively seeking grants and subsidies to maintain costs at minimum levels. ▪ Providing flexible participation arrangements such as shorter seasons of training and competition.

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