



Office
of Sport

Research Partnership Project



THE UNIVERSITY OF
SYDNEY

Quantifying the Economic Impact of Sport and Active Recreation

Literature review of the methodological evidence base
for assessment of the economic and social value of
sport and active recreation



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GLOSSARY

Economic Value

The economic concept of value has been broadly defined as any net change in the welfare of society. This concept does not restrict environmental values to benefits from the direct use of a resource. For example, the benefits received from environmental resources (such as enjoyment of national parks and clean air) add to an individual's well-being, as do the benefits obtained from the consumption of goods. The benefits that individuals obtain in satisfying altruistic desires that arise from their own moral beliefs also have economic value. From an economic perspective, values can be associated equally with the consumption of goods and services purchased in markets and with the services from environmental amenities for which no payments are made. In this sense, anything from which an individual gains satisfaction is deemed to be of value, so long as the individual is willing to give up scarce resources for it.

Social Value

Social Value is created when resources, inputs, processes or policies are combined to generate improvements in the lives of individuals or society as a whole. Social Value includes the concepts of inclusion and access.

Socio-Economic Value

Socio-Economic Value builds on the foundation of Economic Value creation by attempting to quantify and incorporate certain elements of social value. An entity creates Socio-Economic Value by making use of resources, inputs, or processes; increasing the value of these inputs, and by then generating cost savings for the public system or environment of which the entity is a part. These cost savings are potentially realized in decreased public dollar expenditures and partially in increased revenues to the public sector. Value creation in this arena can be measured using a social return on investment metric (SROI), social earnings calculations and other evolving metric.

Sport

Sport can be defined as physical activities that are competitive, organised, involve observation of rules and may be participated in either individually or as a team. This definition refers primarily to those participating in sports as amateurs.

Active recreation

Active recreation is generally unstructured activity that individuals freely pursue in their uncommitted time (leisure time) for a personal sense of enjoyment that also benefits their physical, social or emotional wellbeing.

EXECUTIVE SUMMARY

- The SPRINTER (SPort and active Recreation INTervention and Epidemiology Research) unit, a specialised research group within the Prevention Research Collaboration (PRC), School of Public Health and Charles Perkins Centre at the University of Sydney conducted this review of evidence. The SPRINTER group is dedicated to investigating the health social benefits of participation in sport, and has an applied research focus in actively seeking the translation of research knowledge into policy and practice. The primary aim of this review is to create an evidence base for the assessment of the economic and social value of sport and active recreation.
- Three key areas for the application of evidence were formulated by the NSW Office of Sport and SPRINTER group to guide this review:
 - 1) What evidence is available on the social and economic value of sport and active recreation in Australia and in comparable countries including the UK, NZ, Canada and the US?
 - 2) What models have been used and what are their relative strengths and weaknesses? How robust is the information and underlying assumptions? What is the most appropriate model for NSW?
 - 3) What is the contribution of sport and active recreation to physical activity and to the prevention/stabilisation of childhood obesity?
- This review included academic journal and scholarly articles and grey literature material. Databases used for academic journal and scholarly article searches included: PubMed, Scopus, Science Direct, OVID and the Clearinghouse for Sport. A grey literature search protocol was developed in keeping with recent guidelines.
- Literature was conceptualized into value streams of: physical health, mental health, economic benefit and community development/well-being; and unintended harm areas: physical and mental harm, individual economic cost, exposure to harmful marketing and anti-social behaviour. 136 articles in value streams, 70 for unintended harm areas, as well as 26 grey literature articles were included in this review.
- Six distinct models were identified through the review and are described in detail in the main report together with illustrative case studies (pp. 48 et seq.). These are: Simple Financial Reporting [SFR]; Estimated Market Value [EMV]; Modelling Official Data for Economics [MODE]; Surveillance Augmented Value Estimation [SAVE]; Systematic National Accounts Performance [SNAP]; and Modelling Impacts Driving Augmented Socio-economic gains [MIDAS]. Robustness of the underpinning assumptions are elucidated in an analysis of the strengths and weaknesses of each of the six models.

- Strong evidence exists for the association between numerous forms of sport and active recreation and significant decreases in all-cause mortality^{6, 116}. Its role appears crucial across a participant's life span, with particular importance during childhood and adolescence. Participation in sport and active recreation during this period is a known predictor for active lifestyles and improved health indicators in later life³⁹. Physical education through sport is also crucial during the various developmental stages of childhood and adolescence¹⁵ with organised sport and recreation contributing a significant (and majority) proportion of, overall vigorous physical activity during childhood and late adolescence respectively^{51, 66}. This has policy implications for the fight against childhood obesity.
- Sport and active recreation is of particular importance for mental health in children and young adults, with this being the first stage of life where symptoms of mental illness can arise. Participation in sport during these periods lead to better psychological functioning, emotional well-being and social interaction^{22, 155}. Sporting activities are also associated with more functional body image, lower anxiety scores, less depressive symptoms and higher subjective well-being (happiness), irrespective of gender¹. In later life, physical activity is associated with a lower rate of cognitive decline in older adults⁴, and also contributes to the known link between organised sport, physical activity levels, academic achievement and productivity^{40, 79}. This is due to its relationship with areas of the brain that support complex cognitive processes⁴⁰. While a lesser known but crucial role of sport can through tailored interventions effectively targeting high-risk mental health illness groups such as Indigenous Australians, isolated communities, low-income households and those diagnosed with a recognized mental disorder (e.g. Alzheimer's, bipolar or schizophrenia)^{35, 151}.
- Small, medium and mega sporting events appear to have a significant return on investment for the host community or city^{2, 74}. Even in smaller contexts, corporate organised sporting programs add value through increased corporate image, recruitment of premium employees, productivity, decreased absenteeism and turnover, lower medical costs, and reduced industrial injuries¹⁴⁶. Despite park and recreation centres having less visitor-driven economic impact, they were found to increase social capital, well-being and property prices^{12, 33}. There appears no agreed upon, or best methods for estimating the economic impact of events and stadia investments, although significant impact was found through the novel value area of increased national image and national pride⁶⁰.

- Sport and active recreation can be classified as a *protective good for society*, meaning that it can protect participants against risk-factors associated with harmful activities and behaviours, such as illicit drug use, crime and tobacco use^{26, 91}. Sport and active recreation also has a unique and valuable impact on social cohesion and inclusion, as well as engagement of participants in society¹⁴⁵. A pertinent role with social isolation a well-established risk-factor for mental illness¹⁰⁷. Community sport/activity centres can provide a range of both economic and non-economic benefits such as: increased community visibility, enhanced community image, increases in social capital, community participation and social cohesion, be a mediator for healthier lifestyles, enhance the local profile in the region, as well as increase the number of visitors to the municipality and local businesses⁶⁰. Sporting clubs, both professional and community based, can also be used as vehicles to target specific groups who are prone to social isolation and low physical activity (e.g. men, isolated individuals and those least active in society)^{68, 111}.

- Despite the plethora of areas in which sport and active recreation contribute considerable value for society, negative externalities must also be considered in a robust and comprehensive approach to value assessment. These can be thought of as unintended external costs or harms that are passed on to society. These negative externalities are highlighted for policy consideration because effective remedial policy action has huge potential to enhance value streams.

 - Children involved in competitive organised sport, recreation and particularly elite-level competition are a high-risk group for mental harms due to the clash between the crucial developmental stages of childhood, and the unique social and cognitive pressure that arises from its competitive nature¹⁷⁴. The pressure semi-elite and elite athletes are exposed to can also significantly influence binge drinking behaviour, eating patterns and varying forms and levels of addiction^{59, 169}. This behaviour change is known to be maintained even after initial exposure to harmful culture.
 - Participation in sport and active recreation also incurs higher injury risks, increasing the risk of decreases in quality of life, low mood, and in some cases – depression¹⁹. While the high and extended periods of emotional pressure in elite sport, social isolation, competing interests (education versus competition), cost and time pressure as well as extended periods in hyper-alert competitive states can be risk-factors for poor mental health¹⁷.
 - Despite Australian families spending more money on screen recreation than active recreation; strong economic and cultural gradients exist in their patterns of expenditure on both⁵. Evidence for income as a barrier to participation was generally inconclusive, but may influence type of sport and number of sports for participation⁹.

- Demand for sport and exercise was negatively associated with time (travel or usage time)⁹, shifting high importance onto physical education and sport during school-time . While financial cost of injury also arose throughout literature, where even in minor cases it brings the expectation of financial output for families, and consideration as a barrier to participation.
- From a public health perspective, one of the most prevalent negative externalities apparent in sport is the frequent and continuous exposure of children and adolescents to junk-food, alcohol and gambling advertising during participation. Clear evidence points to four distinct issues: (i) unhealthy advertising is highly prevalent throughout sport; (ii) the majority of parents feel it's unwarranted and unethical; (iii) sports clubs recognise its negative messaging but feel stakeholder pressure to prioritise sustained income; and (iv) it has been proven to have adverse and long-lasting developmental impacts.
- Violence across several sporting contexts (e.g. attendance, participation) appears prevalent, with some concern over violence normalization in power sports⁴⁹. Adolescent and university athletes with the existence of high psychological distress and lack of family support are a high-risk group for undertaking risky behaviours⁶¹. With the finding of a positive association between sport participation and binge drinking holding constant throughout literature, and across differing countries and gender^{138, 180}. This culture, combined with poor alcohol management policies may impede participation in community sporting clubs, particularly by females ³⁴.

PURPOSE OF THIS REPORT

The objective of the research undertaken for this report was to build a methodological evidence base on assessing the economic and social value of sport and active recreation and to provide evidence that could allow the NSW Office of Sport to:

- Promote the value of sport and active recreation;
- Demonstrate the value of current investment in sport and active recreation;
- Inform future projects designed to assess economic and social returns on investment in physical activity, sport and recreation
- Support the case for future funding requests; and
- Support the case to partner and collaborate with others.

INTRODUCTION

This review of literature will build on foundation work already completed during strategic planning and development to support funding for the Office of Sport's new direction.

Sport and recreation are integral components of life in Australia and represent significant contribution to community health. Importantly, it is now understood that sport and active recreation provide additional benefits to society, ranging broad social and economic domains. This document reports the findings of a literature review of the evidence base for the social and economic value of sport and recreation, prepared by the Sport and Active Recreation Intervention and Epidemiology Research group (SPRINTER) University of Sydney, for the New South Wales Office of Sport.

Whilst the physical health benefits of sport and recreation are widely-reported, evidence suggests that benefits exist above and beyond physical health. Values and benefits relating to sport and recreation include; physical and mental health, economic benefits such as GDP, employment, productivity, tourism and events, and community development and wellbeing such as social inclusion, diversion from anti-social behaviour, and volunteering. Reviewing and building the evidence base will support the promotion of the wide-ranging value of sport and active recreation, demonstrate the value and return of current investment, and support the need for future funding and collaborative efforts.

LITERATURE REVIEW RESEARCH QUESTIONS

- PART 1:** What evidence is currently available? Specifically, what work has been done to date on the social and economic value of sport and active recreation in Australia and in comparable countries including the UK, NZ, Canada and the US?
- PART 2:** What models have been used and what are their relative strengths and weaknesses?
- PART 3:** How robust is the information and underlying assumptions?
- PART 4:** Based on what else has been done what is the most appropriate model for NSW? Does it need to map to work in other jurisdictions?
- PART 5:** What is the contribution of sport and active recreation to physical activity and to the prevention/stabilisation of childhood obesity?
- PART 6:** What is the database of research that relates to each key value area (identified in the literature search)?

SEARCH STRATEGY

This search strategy was developed to identify all evidence to date referring to the social and economic value of sport and active recreation in Australia and internationally comparable countries including the UK, NZ, Canada and the US. In developing the search strategy, the research team identified suggested value areas to which sport and active recreation may contribute. The value areas included, but were not limited to:

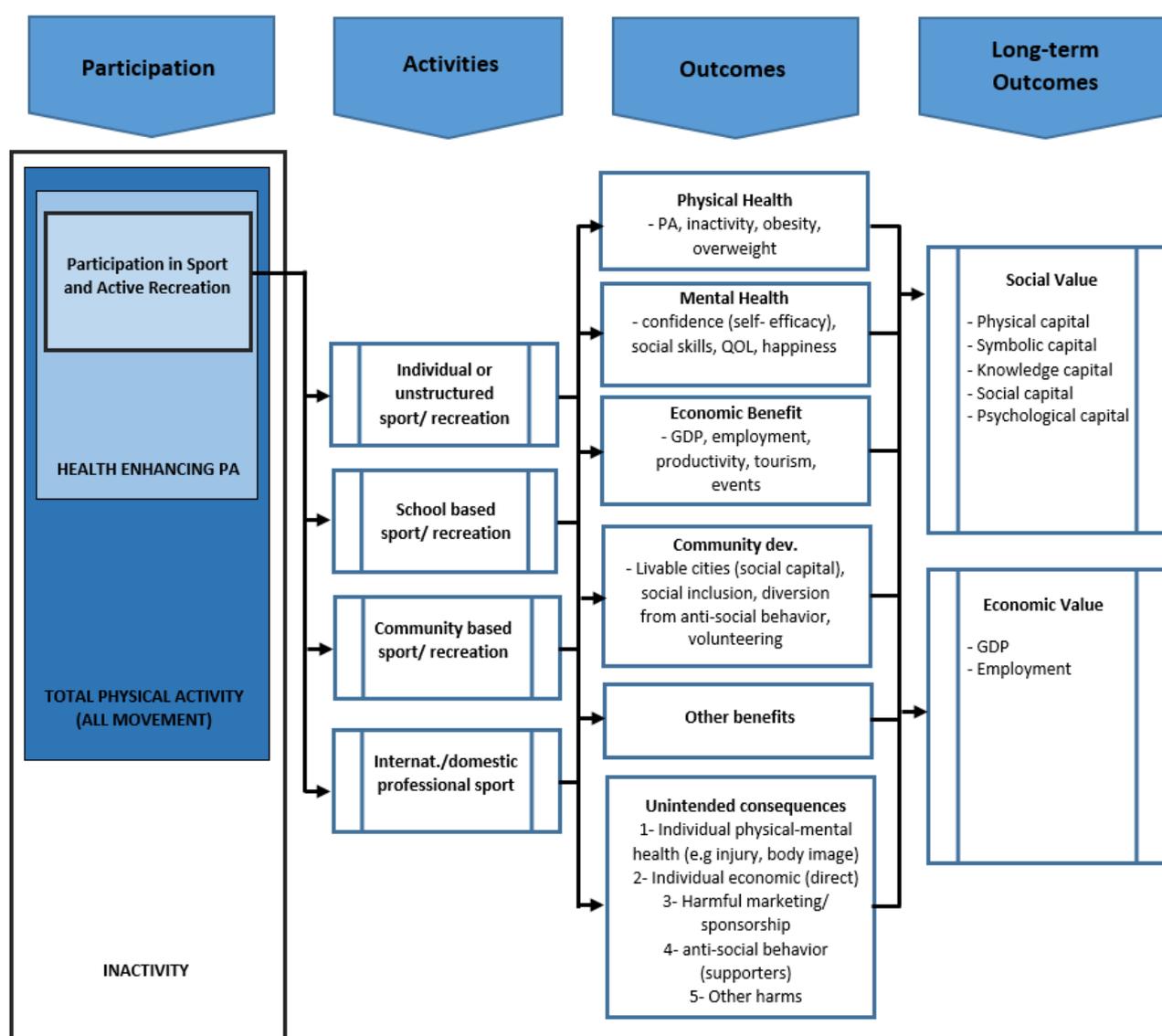
- Physical health – promotion of population physical activity, reduction or stabilisation of population overweight/obesity, and other health outcomes
- Mental health – prevention and reduction in symptomatology related to mental disorders, confidence, self-efficacy, quality of life, happiness, social skills and other mental and emotional related benefits
- Economic benefits – increased GDP, employment, productivity, tourism, events and other economic benefits
- Community development and wellbeing – improved social capital, social inclusion, diversion from anti-social behaviour, volunteering and other community benefits

Unintended harms of sport and recreation were also captured in the search strategy. Unintended harms related to adverse effects such as:

- Physical and mental harm including injury/overuse, mental health problems such as stigmatisation, depression, body image and eating disorders
- Direct individual economic such as time or cost
- Exposure to harmful marketing such as alcohol, junk-food and gambling
- Anti-social behaviour such as violence, risk drinking, and damage

This development of key concepts for the search strategy is most clearly denoted in the search strategy logic model as presented in **Figure 1**.

Figure 1 Logic model for search strategy



PEER REVIEWED SEARCH STRATEGY MATRIX

Due to the wide range of value streams and unintended harm areas, a search strategy matrix (**Figure 2**) was conceptualised for the peer-reviewed database search in favour of a traditional literature search term strategy. The search strategy matrix is used as follows:

1. Activity keywords + 2. Intervention keywords + 3. Concept keywords (value keywords used with each of the four Value streams; and harm keywords used for each of the four unintended harm areas). This strategy equates to a total of 7 searches per database.

Figure 2 Peer-reviewed literature: search strategy matrix

1. Activity	
	“sport” or active?recreation or “team?sport*” or football* or rugby or soccer or basketball* or cricket or swim* or netball* or danc*
2. Intervention	
	participat* or attend* or spectat* or compet*
3. Concept	
<i>Value (use for 4. value streams)</i>	value or impact or contribut* or importance or benefit
<i>Harm (use for 4. unintended harm areas)</i>	cost or negative or harm or harmful or detrimental or expos*
4. streams	
Value streams	
<i>Physical health +</i>	physical activity or obes* or overweight
<i>Mental health +</i>	confidence or self?efficacy or social?skills or quality?of?life or happiness
<i>Economic benefit +</i>	employ* or productive* or tourism or econom* or profit or income or cost?benefit
<i>Community development +</i>	social?capital or social?inclusion or anti?social behaviour or volunteer* or leadership or social?value
Unintended harm areas	
<i>Individual physical/mental harm +</i>	injur* or wound* or emergency or hospital or body image or depressi* or eating?disorder
<i>Individual economic harm +</i>	time or financial?cost or family?cost
<i>Exposure to harmful marketing/sponsorship and anti-social behaviour</i>	sponsorship or marketing or alcohol or gambli* or anti?social or violence

The search strategy was conducted in the following databases:

- SCOPUS
- Pub Med
- Science Direct
- OVID
- Clearinghouse for Sport

GREY LITERATURE SEARCHES

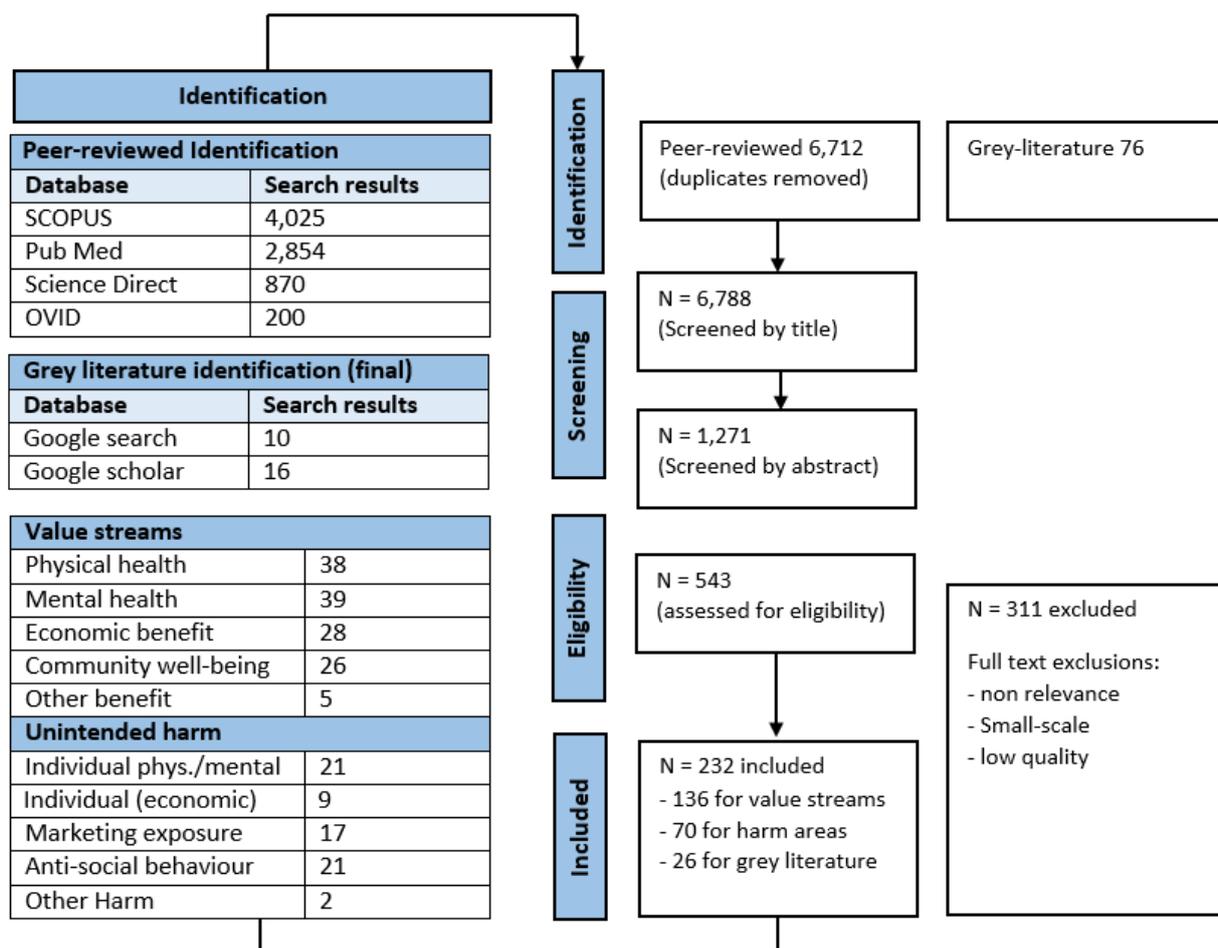
Initial scoping search of Google uncovered a substantial range of previously commissioned economic and social value of sport and active recreation reports. From these reports and other relevant material the following keywords were chosen:

Social – economic – value – benefits – cost – sport – active recreation

In keeping with recent guidelines for Google-based grey literature searches in systematic reviews, the first ten pages (or 100 results) of each search's hits were reviewed by title and provided text⁵⁸.

For Google Scholar, the search strategy developed is aligned with recent methodological evidence of its use in literature/systematic reviews recommending the first 200 results be screened for possible inclusion⁶³. This number of pages was chosen to capture the most relevant hits while still being a pragmatic amount to screen.

Figure 3 Article screening and selection flow diagram



DESCRIPTION OF THE TYPE AND QUALITY OF INCLUDED ARTICLES

The evidence base that emerged following the final screening phase was categorised into the intended benefits and unintended harm value streams as detailed in the search strategy. Studies were excluded if they were small scale interventions, or held little to no relevance to sport and recreation in Australian communities.

There were 136 articles identified relating to benefits of sport and active recreation and 70 articles related to unintended harm. The screening of grey literature concluded with 26 articles relating to sport and active recreation across Australia, New Zealand, North America and UK/Europe. Some identified studies were intervention trials, however most were observational in design (cross-sectional or longitudinal research). An overall description of the type and quality of retrieved records relating to each value stream is provided below.

Physical health

Of the final studies eligible for review, there were 38 relating to the physical health benefits of sport and active recreation. While some of the identified literature referred to physical health benefits in adults and older adults, a large majority of the articles identified in this review related to the physical health benefits of sport and active recreation among children and young people. The main outcomes of interest of this evidence were; physical activity/inactivity levels, energy expenditure, fitness, muscle and bone health, and overweight/obesity or adiposity. While studies dated back to 2000, the majority of this research is relatively recent, being completed since 2010. Most studies uniquely examined individual sports or active recreation involvement, however there were multiple studies reporting the physical health benefits of school-based physical education programs, major sporting events (Commonwealth Games, Olympic etc.), and for specific groups such as individuals with disabilities.

The extensive literature reporting physical health benefits of sport and active recreation is of *high quality*. Studies include rigorous intervention trials, large-scale population-based studies, and typically utilise well-validated and reliable measures. Whilst considered high quality, the evidence base is limited by frequent use of self-report measures of both sport and active recreation, and physical health outcomes, and the extent to which such measures truly reflect a relationship is unknown. For example, population-based studies examining child and adolescent participation in organised sports have often relied on parent recall of the child's involvement, from which average participation is estimated. Such estimates may be subject to bias impacting on research findings.

Mental health

A total of 39 articles reported mental and emotional health benefits of sport and active recreation. The mental health benefits were examined in various study designs, however most studies were observational and there were fewer intervention studies than for physical health benefits. The mental health benefits comprised quality of life, happiness, cognitive functioning and academic achievement, improved body image and self-perception, self-esteem, and a reduction in/protection against mental disorders and associated symptomatology. An aspect of the mental health studies, different to that of physical health, was that multiple studies examined the role of gender or gender differences in the relationship between sport/active recreation and mental health. As expected, the framing of sport and active recreation in these studies was predominately focused on the social opportunities and meaning attributed to activity, as opposed to actual physical exertion which featured in physical health.

The studies identified for the mental health benefits stream was *medium to high quality*. While large scale observational research was found, the number of rigorous trials examining relationships was low. In addition, much of the observational research was cross-sectional in design and therefore causality cannot be inferred. For example, a finding of a higher level of happiness in individuals involved in sports clubs compared to a lower level happiness among those who do not participate in sporting clubs at one point in time cannot confirm that sporting club participation leads to increased happiness.

Economic benefit

There were 28 studies examining the economic benefit of sport and active recreation, focusing on tourism and employment, major sporting events, mass recreational participation events, and cost and return on sporting facilities. Many of the economic studies identified for this review, similar to other discussed value streams, were observational in design. A unique aspect of this value stream was that many studies took the form of case studies, examining the impact of one-off events such as Olympics, Football World Cup, Commonwealth Games, and major international marathons. In addition, many identified studies focus on potential methods for statistical modelling in predicting economic benefit of sport and recreation. The studies in this value stream are exploratory in nature, focusing on applied statistical methodology, compared to the previously described value streams.

The evidence to date for the economic benefit of sport and recreation is of *medium quality*, given it is often exploratory in nature. Many studies examine one-off events and report the findings of a pilot statistical methodology, and therefore its quality is lower than that of physical and mental health streams. It is noted, however, that highly rigorous economic evaluation does exist within this evidence base. In addition, the evidence base considers multiple perspectives for the economic value, from individual, community, national and international perspectives (e.g., the direct cost/benefit for an

individual's attendance at a major sporting event in addition to the cost/benefit for a host nation) and this is a strength of the available evidence for this review.

Community development/wellbeing

There were 26 studies eligible for review for the community development and wellbeing benefits of sport and active recreation. The available literature focuses on social inclusion, volunteering opportunities, role of sport and recreation during of following trauma and chaos, employment/job strain, and building sense of community. Similar to the economic literature, the available evidence for community development and wellbeing often examines the impact of major sporting events such as Olympics, Rugby World Cup and also region specific events such as Australian Community Soccer Program, and European Youth Olympic Festival. Similar to mental health, the available evidence frequently focuses on the meaning attributed to sport and active recreation, and the social and community impact.

The evidence relating to community development and wellbeing is medium to high quality. There are some intervention trials in the available literature including the impact of sports programs for socially vulnerable groups, and longitudinal research examining sense of community over time through sport and active recreation. Some of the included studies, similar to economic impact, are case studies of one-off events hence slightly lowering the quality of available literature.

Unintended harm

The literature examining unintended harms include individual physical/mental harm, individual economic cost, exposure to marketing, and antisocial behaviour. There were 21 identified studies for individual physical and mental harm (injury epidemiology research was considered irrelevant to this review and were excluded). Studies examined associations between sport and active recreation and risk behaviours, body image distortion and self-esteem concerns, violent/victimisation behaviour, and cardiovascular health. Individual economic cost literature (9 studies included) focused on spectators' willingness to re-attend events following cost of attendance, income inequality and association to sport and recreation, and perceived risk of involvement in mass participation events. Exposure to marketing (17 studies included) focused predominately on major sporting events and industry such as soft drink/takeaway, alcohol sponsorship, and gambling advertisement. Anti-social behaviour (21 studies included) was largely focused on three main areas being alcohol consumption/binge drinking, gambling behaviour, and aggression/violence.

Grey literature

The identified grey literature was mostly Australian-based, followed by UK/Europe, US, and New Zealand. Previous Australian-based attempts to explore the value of sport and active recreation have been included in annual state and national reports, in addition to documents reporting specific frameworks for the development of, or proposals to increase participation in, sport and active

recreation. Some reports focus on one aspect of sport and recreation including participation, policy development, social benefits, and economic value.

REVIEW OF EVIDENCE

INTENDED BENEFITS

1. Physical health benefits

Key Points:

- Various forms of sport and active recreation are strongly associated with significant decreases in all-cause mortality^{6, 116}.
- Physical education through sport is especially important during the various developmental stages of childhood and adolescence¹⁵.
- Organised sport and recreation contribute a significant proportion and the majority of overall vigorous physical activity during childhood and late adolescence respectively^{51, 66}.
- Participation in sport and active recreation in childhood and adolescence are known predictors for active lifestyles and health indicators in later life³⁹.

Regular physical activity, even in small doses, offers substantial physical and mental health benefits for participants⁸². While physical inactivity is the 4th leading risk factor for mortality throughout the world³⁰. Sport and active recreation is one sector that can also contribute strongly to public health through increased physical activity at the population-level. However to achieve this, systemic changes require complementary efforts by transportation agencies, park and recreation centres, city planners, education providers as well as all levels of Government to both increase and sustain activity levels of whole populations, not just those already active⁸².

Sport and all-cause mortality

Evidence from population studies in comparable settings to NSW and Australia show a relationship between differing levels of physical activity during work, leisure time (including sport and active recreation), active travel and decreases in all-cause mortality. Rigorous studies in Europe (13,375 women and 17,265 men) found leisure time physical activity to be inversely associated with all-cause mortality in both men and women across all age groups⁶. This evidence was replicated in the UK during a high-quality rigorous study of an 80 306 participant cohort. Significant reductions in all-cause mortality were observed for participation in cycling (HR=0.85, 95% CI 0.76 to 0.95), swimming (HR=0.72, 95% CI 0.65 to 0.80), racquet sports (HR=0.53, 95% CI 0.40 to 0.69) and aerobics (HR=0.73, 95% CI 0.63 to 0.85)¹¹⁶. While significant reduction in cardiovascular (CVD) mortality was also observed for participation in swimming (HR=0.59, 95% CI 0.46 to 0.75), racquet sports (HR=0.44, 95% CI 0.24 to 0.83) and aerobics (HR=0.64, 95% CI 0.45 to 0.92)¹¹⁶. In the U.S.A, data from the Behavioural Risk Factor Surveillance System (BRFSS) found women who participated in sport had better health outcomes with significantly lower odds for all chronic diseases except asthma, and better general

health than women who participated in conditioning exercise, household tasks, or recreation. Participation in formal swimming lessons was also outlined to be associated with an 88% reduction in the risk of mortality from drowning in the 1- to 4-year-old children²³.

School sport, physical education and public health

Sport and active recreation is unique in its ability to be tailored for populations through-out their life course. The first of these is school-based sport and physical education aimed at children and adolescents. A comprehensive review of scientific evidence available shows that physical education and school sport has a positive and profound effect on the physical, lifestyle, affective, social and cognitive domains of child psychology¹⁵. Studies in Australia showed 72% of 9 year olds and 63% of 12 year olds took part in a sports club. Sports club participation was significantly associated with higher physical activity levels at 12 years but not 9 years. An important distinction as a wealth of evidence is available showing that as children move into adolescence; a higher proportion of total physical activity comes from participation in school sport. With physical inactivity during this period a potential predictor of obesity in later life. Regular participation in at least 3 hours per week of sports activities and competitions on top of physical education programs has also shown to be associated with increased physical fitness, lower whole body and truncal fat mass in pre-pubertal boys¹¹. An important body of evidence is also emerging examining the contribution that organised sport makes to health related outcomes in Australian children aged 10-16 years. An Australian cross-sectional study (n=4273) found that boys spent 97.5 minutes and girls 86.6 minutes in daily physical activity, with the majority spent in organised physical activity (boys, 56.3%; girls 60.5%)⁶⁶. Both organised and non-organised physical activities are important contributors to children's overall physical activity; however, for girls, organised physical activity was more strongly associated with fitness and fundamental movement skill competency. Indicating that sport and active recreation affect males and females in different domains. School physical education programs are an ideal delivery vehicle for organised sport and recreation and need to be central to education policy.

Children's physical activity levels throughout school life can be classified into 4 trajectories of: consistently active, decreasing moderate physical activity, substantially decreasing physical activity and consistently inactive, with the majority of children (52.9%) classified in the decreasing moderate physical activity trajectory. Importantly, children in the 'consistently inactive' trajectory also followed a trajectory of no participation in sports⁹⁰. This infers that sport is both a significant contributor to children's daily physical activity levels, and leads to children seeking more physically active lifestyles later in adolescence.

This sentiment was strongly supported by a 2016 systematic review looking at the impact of youth sport participation on children's physical activity and obesity status. The review concluded that participation in youth sport was positively associated with children's total physical activity levels, and

that youth participating in sports were more likely to persist in their physical activity throughout childhood and into adolescents⁹².

Sport club participation during childhood could also be an important contributor to decreasing childhood overweight and obesity. A longitudinal study in Australian youth aged 8-16 found that sports club participants were more physically active at all age groups than non-participants. Fitness was also found to be higher among sports participants, and female sport participants had 2.9% less body fat. Importantly, this participation led to higher fitness levels being maintained over time, but as found in comparable studies, their greater physical activity diminished during adolescence, this being more evident among girls¹⁶⁵.

Another strong contributor of physical activity levels in school children, and an indicator for continued physically active lifestyles as they move into adolescence, is active transport to school. A nationally representative cross-sectional study (n=4,468) in England found that the 64% of children who walked and the 3% who cycled to/from school also had higher overall physical activity levels than the 33% who did neither¹³².

Strategies to increase physical education, active transport, school sport and sport club participation appear particularly pertinent in childhood.

Sport and active recreation's impact through the participants life-course

Sport and active recreation also harnesses the potential to sustain benefits to participant's throughout their life-course from childhood, into adolescents, and across adulthood into old age. In the transition from childhood to adolescence, sports club participation at 9 years old was highly predictive of participation at 12 years, a small but crucial step as this life stage can see large decreases in overall physical activity¹⁸. Greater sports participation frequency in children aged 10-18 in Ireland was also found to significantly predict higher physical activity levels 5 years later. While elite level sport involvement in adolescents had a medium-to-large effect on physical activity levels 5 years later⁶⁵.

A long-term study in the U.S sought to identify the unique predictors of a healthy 25 year-old sustaining involvement in physical activity at 75 years old. The single strongest predictor of later-life physical activity levels was whether the participant had being involved with a sports club during high school, with this also being a predictor for less health service utilisation in life³⁹. These findings were replicated in a relevant systematic review and other U.S and Canadian based studies that found participating in organised school age sporting activities predicted leisure time physical activity as an adult (N=3687). This association was consistent in the various subgroups of marital status, age, smoking, shift work, body mass index, and religious observance. The association was also found to extend outside the realm of physical activity and into nutrition, sexual health and violent behaviour. The longitudinal Centres for Disease Control and Prevention's Youth Risk Behaviour Survey showed a

positive relationship between sport participation, weight loss and increased fruit consumption, which remained consistent across years and race/ethnicity. The same survey also found an inverse relationship between carrying a weapon, considering suicide, attempting suicide and sport participation¹⁶².

Despite Australia being one of the leading countries worldwide in terms of participation, 25–35% of young Australians (5–17 years) do not participate in organised sports. Recommendations from the 2014 Active Healthy Kids Australia study included the provision of good quality physical education during primary school, citing the above evidence for this being a predictor of increasing physical activity at the national level¹⁷³. With organised sports being a strong contributor to recommended physical activity levels at all ages, the provision of physical education appears particularly beneficial to N.S.W and Australia.

Sport and active recreations contribution to recommended physical activity levels

The World Health Organisation recommends Children/adolescents (5–17) should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. While adults should accumulate at least 150 minutes of moderate-intensity physical activity, or at least 75 minutes of vigorous-intensity physical activity per week. Sport and active recreation can make a strong contribution to all ages reaching these targets, and for maintaining and improving health throughout a person's life.

Australia's 2010 Exercise, Recreation and Sport Survey (ERASS) survey (n=21,602) found 82 % of Australian's reported some leisure time physical activity in the 12 months, with 11 % being through organised active recreation, and 18 % through club-based sport⁴⁶. This is encouraging, but shows a large opportunity for strategies promoting further increases. Cycling emerged from the ERASS survey as one potential form of active recreation to increase physical activity levels with a third of Australian cyclists meeting the physical activity guidelines of 150 min/week. Furthermore; two thirds of those participating in organised or partly organised recreational cycling met the guidelines. More attention is needed from city planners and policy makers to promote cycling to its full potential as a tool for public health¹⁶⁷.

Evidence from the UK found that youth (mean age 12) club-based soccer could contribute as much as 60.27% and 70.68% toward daily weekend MVPA, and vigorous physical activity respectively⁵¹. However, following trends in youth physical activity research, this contribution was higher in older teens than younger teens, as older teens become less physically active in other domains. This makes organised sport particularly important in adolescence. In Australia, 56.3% of total physical activity time in males and 60.5% in females aged 10-16 years were accumulated in organised physical activity⁶⁶. While in Portugal male participants in organized sports spent significantly more time in MVPA than non-participants. This participation accounted for 11% - 13% of total daily energy expenditure, corresponding to 35% - 42% of the moderate-to-vigorous portion of daily energy expenditure. In the

U.S, further analysis of the National Health and Nutrition Examination Survey (1999-2006) found Walking (28%), sports (22%), and dancing (9%) contributed most to physical activity volume; with the attributable proportion being higher among men than women for sport-based activity (30% vs. 11%)¹⁷⁶.

Despite sport and active recreation accounting for a large proportion of weekly physical activity levels across all ages, significant differences and areas for improvement are available. At the forefront of those were several population level surveys that found lower sport participation and physical activity levels amongst females when compared to males in both childhood and adolescents. One study found that lower female enrolment in organised sport clubs fully accounted for gender differences in frequency of overall physical activity¹⁷⁵. While a higher female sport club withdrawal rate accounted for a small but significant part of the gender difference in weekly hours of overall activity¹⁷⁵.

Although the above evidence shows that organised sport is an important part of meeting physical activity recommendations, opportunities to increase its role still exist. When measuring school-sport time objectively using accelerometers, the average student spent 49% of the time in sedentary activity (25.4 ± 5.7 min), while 33% of the match (16.9 ± 4.7 min) was spent in moderate-to-vigorous activity (MVPA). From this, organised sport was calculated to have contributed to 25% of the daily recommended MVPA, while more could be done to increase its role by promoting further MVPA during school sport activities¹³⁷.

Sport and public health

The use of sport as a key tool in Public health is gaining both momentum and resource allocation from academics, public health professionals, aid organisations and Governments alike. Sports role in Public health now needs: 1) pursuing the health component of sport far more thoroughly and in its very broadest sense, 2) defining sport broadly beyond elite forms to include a wide-range of physical and lifestyle activities, 3) developing 'spatial sports studies' as a more expansive interdisciplinary field of inquiry spanning the health and social sciences⁷.

Evidence of its use as a public health tool can be seen in new innovative organised active recreation strategies in various settings. An evaluated example of this is 'Parkrun', a UK-wide network of free weekly timed 5-km runs in public parks. Evaluation of 7308 adult participants showed that 25.3% of participants were non-runners, with this group containing a higher proportion of females, people who are overweight (BMI >25) or obese (BMI >30) and those with a disability. This engagement with hard to reach groups and those least active in society is a major step forward for organised recreation into the field of public health¹⁵⁷. While the centres for disease control and prevention found a consistent inverse relationship between sport participation and considering suicide, attempting suicide, and not smoking. Showing the potential for sport to impact mental health and tobacco use, major areas of focus in NSW and Australian public health system¹⁶². Further studies linked workers being active in

their leisure time twice or more each week, to significantly less sickness absence compared to inactive workers. Despite this, an important opportunity exists to leverage the significant national interest in sports to promote greater participation and public health awareness through direct and indirect means¹⁷³.

Other

One example of this is in further leveraging mega sporting events such as the Olympic Games to increase participation at the population level. Several studies examined previous attempts through the Sydney Olympic Games, Vancouver Winter games and London games⁴¹, with no discernable impact. Small effects were shown in medium sized events on large town/city centres¹²⁶, however the best-buy methods for creating this effect are yet to be elucidated¹²⁵.

2. Mental health benefits

Key Points:

- Sport and active recreation is particularly important in early childhood and adolescence as this can be the first stage symptoms of mental illness arise, with participation leading to better psychological functioning, emotional well-being and social interaction^{22, 155}.
- Physical activity is associated with a lower rate of cognitive decline in older adults⁴.
- Involvement in sporting activities is associated with more functional body image, lower anxiety scores, less depressive symptoms and higher subjective well-being (happiness), irrespective of gender¹.
- Link between organized sport, physical activity levels, academic achievement and productivity^{40, 79}.
- Sport can be used to effectively target high-risk mental health illness groups such as Indigenous Australians, isolated communities, low-income households and those diagnosed with a recognized mental disorder (e.g. Alzheimer's, bipolar or schizophrenia)³⁵.

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Mental health is characterised by emotional wellbeing and resilience to stress. Mentally healthy individuals are able to cope with daily stresses and fully participate in family, work, sport, leisure, and community activities. Physical activity stimulates a biochemical response in the brain that influences one's mental state, with regular physical activity, in appropriate amounts, contributing to personal wellbeing. Sport, active recreation and physical activity in general can promote and encourage social interaction, which supports good mental health in early childhood, adolescence, early adulthood and in older adults.

Children, adolescents and development

Scientific evidence for the health benefits of physical activity and organised sports in early childhood and adolescence is well documented. Sport and active recreation for this group is seen as particularly important and can be the first developmental stage that symptoms of mental illness arise. Physical activity during early and mid-adolescence is also associated with more favourable sleeping patterns, and better psychological functioning, including curiosity and exploratory behaviour, mental toughness and emotional well-being^{22, 155}. It is also documented that during adolescence, sports and group activities can assist participants to learn to help others, develop teamwork skills and self-confidence, build social connections, and can increase subjective well-being and happiness⁵⁵. A large scale study of 10,987 pupils found adolescents who are involved in organised sport not only perceive they are in better mental and physical health, they also develop self-efficacy to succeed in other areas such as educational attainment. Sports clubs have the ability to positively influence adolescents' current mental and physical conditions, as well as their future expectations toward work and happiness⁵⁷.

Depression in children and adolescence can be classified into three trajectories: (1) low and declining depressive symptom scores, (2) moderate and stable depressive symptom scores, and (3) high increasing depressive symptom scores. Analysis of a large school-based sample in Canada found Group 2 and group 3 participated in significantly less moderate physical activity and were less likely to participate in team sports compared to group 1¹³⁶. Organised sport can also act as a mediator between negative experiences and the depressive symptoms that follow. In Canada, children who reported peer-victimization and participated in team sports displayed significantly fewer depressive symptoms compared to victims who rarely participated. Participation in team sports also counteracted the longitudinal effect of peer-victimization on depressive symptoms two years later, and victimized children who were part of a sporting team were also less victimized two years later. This evidence was backed up by studies in Europe that found organised team sport to be a positive mediating factor on early indicators of anxiety in children¹⁴¹.

Sport, active recreation, cognitive function, academic performance and productivity

As well as positively impacting children and adolescents during the early years of development, sport and active recreation also impacts cognitive function, academic performance and productivity.

The rigorous longitudinal Health, Ageing, and Retirement in Europe (SHARE) study found physical inactivity to be associated with a higher rate of cognitive decline over a mean follow-up of 2.5 years for those aged 50 and above⁴. In other European studies, low levels of physical activity in adults predicted a decrease in physical functioning 10-15 years later, as well as poor physical functioning across the same period. An increase in physical activity in adults was also found to protect against the onset of anxiety 10-15 years later.

Sport and physical activity has also shown to be effective in managing symptomatology of mental illness. A systematic review of the impact of being introduced to a sport and sport participation on health indicators in people with schizophrenia found that mean reductions in the positive and negative symptoms score ranged from 2.4 points following 12 weeks of basketball, to 7.4 points following a 40 week programme of horse riding. The review concluded that in general, sport has the potential to improve a mentally ill individual's quality of life through providing a meaningful normalizing activity that leads to social interaction and achievement.

Another field of research into sport and active recreation is its impact on academic performance and productivity. Evidence supports the view that physical fitness, single bouts of physical activity, and physical activity interventions benefit cognitive functioning due to its relationship to areas of the brain that support complex cognitive processes⁴⁰. While significant correlations were found between the level of physical activity and total grades in high schools, and suggested one mechanism for this was through increased self-efficacy and self-esteem⁵⁰. The national educational longitudinal study (NELS) of 16,449 U.S high school students found involvement in school-sponsored clubs and sports to be associated with a 1.5 to 2 percent improvement in test scores and a 5 percent improvement in Bachelor's degree attainment expectations⁹⁵. Results were replicated by the 2010 Minnesota Student Study in the U.S that also found participation in school sports to be associated with higher GPAs¹⁷¹. The positive mental effects of sport and active recreation were found to be generally larger for women than men, especially if they participate in competitions¹²³.

Organisational team sporting programs can be used to establish strong bonds between employees, as well as positively influence employees' work values, i.e. self-actualisation, security and relationships; and have been shown to increase self-reported perceived productivity⁷⁹. Studies in young adults in the post-school or university phase of life were also found to be high-risk group for both physical inactivity and its associated harms. Compared with active participants, inactive participants in this life-stage had up to a 4.0-fold higher job strain, consistent between genders¹⁸².

Despite scientific evidence of school sports' positive impact on productivity and academic achievement, considerable debate surrounds whether the decrease in academic time needed to implement such programs would off-set improvements. Data from Canadian schools indicated that allocating up to an additional hour per day of curricular time to physical activity programs does not affect the academic performance of primary school students negatively. Additional curricular emphasis on physical education may result in small absolute gains in grade point average (GPA), with such findings strongly suggesting a relative increase in performance per unit of academic teaching time¹⁷⁰.

Mental health and happiness

Although strong evidence exists that sport-club participation and active recreation can positively impact symptoms of depression, mental illness symptomatology and risk factors for suicide ideation, frequent participation in MVPA can also reduce psychological distress and improve subjective well-being and happiness¹³⁵, decreasing the likelihood of falling into a high-risk mental illness category¹²¹.

Leisure time physical activity as measured in the Spanish National Health Survey of 29 478 persons (11 645 men and 17 833 women, > 16 years) was found to be associated with a higher prevalence of perceived health status and subjective mental health (GHQ scale); with more vigorously active people experiencing additional positive indicators of mental well-being³⁷. This association was replicated in the SEYLE (Saving and Empowering Young Lives in Europe) study where frequency of physical activity and participation in sport were both found to independently contribute to greater well-being, lower levels of anxiety and improved depressive symptoms across both genders¹⁰⁶. This relationship can be categorised as a dose-response relationship due to incremental increases in physical activity volume leading to increases in happiness scores¹³⁰.

There are also known associations between sport club participation and subjective wellbeing (SF-36 scores)⁴⁵, with club-based or team-based sport being associated with improved health outcomes in different domains compared to individual activities. Sport participation and not total physical activity is also associated with better mental health¹⁰¹, likely due to the social nature of the participation; while Individual sport participants derive mental health benefits that can enhance personal development⁴⁷. People achieving leisure time physical activity from family activities, and those doing more diverse forms of physical activity, had a higher association with mental wellbeing. While active travel was also found to contribute to better mental wellbeing and mental health among the moderately and highly physically active¹⁰³.

Depression, body image, anxiety and suicide ideation

Involvement in sporting activities was also associated with more functional body image, lower anxiety scores, and less suicide ideation than those not involved¹. Scientific evidence reviews show that even spectatorship of sports events can have an impact on positive moods and subjective well-being. This was furthered through application of social theory where national pride from international sporting success of representatives contributes to well-being through social integration over a shared goal^{8, 120}. The 2003 Youth Risk Behaviour study in the U.S (n=10,530) reported that compared to inactive students or sports team non-participants, the odds of suicide ideation were lower among boys reporting frequent vigorous-intensity physical activity and sports team participation. The same study found that suicide attempts were also lower among frequently vigorously active boys and sport team participants. Other studies have tried to replicate results and found that it was not physical activity in general that held the mediating effect on suicide and depression, but specifically leisure time physical activity (e.g. sports and active recreation) rather than non-leisure time physical activity (e.g. travel and work)²⁷. The aspect of physical activity responsible for the decrease in depressive symptoms was also investigated. Of the three exposure variables hypothesised to mediate mental health benefits: Sports team engagement, total physical activity or physical education class attendance, only sports team engagement was negatively associated with suicidal thoughts, plans, and attempts. This indicates that physical activity during team sports adds value in other domains of psychology that individual physical activity of the same intensity and frequency doesn't. Possible mechanisms and domains include increases in social support, relationship building and social integration¹⁶³.

In Europe, the SEYLE (Saving and Empowering Young Lives in Europe) study of 11,110 participants concluded that frequency of physical activity and participation in sport were both found to independently contribute to greater well-being, lower levels of anxiety and depressive symptoms in both sexes. Several cross-country studies additionally found that frequent participation in MVPA is also known to reduce psychological distress and decrease the likelihood of falling into a high-risk mental illness category^{121, 136}.

The impact of competitive, elite and professional sport adds a significantly different dimension to mental health than regular club-based involvement. In the U.S, current student athletes demonstrated evidence of better psychosocial health and mental component health-related quality of life than non-athletes. Although evidence of this quality of life into older age was inconclusive due to older alumni student athletes reporting greater joint health concerns¹⁵⁰.

Evaluations of sport based physical activity programs by Australian and U.S Governments found that people who participate in sports clubs and organised recreational activity enjoy better mental health, are more alert, and more resilient against the stresses of modern living. Participation in recreational groups and socially supported physical activity is also shown to reduce stress, anxiety and depression,

and reduce symptoms of Alzheimer's disease, yet more than one-third of adult Australians report no participation in sports and physical recreation¹⁶⁰.

Vulnerable populations

Sport and active recreation also has the valuable property of improving the lives of vulnerable and disadvantaged populations in unique and important psychological and social domains compared to the general population.

Aboriginal Australian adolescents suffer high rates of mental illness and social disadvantage. However, amongst Indigenous youth aged 15-19 years there is a positive relationship between participation in sport and rating of overall health and risk of mental health disorder. Indigenous youth who participate in sport were found to be 3.5 times more likely to report good general health and 1.6 times more likely to have no probable serious mental illness³⁵.

Considerable benefits from organised physical activity were also found for older adults over the age of 65. In this group, moderate-to-vigorous physical activity was associated with higher levels of both general and specific dimensions of well-being. Moderate-to-vigorous physical activity and light physical activity are also associated with different dimensions of well-being in old age, suggesting that different intensities of late-life physical activity make distinct contributions to well-being⁸⁸. While sport also plays a role in managing symptomatology of diagnosed and degenerative mental illness' in later life such as schizophrenia, Alzheimer's and bipolar disorder¹⁵¹.

Sport is also used as a public health tool in low-income and post conflict settings due to its reported effective role in peace building, social inclusion, gender empowerment, mental wellbeing and physical fitness¹²⁹. As a developing field, sport-for-development is yet to be accompanied by a strong body of evidence. However with national Governments, the United Nations Children's Fund (UNICEF) and United Nations Office on Sport for Development and Peace (UNOSDP) investing in program design, delivery and evaluation, its role looks set for the future.

Key Points:

- Small, medium and mega-events appear to have a significant return on investment for the host community or city^{2, 74}.
- Although park and recreation centres were found to have less visitor-driven economic impact, they were found to increase social capital, well-being and property prices^{12, 33}.
- There appears no agreed upon, or best methods for estimating the economic impact of events and stadia investments.
- Events and stadia create value through increased national image and national pride⁶⁰.
- Corporate fitness programs add value through increased corporate image, recruitment of premium employees, productivity, decreased absenteeism and turnover, lower medical costs, and reduced industrial injuries¹⁴⁶.

3. Economic benefits

Throughout the screening phase of literature, there were few academic journal articles published surrounding methodology for quantifying the economic impact of sport and active recreation at the population-level. This section of the report is comprised of methodology extracted from grey literature articles. The academic literature included in this part of the review sought to quantify the economic benefit of sport and active recreation at more fundamental levels and fell into categories of: event economics, stadia economics, health and well-being savings and productivity.

Event economics

The majority of economic benefit literature surrounded methods for estimating or assessing the economic impact of hosting sporting events.

Investigation of the economic benefits of the 2007 Honolulu Marathon by runners from outside the state of Hawaii and their travelling companions found a total economic impact of \$108,890,000 that generated \$3.7 million in state taxes. This estimation was achieved through surveying based on the

Nordic model and consisted of 18 questions regarding length of stay, accommodation, amount of money spent by the marathon participants for food, lodging, souvenirs and other items while attending the marathon². The Inter-industry-based macroeconomic simulation model was used for estimation of mega-events such as the 2006 FIFA World Cup in Germany. This model utilises national data and accounts for necessary investments for upgrading stadium facilities in venues of the event, as well as tourism expenditure of incoming world cup visitors during the event in 2006³.

The predictors of higher spending during events was also studied and found that the winning percentage of the local team, nor winning a national championship had a significant impact on employment or personal income in the cities where teams play¹⁴.

Other events investigated were as diverse as the two-day rally Ourense in Spain¹⁶, non-elite small-scale events³², contribution of golf, windsurfing, horse riding, and scuba diving to the local economy in Messina – Greece⁴³, Formula One Grand Prix (F1)⁷⁴, the paddle tournament “Caceres International Open 2013”⁷⁸, the Beijing Olympics⁹⁴, and GDF-Suez Open of Seine-et-Marne in France¹⁴².

The methods used to assess economic impact were equally as varied and included: questionnaires with proportional income multiplier²⁸, Input-output model⁷⁴, cost benefit analyses (CBA)⁷⁸, computable general equilibrium (CGE) modelling⁹⁴, calculating additional expenditure by visitors and organisers³², surveying (a) average and total expenditures, (b) distribution among different categories of businesses, and (c) geographical distribution⁴³, as well as a social accounting matrix to quantify the impact of this spending stimulus on production, income and job creation within the community¹⁴⁷. The methods applicable to population-level impacts are incorporated and presented in future sections of this report.

Results of analyses of event economics were also varied. In one mega-event study of the estimated economic impacts of a Formula 1 event were reported as 205.85 million Yuan (29.8 million USD) of output, 75.51 million Yuan (10.9 million USD) of income, 17.80 million Yuan (2.5 million USD) of indirect tax as well as 1,409 full-time equivalent jobs⁷⁴. While in the case of a smaller event such as the paddle tournament “Caceres International Open 2013”, it was concluded that for every euro invested in the event has a revenue of 13.85 Euros⁷⁸.

Stadia economics

An evidence review in 2007 investigating the impact of professional sports teams and stadiums on their host communities concluded that little of the academic research that investigates effects ex post finds significant increases in income, employment, taxable sales, or tax revenues associated with sports and sports facilities²⁹. Despite this, evidence since this time shows distinct and substantial gains from stadia investments, sporting events as well as mega-events.

A case study of note was the FARGO-DOME in the U.S.A, a venue that can seat more than 19,000 fans for football games, more than 11,600 for basketball games and nearly 27,000 for concerts. The facility was constructed at an initial cost of \$48 million, with a subsequent \$6.8 million expansion to provide additional meeting rooms and a larger ticket lobby. Extensive evaluation found that over its ten-year history, the FARGO-DOME's events and operations resulted in direct economic impacts totalling \$180 million and total economic impacts of \$434 million. This level of additional economic activity supported an average of more than 600 fulltime-equivalent jobs annually in various sectors of the local economy, in addition to the facility's 20 full-time and approximately 500 part-time employees⁷².

Other relevant studies looked at the question of which parts of a local economy a new professional sports facility and team impacts and concluded that the most prevalent were changes in property values, and increases local welfare⁷⁵.

Corporate, State and/or national brand image

Although relatively difficult to quantify, sporting events add value to the area, city or country of location through increased national image, and national pride⁶⁰. At the much smaller scale, the use of sport and active recreation during corporate workplace fitness programs has been found to add value through increased corporate image, recruitment of premium employees, productivity, decreased absenteeism and turnover, lower medical costs, and reduced industrial injuries¹⁴⁶. Similarly, practising sports during unemployment is highly and positively correlated to a shorter duration of unemployment, a complimentary area of productivity savings²⁴.

Health and well-being cost savings

Economics can also be used to influence the decision to participate sport and recreation through behavioural economics. Looking at varying time and price variables, the money price effect was highest for swimming with a 10% higher price associated with 29% fewer occasions of swimming, followed by gym memberships/workouts with 3% fewer occasions. This shows that positive financial incentives, e.g. subsidising price of participation, could generally lead to an increase in quantity of sport and active recreation among those already exercising. Such policy shifts could lead to desired physical activity levels if implemented at an individual activity level (e.g. higher subsidy on swimming entrance charges than gyms) rather than a blanket implementation¹⁰. Similar behavioural economics evidence also shows that the decision to participate in sports activities in the United Kingdom and the subsequent frequency of participation were primarily motivated by perceived social and personal capital gains⁴².

Collaboration also emerged as a key developmental area for the increased role of sport in public health, and subsequent economic savings from health outcomes. Although few quality research studies exist that examine the role of community sport interventions in raising physical activity levels, the Health and Sport Engagement (HASE) intervention and evaluation study in the UK is one such

example. The intervention is a partnership between local community sport organisations and sport

Key Points:

- Sport and active recreation can be classified as a protective good for society, meaning it can protect participants against risk-factors associated with harmful activity^{26, 91}
- Sport and active recreation have a unique and valuable impact on social cohesion and inclusion, as well as engagement of participants in society¹⁴⁵. A pertinent role with social isolation a potential risk-factor for mental illness.
- Sport can also be used as a direct intervention to target specific groups of interest (e.g. men, isolated individuals and those least active in society)^{68, 111}.
- Community sport/activity centres provide a range of both economic and non-economic benefits such as: increased community visibility, enhanced community image, increases in social capital, community participation and social cohesion, be a mediator for healthier lifestyles, enhance the local profile in the region, as well as increase the number of visitors to the municipality and local businesses⁶⁰.

and public health researchers in determining what are the processes, costs and outcomes in designing, delivering and evaluating community sport interventions that engage previously inactive people in sustained sporting activity for 1×30 min a week¹⁰⁰. The nationwide U.S-based community program, the Arthritis Foundation aquatic exercise classes used the quality of well-being scale (QWB) and current health desirability rating (CHDR) as a tool for economic evaluation. These measures were supplemented by the arthritis-specific health assessment questionnaire (HAQ), Centre for Epidemiologic Studies-depression scale (CES-D), and perceived quality of life scale (PQOL) to estimate cost and outcomes¹¹⁹. This representing an alternative method for assessing the impact of sport and active recreation at the community, State and National level.

4. Community development/wellbeing

Sense of community is an important predictor of well-being and civic engagement for society as a whole¹⁴⁵. Due to this, there are countless "win-win" opportunities for community development and wellbeing through the increased synergy of sport, active recreation and public health. Sport and active recreation provide a wealth of opportunities for volunteers, protection against anti-social behaviour, as well as social change, inclusion and cohesion¹⁸¹.

Sport and active recreation as a protective good

Sport and active recreation can be classified as a protective good for society, meaning it can protect participants against risk-factors associated with harmful activity^{26,91}. Early adolescents who participate in community-based out of school activities are less likely to have tried smoking, alcohol, or marijuana. However, with respect to binge drinking, male athletes reported increased levels compared to non-athletes, this finding is consistent across a wealth of studies⁹¹.

Evidence for competitive school sport participation and academic achievement were inconclusive, as both activities require considerable time commitment⁶². Despite this, adolescence who were continuously involved in school sports from ages 13-15 were shown to have higher self-efficacy and higher value for the education system, than those with no sports participation⁷⁶. Those who continued playing sport throughout secondary school were significantly and substantially more likely to continue their education rather than to join the labour market⁹⁷.

Social cohesion, inclusion, volunteering and engagement

Sport and active recreation also have a unique and valuable impact on social cohesion and inclusion, as well as engagement of participants in society. This aspect appears a particularly pertinent role of sport, with social isolation a known risk-factor for mental illness.

Evaluations of community sport/activity centres shows they provides a range of both economic and non-economic benefits such as increased community visibility, enhanced community image and a range of increases in social capital. Community active recreation centres can also increase community participation and social cohesion; be a mediator for healthier lifestyles; enhance the local profile in the region; as well as increase the number of visitors to the municipality and local businesses (economic impacts)⁶⁰. Building a dual culture of education and sport participation within a community is also vital as large scale rigorous studies show that growing up in a family in which sport is common increases the likelihood of starting a sport⁸⁷. While educational attainment is also positively related to enrolment in sports⁸⁷, with this association shown to be consistent as adolescence move past secondary and into tertiary education⁹⁷.

Despite positive areas for social development stemming from the promotion of sport and active recreation, opportunities to leverage further benefits still exist. Mega events present opportunities to develop considerable human and economic capital through strengthening existing relationships of stakeholders, Governments and contractors, and to build up a valuable reputation of the area's ability to host such events in the future¹⁷⁸. In leveraging mega events for social capital, a comparative study of 7 Olympic sites (Atlanta, Nagano, Sydney, Salt Lake City, Athens, Turin and Beijing) found that socially excluded groups in the host community are very rarely beneficiaries of the event. Little evidence exists of fruitful co-operations with existing networks, participation by socially excluded

persons in planning, and delivery of targets during the period of the Games. The only real mechanism for benefit still argued is the trickle-down effect, however a paucity of evidence exists to comment if this is only positive rhetoric¹⁰⁹.

This supports the notion that sport, in and of itself, is not a sufficient condition to promote inclusion. Sport as a “common interest” allows participants to connect to each other through both formal participation and through informal settings. One of these informal mechanisms is volunteering, that procures feelings of value recognition, human development, involvement and engagement¹²⁸. Volunteering through sport is also largest volunteer sector in Australia, with 2.3 million people currently filling roles that would otherwise incur considerable economic cost to stakeholders¹³.

Another mechanism is through tailoring sport to target high-risk groups prone to social isolation and related social harms. In the U.S qualitative research into the role of sport in the assimilation process of newly arrived immigrants found the majority experienced low levels of recreational sport participation during the first post-settlement period. The social class and ethnic background of immigrants heavily influenced subsequent changes in their sport participation¹⁵⁸. In Australia, community sport inclusion days are held in various community centres. South Australia holds such events aimed at recently arrived migrants and refugees from culturally and linguistically diverse backgrounds (CALD), a group particularly vulnerable to social exclusion. Regular, free soccer activities in one case study engaged young people from a great variety of nationalities, including over 50% refugees. However, such programs aren't without considerable barriers. VicHealth evaluated 22 community projects over 3 years in the ‘Participation in Community Sport and Recreation Program’ in Victoria, Australia. Major barriers to participation were cost, lack of transport, cultural differences, the environment of sporting groups and inaccessible facilities for people with disabilities. Projects that overcame these selected one or two priority groups, put significant effort into communication and building partnerships with community organizations, provided training to staff and volunteers and created new or modified forms of activity¹⁴⁹. The creation of social capital through sport is also not without considerable concerning barriers. Social networks and status positions in sport if not addressed with appropriate consideration can reproduce social divisions rather than contest or resist them. Sport is also still largely gendered, with considerable social pressure to join local sporting clubs prevalent in smaller communities. However if implemented correctly, these clubs provide an opportunity to acquire new skills, as well as new forms of knowledge and experience through sport participation¹⁵². The innovative nature of sport and recreation means that alternative approaches can extend the health benefits of sport participation to disadvantaged children and youth who are excluded from traditional sport participation opportunities¹³¹.

Sport and active recreation interventions as a vehicle for change

In furthering the role of active recreation in vulnerable populations, sport can also be used as a direct intervention to target specific groups of interest. Sport for development and peace programs run in indigenous populations in Australia and Canada have been shown to be successful and particularly beneficial in social and mental health if programs are led by Indigenous peoples and components are fundamentally shaped by Indigenous voices, epistemologies, concerns and standpoints⁶⁷. Three specific case studies of these programs include the 'Imagine Your Goals' program in the UK, Youth Unified Sports programme in Europe and the Football United program in Australia. The 'Imagine Your Goals' programme, run by 16 Premier League football clubs in conjunction with England's 'Time to Change' programme aims to reduce mental health-related stigma and discrimination. Evaluation of 'imagine your goals' showed that elite-level sporting clubs, and the charitable foundations they set up, can successfully deliver programmes to people with mental health problems which improve access to personal skills and social capital⁶⁸. Sporting interventions being used as a vehicle for change have also been trialled in schools to reduce violent behaviour. Achieving significant reductions in aggressive behaviours such as violence, failing to calm down, frustration intolerance, and throwing articles⁸⁶. Football United aims to build the capacity of young people in diverse communities in both Australia and Myanmar through soccer (football). Evaluation of the program by the University of New South Wales found that the Football United participants had significantly lower scores on the peer problem scale and significantly higher scores on the pro-social scale, and also higher levels of other-group orientation. A lower score on peer problems and higher scores on pro-social behaviour in the survey were positively associated with frequency of program attendance¹¹¹.

The process' by which these changes took place were evaluated in the Youth Unified Sports programme of Special Olympics in 2013, and found four mechanisms: (1) the personal development of athletes and partners; (2) the creation of inclusive and equal bonds; (3) the promotion of positive perceptions of athletes; and (4) building alliances within local communities¹⁰⁵. It was also found that impacts are more likely to be sustained when some or all of the following project features are in place: effective matching of pupil needs with the specific project objectives; locating project activities outside of the 'normal' school context; working closely with pupils to choose activities, set targets and review progress; establishing positive relationships between project leaders/supporters (mentors) and pupils; and giving pupils the opportunity to work with and for others¹³⁹. Gendered differences in program outcomes meant that the extent to which disadvantaged girls derive benefits from their participation in sport also depends on group composition¹⁴⁰.

Community pride / rural areas

Social and human capital stemming from community-based sport and active recreation also appears to offer a crucial 'glue' to rural, isolated and smaller communities. Sports club membership data from five popular team sports in Victoria found participation rates were generally higher in non-

metropolitan than metropolitan areas⁴⁶. Sporting associations in rural areas provide a range of unique non-economic benefits such as enhanced community image, and social cohesion; creation of a better lifestyle for the community, as well as the social benefits associated with opportunities for community

Key Points:

- Children involved in organised sport, recreation and particularly elite-level competition are a particularly high-risk group for mental harms due to the clash between the crucial developmental stages of childhood, and the unique social and cognitive pressure that arises from its competitive nature¹⁷⁴.
- Participation in sport and active recreation incurs higher injury risks, increasing the risk of decreases in quality of life, low mood, and in some cases – depression¹⁹.
- The high and extended periods of emotional pressure in sport, social isolation, competing interests (education and competition), cost and time pressure as well as extended periods in hyper-alert competitive states can be risk-factors for poor mental health¹⁷.
- The unique pressure semi-elite and elite athletes are exposed to can also influence binge drinking behaviour, eating patterns and varying forms and levels of addiction^{59, 169}.

volunteering⁶⁰. Football clubs, which are a social hub in many rural communities, were seen as an effective conduit to access young people experiencing mental health difficulties. The ‘Coach the Coach project’, with the sub-title ‘don't wait - talk to a mate’, resulted from this initiative¹²⁴.

Community pride and happiness are also significantly associated with elite sports, sport participation and socio-economic variables in community settings. Women, individuals with a low educational background, and low income are the population segments who gain most from the sporting success of local sporting teams⁶⁴. In a study undertaken in the Northern Wheat belt of Western Australia, sport was found to contribute strongly to social connectivity, volunteering, social interaction and engagement. However for these benefits to be applied evenly across society, attention had to be paid to breaking down of social barriers into sport, as well as strategies to diminish exclusionary behaviour based on gender, race and class¹⁶⁸.

UNINTENDED EFFECTS

1. Individual physical/mental health effects

A recent systematic review into the negative impact of organised sport on the family unit showed the most prevalent to be: physical and psychological effects on the youth athlete; the straining financial and practical investments that parents undertake with having children in organised sport, issues surrounding parental mental health, and psychosocial effects on siblings such as feelings of

resentment and jealousy towards their brother or sister¹⁹. As with any activity, sport and active recreation contain negative impacts or ‘externalities’ that require both attention and mitigation. The first of these are both the direct and indirect physical and mental health harm that can be incurred by an individual.

Children

Children involved in organised sport, recreation and particularly elite-level competition are a particularly high-risk group for these harms. This stems from the clash between the crucial developmental stages of childhood, and the unique social and cognitive pressure that arises from competitive participation in sport and active recreation. In reaction to this pressure, the first large-scale prevalence study on interpersonal violence against children in sport was commissioned in Europe. 38% of all respondents reported experiences with psychological violence, 11% with physical violence, and 14% with sexual violence. Ethnic minority, lesbian/gay/bisexual and disabled athletes, and those competing at the international level faced significantly higher levels of interpersonal violence in sport¹⁷⁴. There have also been growing fears of the impact of paediatric sports-related traumatic brain injuries in the developmental stages of childhood and adolescence, as well as complications from these injuries in older adulthood. Data from the National Trauma Data Bank (NTDB) in the U.S.A outlined that extra-cranial traumas are important predictors of patients developing acute medical complications, prolonged hospital and ICU stays, and in extreme cases, in-hospital mortality rates¹⁸³.

Injury, decreased quality of life and depression

Participation in sport and active recreation incurs higher injury risks, leading to decreases in quality of life, low mood, and in some cases – depression¹⁹. With a supportive policy environment increasing participation in organised and elite sport, policies for the accompanied increase in injuries need to be considered. Across the past 10 years in Victoria alone, frequency of non-fatal hospital-treated sports injury in children and adolescence under 15 years increased by 29%⁵³. This suggests an urgent need to prioritise sports injury prevention in this age group⁵³. For adults, the overall annual rate of hospital treated sports injuries increased by 24%, and lower limb injuries by 26% over 7 years. The associated aggregate economic burden was calculated at \$265 million for all sports injuries and \$110 million for lower limb injuries⁵².

The injury concern for sport participants also varies across genders. A unique developmental concern for female athletes is known as the ‘triad’, characterised by an interplay between low energy availability, menstrual disturbances, and decreased bone mineral density. The female athlete triad can lead to diminished quality of life as the athlete moves into older adulthood. Educational initiatives need to be geared toward athletes, as well as coaches, athletic trainers, school nurses, primary care providers, and others involved in female athletics to allow early identification and intervention⁷³.

Concerns for traumatic brain injuries have also come to the forefront of injury attention in Australia after several high profile incidents. Despite significant policy action been taken, this area of injury will likely populate debate well into the future¹⁸³.

Youth sport tends to follow two trajectories, being: (1) sport samplers, characterised by playing various sports for enjoyment, health and social benefits, and (2) specialisers, who focus on one sport at an elite level. Research into the unique outcomes of each trajectory showed that "samplers" reported more experiences regarding the integration of sport, family as well as linkages to the community. Although the "specialisers" reported higher levels of physical/emotional exhaustion compared to the "samplers, they also reported more experiences related to diverse peer groups¹⁵⁹.

Athletes, sport and depression

Elite sport also exposes participants to unique competitive conditions that are known risk-factors for anxiety and depressive symptoms. These conditions include high and extended periods of emotional pressure, social isolation, competing interests (education and competition), cost and time pressure as well as extended periods in hyper-alert competitive states. This pressure starts at a young age with the selective nature of team sports known to impact subjective state (positive and negative emotions), classroom performance (attentiveness, grades), attendance/truancy, and self-efficacy¹⁷. The straining financial and practical investments that parents undertake with having children in elite sport can also impact family structure through imbalanced parenting investment¹⁹. Young athletes competing in individual sports were also found to be more prone to depressive symptoms than athletes competing in team sports. With this high risk group needing a higher degree of psychological attention¹¹⁵. Gender differences also exists in relation to child and adolescent participation in sport, and the negative externalities experienced. Although adolescent girls participated in organised sport at a lower rate than boys, they experienced higher levels of peer-based abuse. It was concluded that peer-based abuse and body image concerns may contribute to adolescent girls' reduced rates of participation in sports and other physical activities¹⁴⁸.

Retired athletes also face considerable and unique challenges that are known risk-factors for depression. Data collected from the 'Retired professional football player's survey' in the U.S found that although retired professional footballers experience levels of depressive symptoms similar to those of the general population, the impact of these symptoms leads to larger decreases in quality of life stemming from high levels of difficulty with pain and poor joint health¹⁴³.

Binge drinking, eating disorders and addiction

The unique pressure semi-elite and elite athletes are exposed to can also influence binge drinking behaviour, eating patterns and varying forms and levels of addiction. The proportion of athletes suffering from some kind of eating disorder was found to be as high as five times that of the general population¹⁶⁹. In some cases this harm was mediated by media focus and exposure. Audiences of

'body-focused sports' such as ice skating, gymnastics and swimming during the Olympic games were more likely to have negative body imagery amongst women. In general, non-professional performers of sports emphasising thinness or muscularity, such as ballet and body-building, show a high degree of body uneasiness and inappropriate eating attitudes and behaviours¹²⁷. This potentially stemming from high-focus on the body of the athlete. While those of 'performance-focused' sports such as basketball, soccer and tennis had more positive attitudes as the body is more seen as an instrument of athletic ability²⁰. For men, body image issues emerged from power sports in particular. Being a bodybuilder was associated with 5.7-times higher predisposition for a health harmful practice than casual weightlifters. While entering bodybuilding competitions was associated with a 3.2-times higher muscle size dissatisfaction and a 4.8-fold increase in reported predisposition for health harmful muscle gain practice⁷⁷.

The German Young Olympic Athletes' Lifestyle and Health Management Study (GOAL), which investigated eating disorder epidemiology in European athletes, sought to define risk-factors for policy consideration and correct distribution of psychological assistance during competition. High risk groups comprised (a) athletes competing in weight dependent sports, (b) athletes who are high on negative affectivity, (c) female athletes and (d) male athletes competing in endurance, technical or power sports. Athletes reporting eating disorder pathology also showed higher levels of depression and anxiety than athletes without eating disorder pathology⁵⁶.

Alongside the negative influence sport can have on eating disorders, organized sport participation was also found to be strongly associated with binge drinking. This relationship held constant across racial and gendered lines with the effects of exposure extending beyond just the time of sporting involvement⁵⁹. Evidence exists for sport participation's protective effect against cigarette, and illicit drug use; however this protective effect doesn't hold firm against binge drinking⁹⁶. Athletes reported more binge drinking, heavier alcohol use, and a greater number of drinking-related harms than the general population. One mechanism for this appears to be that athletes are more likely to exhibit the strong social ties found to be associated with binge drinking. Athletes, despite drinking more heavily than other students, also reported greater exposure to alcohol prevention efforts and possess unique motivations to limit their alcohol use¹¹³.

Other

Other relevant physical and mental health (unintended) effects supported by only exploratory or single study evidence, focused on the normalisation of violence in sport. One study examined the relationship between measures of sports participation, competitiveness, the need to win and the acceptability of violence in dating relationships. Only the need to win was associated with the acceptability of dating violence, not sports participation or competitiveness¹⁰⁸. Aggressive coaching culture may allow physical aggression and violence between young people to thrive. Just as the

educational field began to realise 15 years ago that children's voices were being excluded from education decision-making, the same may be argued about the absence of children's voices in informing decision-making in organised sport. Children need to be central in helping shape a new positive 'sporting culture', understanding violence and bullying and its impact in sport, and in the development of guidelines for children's participation in sport¹⁵³. The above evidence points to the need for aggression in some sports seeping into other areas of society, with this needing thoughtful consideration.

2. Unintended economic effects

Key Points:

- In 2013, the average weekly household expenditure on sport and recreation products during 2009–10 was \$18.94¹³. Despite Australian families spending more money on screen recreation than active recreation; strong economic and cultural gradients exist in their patterns of expenditure on both⁵.
- Demand for sport and exercise was negatively associated with time (travel or usage time)⁹.
- Injury, even in minor cases brings with it the expectation of financial output for families, and consideration as a barrier to participation.
- Evidence for income as a barrier to participation was inconclusive, but it may influence type of sport and number of sports for participation⁹.

The Australian Bureau of Statistics reported that in 2013, the average weekly household expenditure on sport and recreation products during 2009–10 was \$18.94¹³. Despite Australian families spending more money on screen recreation than active recreation; strong economic and cultural gradients exist in their patterns of expenditure on both⁵. This suggests that costs of active recreation may be a barrier to participation for some families, but that there are also social and cultural values also influencing choices.

Cost for families as a barrier to participation

Economic analysis of family participation in sport found that demand for sport and exercise was negatively associated with 'variable' price and positively correlated with 'fixed' price. Meaning the unknown nature of the costs of sport (e.g. unexpected equipment replacement, unknown tournament cost) was a barrier for participation⁹. Sport is also a substantial economic cost for most families, with different sports making different financial demands. A survey of 220 families in QLD and VIC from the sports of cricket, Australian football, gymnastics, hockey, netball and tennis found that family income and structure are the key factors in determining the likelihood of a child's involvement in junior sport. For many Australian children, financial factors may be barriers to their participation in junior sport⁸⁵. However the finding of family income as a predictor for sport involvement was inconclusive with others studies concluding that neither low levels of education nor personal income were barriers to sport⁹³. Of particular interest to cost as a barrier to sport participation was a cross-national secondary data from the United Nations. The study concluded that countries with less income inequality have more leisure time and higher levels of cultural and sporting participation. Furthermore, in these countries increased leisure time and higher levels of participation in cultural and sporting leisure activities also held constant across all income and socio-economic groups¹⁷².

Time cost

The findings that time cost is a major barrier was consistent across studies. Demand for sport and exercise was negatively associated with time (travel or usage time)⁹. Therefore time availability is a major area for policy consideration to expanding the base of participants or increasing the intensity of participation. This finding also lends higher importance to the promotion of school-based physical education and organised sporting opportunities.

Injury costs

Injury, even in minor cases brings with it the expectation of financial output for families, and consideration as a barrier to participation. In sport at the elite-level with player salaries, competition and sponsorships on the line, this cost is exponentially compounded. Injury epidemiology data from the Australian Football League (AFL) shows the average yearly financial cost of hamstring injuries per club increased by 71% compared with a 43% increase in average yearly athlete salary. The aggregate cost of a single hamstring injury increased by 56% from \$A25 603 in 2003 to \$A40 021 in 2012⁶⁹. If attention isn't paid to such issues, average annual medical care costs incurred due to participation in sport and recreation could erode gains in costs avoided by the disease-prevention effects of exercise¹¹⁴.

3. Exposure to harmful marketing

From a public health perspective, one of the most prevalent negative externalities apparent in sport is the frequent and continuous exposure of children and adolescents to junk-food, alcohol and gambling advertising during sport participation. Evidence presented below shows three clear points: that unhealthy advertising is highly prevalent throughout sport, that the majority of parents feel it's unwarranted, sports clubs recognise its negative messaging but feel stakeholder pressure to prioritise sustained income, and that it has been proven to have adverse and long-lasting developmental effects.

Junk food, alcohol and gambling advertising

In the Australian context, a cross-sectional survey of 3416 parents on children's sport participation found that 77.3% of Australian children aged 5-14 participated in organised sport. In NSW, weekly total person-time exposure for children was highest for outdoor soccer (91,200 children × median frequency of 2 sessions per week of 1. h duration = 182,400. h/week). Therefore, considering rates of sponsorship at different sports, children would be exposed to food/beverage sponsorship to the greatest extent in rugby league and cricket⁸⁰. This is of particular concern with cricket having the highest percent of unhealthy sponsors (27%) and the highest number of unhealthy food and beverage sponsors (n≤19)⁹⁹. Junior development sport programs also appear to be specifically targeted by sponsorship from unhealthy food and beverage companies. One study found that 91% of all food, beverage, alcohol or gambling companies sponsoring junior programs to be unhealthy¹⁷⁷.

In New Zealand, a review of 308 websites of national and regional sporting organisations concluded that in general, food and beverage sponsorship isn't common in NZ. However those that do are predominantly unhealthy food and beverages with marketing aimed at children. Sports organisations felt concerned about associating themselves with unhealthy foods or beverages, while others considered sponsorship income more important for sustainable sporting clubs²⁵. It appears that the root of changing the acceptability of unhealthy marketing in sport clubs lies in the apparent competing interests of stakeholders³¹.

Stakeholder perceptions

Popularity for these types of sponsors to target youth sport has grown considerably, indicating evidence of successful campaigns. One study in the Australian context found two-thirds of children recalled sponsors of their favourite elite sports team/athlete, with the 825 parents and 243 children included in the study, recalling a total of 428 sponsors. Of these, 11 % were food/beverage companies and 3 % were alcohol-related. Children reported feeling better about the company after it had sponsored a team/athlete⁸¹. It is argued that sport may have found itself lending unwarranted credibility to products which would otherwise not necessarily be seen as beneficial for participation in sports and exercise or as inherently healthy products¹¹⁷.

In Australia, three-quarters of parents supported the introduction of policies to restrict unhealthy food, beverage and alcohol sponsorship of children's and elite sports⁸¹. Furthermore, parents (81 %) supported the introduction of alternative funding models to allow these companies to sponsor sport provided there was no visible branding. In Western Australia, 50% of parents thought promotion of fast foods inappropriate at community events. Only 33% thought it appropriate at events where kids are present, while 66% felt unhealthy food/drink sponsorship at sport events to be contradictory¹²².

What's the impact of unhealthy marketing?

Evidence for the impact of unhealthy marketing aimed at children through sport has caused concern amongst public health and sporting professionals, as well as parents. A European study on the effect of alcohol marketing exposure on adolescents' drinking found that alcohol sponsorship led to higher incidence of drinking over time in adolescents exposed³⁶. Similar studies and results were replicated in the U.S⁴⁸. To partially mediate this impact, alcohol management policies and interventions have been trialled across community sporting clubs. Poor alcohol management policies within sports clubs also erode perceived club safety, potentially harming efforts to increase participation. While having alcohol promotions, and providing alcohol as prizes was associated with increased risky alcohol consumption while at the club; which in turn was associated with lower levels of perceived club safety and member participation¹³³.

The impact of gambling advertisement in sport appears particularly harmful, with impacts ricocheting through the family unit. A review in Australia found that gamblers engaged in the greatest variety of

gambling forms had the highest average problem gambling severity scores. This high-risk group was also most likely to attribute problems to sports betting than any other group⁵⁴. Exposure of problem gamblers to gambling promotions during televised sport may encourage gambling intentions, or in some cases, relapse⁷¹. The audience most likely stimulated by sport gambling promotions are problem gamblers, as they have the greatest exposure and a favourable disposition⁷⁰. In remote areas, multifamily households, participation in sports and cultural events, and reporting of community problems were associated with higher reported gambling problems¹⁵⁶. While problem gambling in U.S adolescents was found to be more prevalent in students attending schools with a greater "sports interest"¹¹². Sport betting was found to be the most frequent gambling activities for high-school boys in many settings.

4. Anti-social behaviour

Key Points:

- Adolescent athletes with the existence of high psychological distress and lack of family support are a high-risk group for undertaking risky behaviours⁶¹.
- Participation in community sporting clubs, particularly by females may be impeded by poor alcohol management policies³⁴.
- The finding of a positive association between sport participation and binge drinking held constant throughout literature, and between differing countries^{138, 180}
- Violence across several sporting contexts (e.g. attendance, participation) appears prevalent, with some concern over violence normalization in power sports⁴⁹.

Involvement in sport and sporting club involvement also brings with it increased risk factors of both perpetrating and being exposed to a range of anti-social behaviours.

Students, sport, binge drinking, drugs and risky behaviour

Secondary or tertiary students participating in sport are exposed to unique and potentially harmful anti-social behaviour. In some cases, higher sport volume was associated with higher smoking rates; while practicing sport in a formal context, team sports, and competitive participation represented risk factors for binge drinking¹⁰². Additionally, two major risk factors for risky behaviours in adolescent athletes were the existence of high psychological distress and a lack of family support, particularly in the case of males⁶¹. A recent systematic review investigating the relationship between sport participation and alcohol and drug use among adolescents concluded that sport participation is associated with alcohol use, but negatively associated with illicit use (particularly non-cannabis drugs)⁸⁹. However this negative association with illicit drugs was challenged in other research, so is inconclusive¹⁴⁴.

The finding of a positive association between sport participation and binge drinking held constant throughout literature, and between differing countries^{138, 180}. Perhaps most damaging was 7-year longitudinal data from the National Study of Adolescent Health in the U.S, which found that greater involvement in sports during adolescence was associated with faster average acceleration in problem alcohol use over time¹⁰⁴.

University sporting clubs also bring with them a host of potential risk factors for anti-social and harmful behaviours. A cross-sectional study of UK University Sport members found levels of alcohol-related risk and harm, as measured by AUDIT (Alcohol Use Disorders Identification Test) scores, are high in members of UK university sport groups. University sports members, particularly in team sports, are therefore a high-risk group for alcohol-related problems¹¹⁸. In France, student populations at risk of binge drinking were identified as: male, living in rented accommodation, regular sport participation, and those involved in other risk behaviours such as tobacco and cannabis use¹⁶⁴.

Limited literature exists on the impact of sport and active recreation on performance enhancing drug use. However one study commented that High school students participating in fitness and informal training outside of formally organized sport clubs (e.g. active recreation) are the main risk group¹⁶⁶.

Sports clubs, athletes and alcohol

Youth, community and elite sports clubs also appear to bring with them potential risk-factors for unhealthy and anti-social behaviours.

Members of community football clubs in Australia that served alcohol to intoxicated people, conducted 'happy hour' promotions or provided alcohol-only awards were at significantly greater odds of consuming alcohol at riskier levels than members of clubs with stricter alcohol management practices^{83, 134}. Common contexts at events where alcohol-related problems were seen included: inadequate alcohol control and management by security staff; the ability to purchase four alcoholic drinks (rather than two) at a time; inexperienced bar staff untrained in responsible alcohol service; no or little promotion of low and non-alcoholic drinks; and a lack of monitoring and enforcement of the law on intoxication⁹⁸. A cluster randomised controlled trial of an alcohol management intervention was undertaken in community sporting clubs in New South Wales. With alcohol management practices in place, a significantly lower proportion of club members reported: risky alcohol consumption at the club; risk of alcohol-related harm; alcohol consumption risk and possible alcohol dependence⁸⁴.

Despite the clash between implementing safe alcohol management practices and reliance on alcohol as income, harmful effects can be negated.

A case study of the Good Sports program alcohol management intervention aims to influence alcohol management in community sports clubs at 3 tiers: (1) basic liquor licensing compliance; (2) intermediate compliance (e.g. no happy hours or cheap drinks promotions, having non-alcoholic

options); (3) Alcohol management policy institutionalised that covers all procedures and safety precautions. Monitoring and evaluation of the program concluded that income increased and reliance on alcohol as a funding source diminished over time. Membership increased and was particularly accelerated among females, young people and non-playing members³⁴. Participation in organized team sports also showed a stronger association with increased alcohol abuse among adolescent males as compared to individual sports. Suggesting the team-orientated atmosphere led to stronger behaviour change¹⁵⁴. This association between sport clubs and harmful alcohol assumption and anti-social behaviour was also found to extend to major sporting events. An investigation into the additional hospital workload in Wellington during the 2011 and 2012 International Rugby Sevens, and the Rugby World Cup 2011 (RWC) found that alcohol was a contributory or causative factor for the patient's attendance in 80-90% of cases¹⁶¹.

Violence

Violence across several mediums also appear to be prevalent in certain aspects of sport involvement. The first of these mediums is major sporting events such as the 2006 Football World Cup. Call volumes on the first day of the world cup increased by over 50% due to increases in alcohol-related emergencies, collapse, unconsciousness, assault and road traffic accidents³⁸.

Power sports such as boxing, wrestling, weightlifting, and martial arts are another medium that also carry unique risk-factors for anti-social and violent behaviour. Participation in power sports can lead to an increase or enhancement of antisocial involvement in the form of elevated levels of violent as well as non-violent behaviour outside sports. This suggests that involvement in physical or combative sports led to a normalisation effect on violence⁴⁹. This sentiment isn't uncommon with spectator violence and forceful contact sport allowing parts of society to become somewhat immune to violence, with grave repercussions. This is also common in a global sense, with a link between peaceful societies who practice passive forms of sport, as opposed to violent states who promote sports that releases aggressive emotions¹⁷⁹.

WHAT MODELS HAVE BEEN USED?

Increasing complexity / decreasing feasibility

Simple Financial Reporting [SFR]

Method 1 (CS1) Simple financial reporting. (Direct costs as input, income as output)

Estimated Market Value [EMV]

Method 2 (CS2) Calculating sport and recreation's market value (aggregate value of businesses in sport and recreation + physical and human infrastructure + market value of volunteers + additional industries reliant on SPR)

Modelling Official Data for Economics [MODE]

Method 3 (CS3) Involves only including economic variables of which official data is available (ABS data), with the addition of simple assumptions and multipliers.

Surveillance Augmented Value Estimation [SAVE]

Method 4 (CS4) using EMV or MODE method as calculation base, with additional inclusion of representative surveys and simple economic multipliers

Systematic National Accounts Performance [SNAP]

Method 5 (CS5) uses a country's System of National Accounts to construct "a robust statistical framework to measure the economic importance of the sport industry in the national economy".

Modelling Impacts Driving Augmented Socio-economic gains [MIDAS]

Method 6 (CS6) involves economic modelling to estimate impact on productivity, social gains and other domains for which quantification is difficult.

HOW ROBUST IS THE INFORMATION AND UNDERLYING ASSUMPTIONS?

Economic methods for the quantification of the value of sport and active recreation *					
Economic method	Strengths	Weaknesses	Value measured	Data required	Example
1. SFR Simple Financial reporting	<ul style="list-style-type: none"> Least complex Conservative no assumptions 	<ul style="list-style-type: none"> Ignores economic impact Ignores social impact Regularly produces financial loss Rarely used Overly simplistic 	<ul style="list-style-type: none"> Direct income Direct costs Net gain or loss 	<ul style="list-style-type: none"> Financial balance sheet data Direct income from sport and rec Direct costs of sport and rec Capital costs 	Crompton, John L., Measuring the Economic Impact of Park and Recreation Services, <i>Research Series 2010</i> (http://www.nrpa.org/uploadedFiles/nrpa.org/Publications_and_Research/Research/Papers/Crompton-Research-Paper.pdf)
2. EMV Estimated market value	<ul style="list-style-type: none"> Conservative Based off official statistics Without assumptions Cost-effective to calculate 	<ul style="list-style-type: none"> Ignores most socio-economic value. Likely underestimate 	<ul style="list-style-type: none"> Sport and recreation industries Physical and human infrastructure Market value of volunteers Auxiliary industries reliant on sport sector 	<ul style="list-style-type: none"> National accounts (industry benchmarks) data. Latest Census data ABS Volunteers in Sport, Australia ABS Voluntary work Australia ABS employment data (i) incomes of people working in sport and recreation occupations outside of the 17 industries; (ii) investment by central government in sport and recreation education in schools; and (iii) local Government expenditure on new sport and recreation facilities. 	Dalziel (2011). Economic and social value of sport and recreation to NZ. <i>Lincoln University (Agribusiness and Economics Research Unit) pg. xii</i> (http://www.srknowledge.org.nz/research-completed/the-economic-and-social-value-of-sport-and-recreation-to-new-zealand-2/) Dalziel (2015). Economic value of sport and outdoor recreation to New Zealand: updated data, <i>Lincoln University (Agribusiness and Economics Research Unit) pg. 50</i> (http://www.sportnz.org.nz/assets/Uploads/AERU-SportNZ-Econ-Value-Updated-FINAL.pdf)

Economic methods for the quantification of the value of sport and active recreation *

Economic method	Strengths	Weaknesses	Value measured	Data required	Example
<p>3. MODE Modelling official data for economics</p>	<ul style="list-style-type: none"> • Conservative • Includes value from productivity 	<ul style="list-style-type: none"> • Still excludes key socio-economic variables • Likely underestimate 	<ul style="list-style-type: none"> • Productivity • Tourism • Healthcare savings • Obesity savings • Retail spending – sport equipment • Direct contribution of sport and rec organisations 	<ul style="list-style-type: none"> • Sport and rec organisation data (ABS. cat. no. 8686.0) • ABS Volunteers in Sport, Australia • ABS Household Expenditure Survey (HES) • Sport NSW (2013) report • Destination NSW Tourism Performance Scorecard (2015) • Sport NSW - Economic Value of Sport in NSW (2013) • AusDiab study data • NSW Health – admitted patient report 2012. 	<p>Access economics (2010). The economic contribution of sport and recreation in the ACT. <i>ACT Sport and Rec Services</i>, pg. iv⁴⁴ (https://www.clearinghouseforsport.gov.au/_data/assets/pdf_file/0009/395217/AccessEconomics_ACTSport.pdf)</p>
<p>4. SAVE Surveillance augmented value estimation</p>	<ul style="list-style-type: none"> • Survey collection can be tailored • Can collect other useful data. 	<ul style="list-style-type: none"> • Impact survey incurs higher cost • Still may not be able to add socio-economic dollar value 	<p>See method 2 (EMV) or 3 (MODE)</p> <ul style="list-style-type: none"> • Social impact of sport and active recreation on Australian individuals and families 	<ul style="list-style-type: none"> • Commissioned social impact survey of representative sample of Aus households • See method 2 (EMV) or 3 (MODE) 	<p>See method 2 (EMV) or 3 (MODE)</p> <p>Bloom, M., M. Grant and D. Watt (2005) Strengthening Canada: The Socio-economic Benefits of Sport Participation in Canada. <i>Ottawa: The Conference Board of Canada</i>²¹ (http://www.edmontonsport.com/pdfs/benefits_cboc.pdf)</p>
<p>5. SNAP** Systematic national accounts performance</p>	<ul style="list-style-type: none"> • Provides longitudinal data • Standardised definitions and methods across Europe • Results can be compared between countries 	<ul style="list-style-type: none"> • Long-term strategy • Requires collaboration between jurisdictions • Initially resource intensive 	<ul style="list-style-type: none"> • Sport Related Consumer Spending • Sport Related Gross Value Added • Sport Related Employment 	<ul style="list-style-type: none"> • ABS family spending survey • Supply Table in the national accounts • ABS employment data 	<p>Panagouleas & Kokolakis (2012). A Manual for the Construction of a Sport Satellite Account (SSA). <i>Sport Industry Research Centre (SIRC) – Sheffield Hallam University</i> (http://ec.europa.eu/assets/eac/sport/library/documents/xq-stat-ssa-manual-september-27.pdf)</p>

Economic methods for the quantification of the value of sport and active recreation *

Economic method	Strengths	Weaknesses	Value measured	Data required	Example
<p>6. MIDAS Modelling impacts driving augmented socio-economic gains</p>	<ul style="list-style-type: none"> • Comprehensive • Novel • Includes a range of socio-economic variables • Sets agency as leader in economic impact analysis • Higher estimated value per dollar 	<ul style="list-style-type: none"> • Economic assumptions can be disputed. • Requires longer time frame • Higher costs • Resource intensive 	<ul style="list-style-type: none"> • Health benefits (avoided costs; stat. value of human life; disability adjusted life years) • Productivity • Leisure • Government (tax, civic) • Sport and recreation industries • Costs: household; Gov; businesses; opportunity cost (participation, volunteering & infrastructure) 	<ul style="list-style-type: none"> • 2009 ERASS survey • ABS SPR participation data • ABS Volunteers in Sport, Australia • ABS Children’s Participation in Cultural and Leisure Activities survey • ABS Voluntary work Australia • ABS Household Expenditure Survey (HES) • AIHW 2009 Health Expenditure Australia • Cost of disease in NSW data. • ABS 2006 Census of Population and Housing. • ABS 2009 Sports and Physical Recreation Services • Generosity of Australian Business survey • Sport and recreation asset and infrastructure data • Commissioned survey for local council expenditure • ABS. Australian National Accounts: Input-Output Tables • NSW Health – admitted patient report 2012 • NSW Health – non-admitted patient data. • Range of related ABS data reports 	<p>Muller P, Wadsley A, Adams D, Arthur D, Felmingham B (2010). The value of sport and physical recreation to Tasmania. <i>Australian Innovation Research Centre – University of Tasmania</i> ¹¹⁰ http://eprints.utas.edu.au/11650/1/The Value of Sport & Physical Recreation to Tasmania.pdf</p>

CASE STUDIES OF THE ECONOMIC MODELS USED

Method 1 – Simple financial reporting (SFR) – Case study

Many recreation and parks agencies tend to use a *financial reporting* approach to illustrate their effectiveness. In contrast, tourism agencies and a growing number of sport and active recreation agencies tend to prefer *economic impact reports*, which highlight and quantify the overall impacts associated with incremental increases in investments. By tourism and sporting departments focusing on overall economic benefits, and parks focusing on basic financial inflows and outflows, there is a perception that tourism and conventions are generators of economic activity, while parks and recreations represent a drain on the public purse.

For example a city hosting a national U18 soccer tournament

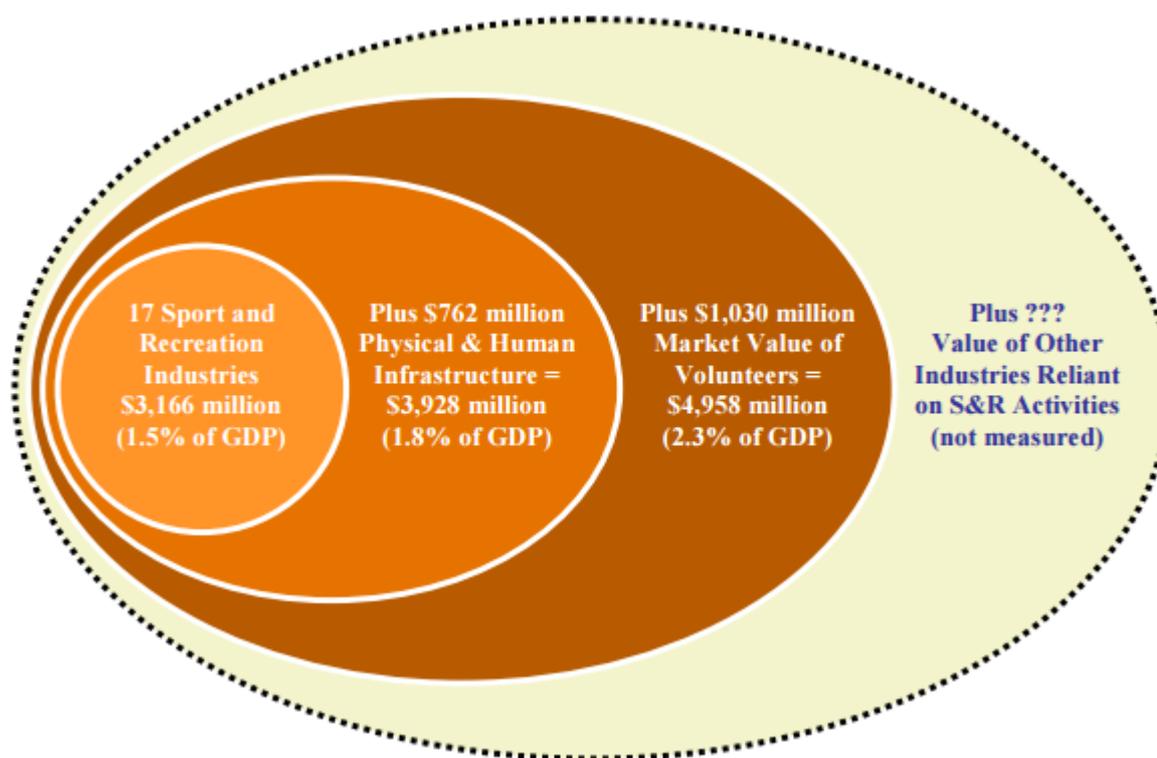
Example 1 – Financial accounting method (shows net financial loss)

Financial Data	
Income	
Entry fees \$? X number of entrants	39,900
Gate admission fees	74,843
Concessions/souvenirs % of gross	32,395
Hotel rebate	4,650
Social fee	5,683
Programs	1,440
Total	158,911
Costs	
Tournament costs and staff time	197,258
Net Loss	(38,347)

Example 2- economic impact method (shows increased economic impact)

Economic Data	
Total expenditure in the local area by the 1,810 players and their family/friends	2,039,000
Economic impact on sales	3,731,000
Economic impact on income	1,162,000
Return on investment	
For each dollar invested, residents' income increased by \$30.30 (1,162,000/38,347). Facility cost \$12 million; payback period to residents is approximately 10 tournaments of this size.	

Method 2– Estimated market value (EMV) – Case study



Source: developed by Grant McLean at Sport NZ.

This is one of the most conservative options for estimating the social and economic value of sport and active recreation. This means the method isn't open to intensive debate over assumptions, however its negative side is that it ignores major areas that sport and active recreation add value such as: social capital, mental and physical health gains and community building.

Method 3 – Modelling Official Data for Economics [MODE] – Case study

This method involves the inclusion of economic variables of which official data is available (e.g. ABS data), with the addition of simple hypothetical assumptions and multipliers. Simple steps taken in the use of this methodology includes:

- 1- Identify key areas where sport and active recreation adds/creates value in society
 - Productivity (assumptions required)
 - Sport tourism
 - Reduced obesity expenditure (assumptions required)
 - Reduced healthcare costs (assumptions required)

- 2- Find summation of total benefits to country or state (e.g. found in ABS data or previously commissioned reports).
- 3- Estimate percentage savings/gain in each area from hypothesised increase in participation of sport and active recreation.
- 4- Calculate percentage in a monetary terms from the figures presented in data or reports.

The Sport England report of economic impact assessment, uses as its basic input, where possible, economic variables from official statistics. The methodology employed in the Sport England report is based on national income accounting and the income and expenditure flows between sub-sectors of the economy, namely:

- Consumers – including the personal or household sector.
- Commercial Sport – including spectator sport clubs, sports good manufacturers and retailers.
- Commercial Non-Sport – including suppliers for the production of sport-related goods and services.
- Voluntary – including non-profit making sport organisations such as amateur clubs run by their participants.
- Local Government – including income from local government sport facilities, sport related grants from the Central government and rates from the commercial and voluntary sector.
- Central Government – including taxes, grants and wages on sport related activities.
- Outside the Area sector – including transactions with economies outside the region.

The *Building an active community: The economic contribution of sport and recreation in the ACT* report for the ACT Government for the financial year 2008-09 appeared to also follow this method:

The report identified four key elements making up the total economic contribution:

- Direct contribution of sport and recreation organisations
- Contribution from retail spending on sporting equipment
- Preventative health benefits provided by physical activity
- Benefits of sports-related tourism'

Aggregating these key elements, the report produced a total estimate of \$245.2 million in 2008 to 09.

Method 4 – Surveillance Augmented Value Estimation [SAVE] – Case study

This method uses either the EMV or MODE method as its base calculation, with the inclusion of representative social impact surveys and simple economic multipliers for additional benefits. For example, the Frontier Economics Report for the Australian Sports Commission was not able to quantify the impacts on social cohesion and socialization, a universal issue in this field of economics.

The Conference Board of Canada adopted a different approach to this question, which was to commission a Sport Participation Impact Analysis Household Survey²¹. This was a questionnaire-based representative national telephone survey of Canadian adults (aged 16 years or older) about their own and their household's participation in sport, and its impact on them and the family unit.

The study was able to collate perceptions on the benefits of sport and to analyse differences in responses between people who reported high sport participation and people who reported low sport participation. The study found, for example, that overall, survey respondents see a strong net positive social impact of sport participation. They feel strongly that sport brings families together and encourages people to interact in the broader community and beyond, often with people of different social backgrounds, even though they do not see it as breaking down economic barriers.

Method 5 – Systematic national accounts performance (SNAP) – Case study

In Europe progress has been made on agreed methods and standards for creating Sport Satellite Accounts (SSA) in member countries of the European Union. This is a major development in the field of sport and active recreation economic evaluation with the current plethora of differing methods used making cross-national, and even cross-state impact comparisons impossible. An SSA uses a country's system of national accounts to construct "a robust statistical framework to measure the economic importance of a specific industry, in this case the sports sector, within the national economy".

The narrow definition aims to encompass all industries which produce goods and services that are necessary to perform sport, while the broad definition aims to also include relevant parts of the industries for which sport is an important input for their production processes (for example, television broadcasting). Despite this method still in its infancy, there is precedence for its use in Australia. The Australian Bureau of Statistics' Tourism Satellite Account (TSA) is recognised internationally as the benchmark for estimating the economic contribution of tourism in an economy. The Australian TSA is published each year, and provides measures of tourism gross domestic product (GDP), tourism gross value added (GVA), tourism trade, and employment in tourism.

This method could be a future direction for Australian states in monitoring the contribution of sport and active recreation to the state economy, as well as nationally.

Costs of sport and active recreation

1. Current costs

- *Household expenditure on sport and active recreation*

The figure is per household weekly expenditure, indexed to 2008-9 prices (ABS data), times the number of households in the state (ABS data), times 52 weeks.

- *Government expenditure on sport and active recreation*

Looked at all three tiers of Government, and undertook a survey of local councils to estimate cost.

- *Business expenditure on sport and active recreation*

In 2004-05, Australian SPR providers reported receiving 9.1% of their operating income from sponsorship and fundraising (ABS, 2009). In 2008-09 terms, this would equate to \$20.6 million to Tasmanian operators. When this amount is discounted by the amount donated by households (reported in Table 3.1 to be \$3.0 million), we can conclude that the sum of business sponsorship is approximately \$17.6 million.

2. Opportunity costs

- *Opportunity cost of participation*

The opportunity cost of sport and active recreation participation is estimated using the average weekly earnings for part-time and full-time workers for each age group, less a 35% marginal rate of tax. This approach applies a simple leisure/work trade-off model that identifies the opportunity cost of one hour of leisure by the income that could have been earned by working for an extra hour.

- *Opportunity cost of volunteering*

The same method can be used to calculate the cost of hours diverted by individuals into SPR volunteering. Data illustrates the cumulative hours of SPR volunteering in the state. Applying these rates to the known opportunity costs allows us to infer that in Tasmania in 2008-09 there were over three million hours donated to sport and physical recreation volunteering, at an opportunity cost to volunteers of \$36.8 million.

- *Value of sport and active recreation infrastructure*

Costs

Current

Households

Government

Businesses

Opportunity

Participation

Volunteering

Assets

Benefits

Individuals

Health

Productivity

Leisure

Government

Civic

Commercial (taxes)

Businesses

Productivity

Commercial (profit)

Net welfare benefit

The method for calculating infrastructure costs involves determining the value of assets associated with SPR activities, primarily by apportioning the value of land and building assets of government departments with functions relating to SPR.

Benefits of sport and active recreation

1. Individuals

- *Health benefits*

Statistical value of human life

The Australian Government's Office of Best Practice Regulation (OBPR, 2008) adopts \$3.5 million (in 2007 dollars) as the value of statistical life based on a healthy person living another forty years. Discounted for present value and indexed, in accordance with OBPR advice, to 2009 prices, this makes the value of a statistical life year (VSLY) \$158 963.

Disability adjusted life year

Use major diseases physical inactivity is known to be a risk factor for. This includes heart disease, type 2 diabetes, stroke, colorectal cancer and breast cancer.

- *Productivity*

It has long been assumed that participation in SPR can increase the productive output of workers; however, there have been almost no successful attempts to quantify this contribution. The main barrier to analysis appears to have been complexity of process. SPR is known to enhance a number of human attributes (various forms of capital) that are known to increase labour productivity. However, the overlapping quality of these attributes, the unique ways in which they are arrived at and their causal attribution to SPR have made it exceedingly difficult to definitively state that x% of a person's output is a direct result of their SPR participation.

- *Leisure*

Consumer surplus is a financial measure of the satisfaction that people get from their purchases above and beyond the amount they paid for them. For example, a person may pay \$750 for a gym membership, but be willing to pay up to \$2 000 for the benefits they receive from their subscription. This difference of \$1 250 is the consumer surplus - an important economic criterion for decision making, especially in public policy

2. Government

- *Civic benefits*

The delivery of sport and physical recreation is further subsidised by the labour of volunteers, which relieves other civic bodies (such as governments and community groups) of the need to directly

provide these services. SPR events and activities also raise a state's off-shore profile, thereby adding value to the state 'brand', and they contribute directly to the community's sense of wellbeing

- *Commercial (taxes)*

This is the sum of dollars that flow into an economy as a result of the state's SPR industry.

3. Businesses

Profit/income from the largest business'/industries involved in the sport and active recreation sector.

Capital gains from sport and active recreation

- *Cultural capital*: forms of knowledge, skills, education, and advantages that a person gains from sport, which give them a higher status in society.
- *Knowledge capital*: the skills training afforded by sport, especially for those in facilitative roles (e.g. volunteers), is a form of technological knowledge.
- *Economic capital*: sum of wealth created by the sports economy.
- *Human capital*: understood in terms of the hours that people dedicate to either participating or volunteering in the activity
- *Psychological capital*: construct of the states (as opposed to dispositional traits) of self-efficacy, hope, optimism and resilience can be amassed in the individual and converted into commercial gain
- *Instructional capital*: capital resulting from investment in producing learning materials.
- *Social capital*: the norms and social relations embedded in the social structures of societies that enable people to co-ordinate action to achieve desired goals'
- *Intellectual capital*: wealth embedded in ideas, and so forth.
- *Symbolic capital*: the value derived from being known and recognised, a concept synonymous with standing, good name, honour, fame, prestige and reputation.

APPENDIX 1 INTENDED BENEFITS – TABULATION OF EVIDENCE

1. PHYSICAL HEALTH

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
1	Anderson (2000) Denmark Aim: evaluate the relationship between levels of physical activity during work, leisure time, cycling to work, and sports participation and all-cause mortality.	Prospective study with follow-up of 14.5 years; 13,375 women and 17,265 men, 20 to 93 years of age, who were randomly selected.	Leisure time physical activity was inversely associated with all-cause mortality in both men and women in all age groups. Benefit was found from moderate leisure time physical activity, with further benefit from sports activity and bicycling as transportation.	Inverse association between active recreation and all-cause mortality from large scale high quality study.
2	Anderson (2009) Denmark Aim: examine the contribution of athletic identity and three key demographic variables to physical activity and sports team participation	Students aged 8-15 completed the 40-item Athletic Identity Questionnaire which measures self-perceptions of athletic appearance; competence; importance of physical activity and sports; and encouragement for activity from parents, teachers, and friends.	In children and adolescents, the global score of athletic identity was independently, positively related to physical activity levels and team participation, after controlling for demographic variables.	Results support the role of athletic self-concept in promoting physical activity and organized sport participation in children and adolescents.
3	Andrews (2016) Australia Aim: Commentary on the role of sport in public health.	Commentary	Need to: 1) pursuing the health component of sport far more thoroughly and in its very broadest sense, 2) defining sport broadly beyond elite forms to include a wide-range of physical and lifestyle activities, 3) developing 'spatial sports studies' as a more expansive interdisciplinary field of inquiry spanning the health and social sciences.	Push to put sport in the realm of public health and social science
4	Ara (2004) Europe Aim: study the effect of physical activity on whole body fat (BF), its regional deposition and the influence of body fatness on physical performance in pre-pubertal children.	Body composition (DXA), anthropometric variables (body circumferences and skinfolds) and physical fitness were determined in 114 boys.	Regular participation in at least 3 h per week of sports activities and competitions on top of the compulsory physical education program is associated with increased physical fitness, lower whole body and truncal fat mass in pre-pubertal boys.	Physical activity decreases body fat, a known risk factor for several NCD's.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
5	<p>Bailey (2006)</p> <p>UK</p> <p>Aim: explore the scientific evidence that has been gathered on the contributions and benefits of physical education and sport (PES) in schools for both children and for educational systems.</p>	<p>Review of scientific evidence relating to physical, lifestyle, affective, social and cognitive impacts of sport in schools.</p>	<p>In physical, lifestyle, affective, social and cognitive domains of child psychology, physical education and sport in schools has a positive and profound effect.</p>	<p>There is a duty for those in educational positions to advocate for its inclusion in school programs.</p>
6	<p>Basterfield (2015)</p> <p>Australia</p> <p>Aim: (1) What are the cross-sectional associations between sports club participation, physical activity, and adiposity? (2) Does physical activity and adiposity predict sports club participation? (3) Does sports club participation predict physical activity and adiposity? (4) Do changes in sports club participation predict changes in physical activity and adiposity?</p>	<p>Longitudinal and cross-sectional; Data from the Gateshead Millennium Study birth cohort (n= 609 at age 7 years)</p>	<p>Seventy-two per cent of 9 year olds and 63% of 12 year olds took part in a sports club; Sports club participation was significantly associated with higher physical activity levels at 12 y but not 9 y; an inverse relationship between fat mass and sport club participation was found in 12 yrs. but not 9; Sports club participation at 9y was highly predictive of participation at 12y.</p>	<p>Need to engage children in organized sport as it could lead to higher levels of PA later in life.</p>
7	<p>Brenner (2009)</p> <p>U.S.A</p> <p>Aim: estimate the association between swimming lessons and the risk of drowning among children aged 1 to 19 years.</p>	<p>Case-control study; exposure = swimming lessons; outcome = death</p>	<p>Participation in formal swimming lessons was associated with an 88% reduction in the risk of drowning in the 1- to 4-year-old children.</p>	<p>Swimming lessons in youth important for reducing child mortality.</p>
8	<p>Craig (2014)</p> <p>Canada</p> <p>Aim: determine if hosting the 2010 Vancouver Olympic Games encouraged Canadian children to be physically active.</p>	<p>Children 5-19 years (n = 19862) were assessed as part of the representative Canadian Physical Activity Levels Among Youth surveillance study</p>	<p>The 2010 Olympic Games had no measurable impact on objectively measured physical activity or the prevalence of overall sports participation among Canadian children.</p>	<p>Greater cross-Government and long-term efforts are needed to create the conditions for an Olympic legacy effect on physical activity.</p>
9	<p>Dohle (2013)</p> <p>U.S.A</p> <p>Aim: identify background or personality characteristics that predict whether a healthy 25 year-old would become a physically active 75 year-old.</p>	<p>Data was collected from 712 healthy United States males who passed a rigorous physical exam in the 1940s and who were surveyed 50 years later (in 2000).</p>	<p>The single strongest predictor of later-life physical activity was whether he played a varsity sport in high school, and this was also related to fewer self-reported visits to the doctor.</p>	<p>Encouraging physical activity at a young age might be the best investment in long-term activeness.</p>

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
10	Downward (2015) U.K Aim: Examine the causal relationship between sports participation, as physical activity, and subjective health accounting for the London 2012 Olympic Games.	Rolling monthly survey design of the annually reported Taking Part Survey (TPS) is used to create time series data.	For the population as a whole, sport can contribute to health, with diminishing impact, but impacts vary across the life course and genders.	Policy considerations needed to account for these variations.
11	Eime (2015) Australia Aim: examine the contribution of sport to overall health-enhancing leisure-time physical activity (HELPA) in adults.	2010 Exercise, Recreation and Sport Survey (ERASS) survey conducted on 21,602 respondents.	82 % reported some leisure time physical activity in the 12 months; 37,020 activity types were reported of which 94 % were health enhancing; 71 % were non-organised, 11 % were organised but not sport club-based, and 18 % were sport club-based.	Club sport participation contributes considerably to leisure time physical activity at health enhancing levels.
12	Fenton (2015) UK Aim: (1) to determine minutes of moderate-to-vigorous physical activity (PA) and vigorous PA accrued in youth soccer, and the contribution toward daily weekend moderate-to-vigorous PA and vigorous PA for males aged 9-16 years, and (2) to investigate variability in these outcomes related to age and playing position.	109 male grassroots footballers (Mean age = 11.98 +/- 1.75 years) wore a GT3x accelerometer for 7 days.	Youth sport football moderate-to-vigorous PA and vigorous PA contributed 60.27% and 70.68% toward daily weekend moderate-to-vigorous PA and vigorous PA, respectively. The contribution was higher in older teens than younger teens.	Soccer is an important source of PA. It is more important in adolescents than youth.
13	Guagliano (2013) Australia Aim: Examine the physical activity (PA) levels of girls during organized sports (OS) and to compare the levels between games and practices for the same participants.	94 girls recruited from 10 teams in three sports (netball, basketball, and soccer) from the western suburbs of Sydney.	Girls spent a significantly higher percentage of time in moderate-to-vigorous PA (MVPA) during practices compared with games; For every hour of game play or practice time, girls accumulated approximately one third of the recommended 60 min of MVPA time;	Organised sport makes a substantial contribution to the recommended amounts of MVPA and steps for participating girls.
14	Hardie Murphy (2016) Ireland Aim: examine tracking of PA during key transition periods in youth and to determine the longitudinal associations between sports club participation and PA.	Participants (n = 873, baseline age 10 to 18 years) completed self-report surveys in 2009 and 2014	Greater sports participation frequency at baseline significantly predicted PA at follow-up. Involvement in club sports at an elite level had a medium-to-large effect on PA levels 5 years later	PA should be promoted in youth as it can lead to a continuation of PA later in life.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
15	Hardy (2014) Australia Aim: examine the associations between children's organized physical activity (OPA), non-organized physical activity (NOPA), and health-related outcomes.	Cross-sectional survey of children aged 10-16 years (N = 4273).	Boys spent 97.5 minutes and girls 86.6 minutes in daily physical activity with the majority spent in OPA (boys, 56.3%; girls 60.5%). Both OPA and NOPA are important contributors to children's physical activity; however, for girls, OPA was more strongly associated with fitness and FMS competency.	School physical education programs are an ideal delivery vehicle for OPA and need to be central to education policy.
16	Johnson (2009) U.S.A Aim: Analyse evidence of the benefits of physical activity for youth with developmental disabilities.	Systematic review (17 included)	Strong evidence indicated that children and adolescents with developmental disabilities derive health benefits from participation in group exercise programs, treadmill training, or therapeutic riding/hippotherapy. Documented benefits of physical activity include improvements in aerobic capacity, improved gross motor function, and high levels of participant/parent satisfaction.	Evidence exists that active recreation is beneficial for youth with developmental disabilities.
17	Khan (2012) Canada Aim: examine the broader question of whether sport and exercise specifically contribute to the health of nations.	Lancet series report	Regular physical activity, even in small doses, confers substantial health benefits; Sport is one sector that can improve the health of a nation through increased physical activity, but system-wide changes also require complementary efforts by transportation agencies, park and recreation areas, city planning, and school programmes to increase and sustain activity levels of whole populations.	
18	Kraut (2003) Canada Aim: evaluate the influence of organised childhood sporting activities on leisure time physical activity as an adult in a cohort of industrial workers.	3687 industrial workers in the Cardiovascular Occupational Risk Factors in Israel Study (CORDIS) cohort	Participating in organized school age sporting activities predicted LTPA as an adult. This association was consistent in the various subgroups of marital status, age, smoking, shift work, body mass index, and religious observance.	Organised school age sporting activities influenced future leisure time physical activity in this cohort.
19	Kwon (2015) U.S.A Aim: identify distinct trajectories of daily time spent in moderate- to vigorous-intensity physical activity (MVPA) from ages 5 to 19 years and to examine the associations of MVPA trajectories with sports participation and television viewing trajectories.	Cohort members wore accelerometers at time points between September 16, 1998, to December 9, 2013, at ages 5, 8, 11, 13, 15, 17, and 19 years and completed a questionnaire every 6 months.	Identified 4 MVPA trajectories: consistently inactive (14.9%), consistently active (18.1%), decreasing moderate physical activity (52.9%), and substantially decreasing high physical activity (14.1%). All participants in the consistently inactive trajectory also followed a trajectory of no participation in sports.	Sports participation could be a critical way to avoid the consistently inactive pattern.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
20	Lee (2016) U.S.A Aim: present a comprehensive review of the impact of youth sport participation on children's PA and obesity status.	Systematic review (44 studies included)	Participation in youth sport was positively associated with children's PA levels, and youth participating in sports were more likely to persist in their PA. However, the relationship between youth sport participation and obesity status was inconclusive.	Sport increases child PA levels but not obesity at this point. The area needs policy attention.
21	MacHado-Rodrigues (2012) Europe Aim: estimate the contribution of participation in organized sport to the total daily energy expenditure and also to its moderate-to-vigorous portion in male adolescents.	165 Portuguese male youth, aged 13 to 16 years; PA assessed by Actigraph GT1M accelerometer plus 3-day diary record.	Male participants in organized sports spent significantly more time in moderate-to-vigorous activities than nonparticipants; male adolescents spent 11% to 13% of total daily energy expenditure in organized sports which corresponded to 35% to 42% of the moderate-to-vigorous portion of daily energy expenditure.	Organised sport appears to be a relevant component of daily activity energy expenditure to promote healthy lifestyles among male adolescents.
22	Oja (2016) UK Aim: examine the associations of six different types of sport/exercise with all-cause and cardiovascular disease (CVD) mortality risk in a large pooled Scottish and English population-based cohort.	Cox proportional hazards regression was used to investigate the associations between each exposure and all-cause and CVD mortality with adjustment for potential confounders in 80 306 individuals (54% women; mean±SD age: 52±14 years).	Significant reductions in all-cause mortality were observed for participation in cycling (HR=0.85, 95% CI 0.76 to 0.95), swimming (HR=0.72, 95% CI 0.65 to 0.80), racquet sports (HR=0.53, 95% CI 0.40 to 0.69) and aerobics (HR=0.73, 95% CI 0.63 to 0.85). No significant associations were found for participation in football and running. A significant reduction in CVD mortality was observed for participation in swimming (HR=0.59, 95% CI 0.46 to 0.75), racquet sports (HR=0.44, 95% CI 0.24 to 0.83) and aerobics (HR=0.64, 95% CI 0.45 to 0.92), but there were no significant associations for cycling, running and football.	Participation in specific sports may have significant benefits for public health.
23	Pate (2000) U.S.A Aim: examine the relationship between sports participation and health-related behaviours among high school students.	Cross-sectional design using data from the 1997 Centres for Disease Control and Prevention Youth Risk Behaviour Survey.	Male sports participants were more likely than male nonparticipants to report fruit and vegetable consumption on the previous day and less likely to report cigarette smoking, cocaine and other illegal drug use, and trying to lose weight. Compared with female nonparticipants, female sports participants were more likely to report consumption of vegetables on the previous day and less likely to report having sexual intercourse in the past 3 months.	Sports participation is associated with numerous positive health behaviours and few negative health behaviours.
24	Pharr (2016) U.S.A Aim: examine the relationship between sport and women's health in the USA	Data from the Behavioural Risk Factor Surveillance System (BRFSS).	Women who participated in sport had better health outcomes with significantly lower odds for all chronic diseases except asthma and better general health than women who participated in conditioning exercise, household tasks, or recreation.	As a means to improve health of women, the USA could focus on efforts to increase sport participation among women.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
25	Pringle (2014) UK Aim: assess effect of a national programme of men's health delivered in EPL football clubs, and assess their ability to engage hard to reach and unhealthy men.	Premier League Health is a 3-year programme of men's health promotion delivered through 16 EPL football clubs. n = 4020 men participated in the evaluation.	Interventions engaged men with unhealthy lifestyles and multiple risk factors for CVD. Improvements were found for an array of lifestyle behaviours. Over 85% of men in this study presented with multiple combinations of CVD risk factors.	Study included to show successful delivery of public health programs through large sporting bodies that target hard to reach population.
26	Ramchandani (2012) UK Aim: investigate whether attending one-off sport events might inspire audiences to increase their participation in sport or recreational physical activity.	Primary data collection was undertaken with spectators aged 16 and over at three major sport events held in the UK in 2010. The findings are based on an aggregate sample of 2,312 respondents.	66% reported that their event experience had inspired them to increase their participation in sport or physical activity. This varied by sport: triathlon (76.1 per cent), hockey (61.6 per cent) and rugby (65.2 per cent) events. Inspiration sources: athletes in the event (skill and ability) and the sporting context in which the event takes place (quality of competition and performance of the team or athlete being supported).	Opportunity to use elite sport to inspire increased PA in attendees.
27	Roth (2012) UK Aim: assess the contribution of active travel to and from school to children's overall physical activity levels in England.	4,468 children aged 5-15y (303 with valid accelerometer data) participating in the nationally-representative cross-sectional Health Survey for England 2008.	The 64% of children who walked and the 3% who cycled to/from school were more active than the 33% who did neither.	Opportunity to encourage active recreation before and after school in children.
28	Sacheck (2011) U.S.A Aim: Investigate how organized sports participation contributes to meeting physical activity recommendations in children.	Anthropometrics were measured in children (n = 111; 68% female, 9.1 ± 0.8yr) before one 50-min soccer match. Time spent at different physical activity intensity levels was examined using Actigraph accelerometers.	49% of the match time was spent in sedentary activity (25.4 ± 5.7 min), while 33% of the match (16.9 ± 4.7 min) was spent in moderate-to-vigorous activity (MVPA; p < .001). Organised sport contributed to 25% of the daily recommended MVPA.	Organised sport is an important part of meeting PA recommendations. More could be done to increase its role by promoting further MVPA.
29	Stevinson (2014) UK Aim: explore the public health potential of parkrun, a UK-wide network of free weekly timed 5-km runs in public parks.	A total of 7308 adult participants of parkrun self-reported demographic characteristics, current physical activity and the perceived impact of involvement.	25.3% of participants were non-runners, including the highest proportions of females (53.8 versus 48.9% for the total sample), overweight/obese (45.2 versus 33.2%) and those with a limiting disability (6.1 versus 4.3%). This group had the largest increase in performance.	Organised active recreation events have the potential to engage hard to reach groups and those least active in society.
30	Taliaferro (2010) U.S.A Aim: examine relationships by year between sport participation and numerous health risk behaviours among high school students.	Centres for Disease Control and Prevention's Youth Risk Behaviour Surveys administered every 2 years from 1999 through 2007; Items assessed were sport participation, vigorous physical activity, dietary habits, weight loss, sexual activity, interpersonal violence and suicidality, and substance use.	Relationship between sport participation, weight loss and increased fruit consumption remained consistent across years and race/ethnicity; Male and female athletes across years and racial/ethnic groups were more likely than non-athletes to use a condom during their last sexual encounter; among males, across years and races/ethnicities, we found consistent inverse relationships between sport participation and carrying a weapon, considering suicide, and attempting suicide; male athletes were more likely to use alcohol and less likely to smoke cigarettes.	Participation in organized sports has many health benefits, but relates to some negative health behaviours in certain subgroups.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
31	Telford (2016) Australia Aim: investigate the longitudinal effect of sport participation in physical activity, fitness and body fat changes during childhood and adolescence.	Longitudinal study (134 boys, 155 girls) of Australian youth aged 8-16 years.	Sports club participants were more physically active at all age groups than non-participants; Fitness was higher among sports participants and sport participant girls had 2.9% less body fat. Higher fitness scores were maintained over time by sports participants but their greater PA diminished during adolescence, this being more evident among girls.	Need to design strategies to maintain PA of sport participants during adolescence.
32	Titze (2014) Australia Aim: provide population estimates and explore recreational cycling by subgroups, and to understand the contribution of recreational cycling to meeting the physical activity guidelines among Australian adults.	Repeated cross sectional population surveys from Exercise, Recreational and Sport Survey (ERASS) for the years 2001-2009.	Among all cyclists a third met the physical activity guidelines of 150. min/week, and less than 20% met the guidelines of 300. Min/week or 5 sessions of 30. Min/week; two thirds of those participating in organised or partly organised recreational cycling met the guidelines.	Cycling is a strong contributor to recommended PA levels, however more attention is needed to promote to its full potential.
33	Van Amelsvoort (2006) Europe Aim: establish whether workers with frequent leisure time physical activities are at higher or lower risk of sickness absence compared to inactive workers.	Self-reported and company recorded sickness absence data were collected during 18 months of follow-up for 8902 workers. Frequency of leisure time physical activities was queried at baseline.	Workers active in their leisure time twice or more each week reported significantly less sickness absence compared to inactive workers (14.8 versus 19.5 days/year), mainly due to a decrease in sick leave because of musculoskeletal disorders.	Promoting PA could lead to less absenteeism. Issues surrounding demotivation of PA due to making workers liable for days absent from injury.
34	Vella (2016) Australia Aim: examination of the evidence informing the grade for Organised Sport from the 2014 Report Card, compares Australia's Organised Sport grade with other countries, identifies future directions for research and surveillance, and explores possible beneficial strategies.	2014, Active Healthy Kids Australia released its inaugural Report Card on Physical Activity for Children and Young People	Despite Australia being one of the leading countries worldwide in terms of participation, 25–35% of young Australians (5–17 years) do not participate in organised sports. Recommendations: increasing access to organised sports and preventing dropout, while also include the provision of good quality physical education during primary school, which predicts participation in organised sports at a national level.	An important opportunity exists to leverage the significant national interest in sports to promote greater participation through direct and indirect means.
35	Vilhjalmsson (2003) Iceland Aim: attempt to account for gender differences in total leisure time physical activity.	Representative national survey of 3270 Icelandic 6th, 8th and 10th grade students.	Girls' lower enrolment in organized sport clubs fully accounts for gender differences in frequency of overall physical activity, and largely accounts for gender differences in frequency of strenuous activity, and weekly hours of overall and strenuous activity. Girls' higher sport club withdrawal rate accounted for a small but significant part of the gender difference in weekly hours of overall activity and frequency of strenuous activity	Gender differences in sport participation can account for large disparities in overall leisure time PA between males and females.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – physical health benefits	Comments
36	<p>Watson (2016)</p> <p>U.S.A</p> <p>Aim: identify specific activities that contribute substantially to total volume of leisure-time PA in US adults.</p>	<p>National Health and Nutrition Examination Survey 1999-2006; 9 specific types of activities was estimated using self-reported data from 21,685 adult participants.</p>	<p>Walking (28%), sports (22%), and dancing (9%) contributed most to PA volume; attributable proportion was higher among men than women for sports (30% vs. 11%) and higher among women than men for walking (36% vs. 23%), dancing (16% vs. 4%), and conditioning exercises (10% vs. 5%).</p>	<p>Walking, sports, and dance account for the most activity time among US adults overall.</p>
37	<p>Wickel (2007)</p> <p>U.S.A</p> <p>Aim: 1) to determine the contribution of organized youth sport to total daily physical activity (PA), and 2) to examine the contribution of daily recess and physical education (PE) to total daily PA.</p>	<p>Cross-sectional design, 119 children wore an accelerometer during a school day in which they participated in organized youth sport.</p>	<p>Youth sport contributed approximately 23% of the total MVPA, whereas PE and recess contributed almost 11 and 16%, respectively; approximately 52% of youth sport time was spent in either sedentary or light-intensity activities; During a non-sport day, participants engaged in significantly more sedentary activity and significantly less moderate and vigorous activity compared with the sport day.</p>	<p>Sport is a key contributor to PA in children that can be leveraged further.</p>
38	<p>Wilhite (2009)</p> <p>U.S.A</p> <p>Aim: describe how participating in sport, broadly defined, helps persons with a disability achieve and maintain health and health-related components of well-being.</p>	<p>Qualitative snowball interviewing</p>	<p>Sport benefits included enhanced functional capacity, health promotion, relationship development, increased optimism, and inclusion in meaningful life activities and roles. Health professionals were vital in introducing and encouraging people with disabilities to participate in sport.</p>	<p>Sport is beneficial for the health of people living with disabilities.</p>

2. MENTAL HEALTH

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
1	Abbott (2011) Australia Aim: explore the association between sports and physical activity participation and body image among Australian adolescent girls.	cross-sectional design; Adolescent girls (N=1002) aged 13-18, from 34 high schools across Western Australia physical-activity portfolio investigated body image difference among sports participants, general physical-activity participants and non-physically active girls.	Sports participants reported higher functional values, functional behavioural-investment and functional satisfaction than physically active and non-physically active girls.	Involvement in sporting activities was associated with more functional body image than those not involved in sports.
2	Aichberger (2010) Europe Aim: examine the association between physical activity and cognitive performance in a longitudinal study.	Non-institutionalized persons aged 50 years or older in 11 European countries who participated in Wave 1 (2004/2005) and Wave 2 (2006/2007) of the Survey of Health, Ageing, and Retirement in Europe (SHARE).	Physical inactivity (neither moderate nor vigorous) to be associated with a higher rate of cognitive decline over a mean follow-up of 2.5 years	Physical activity may be of particular importance when other risk factors for cognitive decline are present.
3	Andriessen (2009) Europe Aim: Review literature on the relationship between sports spectatorship and suicidal behaviour.	Literature review	Sports events can have an impact on suicide mortality and morbidity, but this relationship seems to be mediated by age, gender, marital status, and alcohol consumption, as well as the process and outcome of the game (e.g., victory vs. defeat of the favoured team).	Weak link between sport spectatorship and suicidal behaviour.
4	Bäckmand (2009) Finland Aim: study whether factors related to type of sport participated in as young adults and level of and changes in physical activity later in life predict changes in mood as well as functioning during a 6-year follow-up.	Cohort of male Finnish former athletes (N = 504) and controls (N = 349); outcomes: PA, self-reported mood; functioning of daily living.	Low level of physical activity in 1985 predicted a decrease in physical functioning between 1995 and 2001, as well as poor physical functioning at the end of follow-up in 2001; an increase in physical activity between 1985 and 1995 protected against onset of anxiety between 1995 and 2001.	PA shows protective properties for anxiety and decreased physical functioning in elderly.
5	Brand (2016) Europe Aim: aim of the present study was to explore the associations between PA, sleep, psychological functioning, curiosity and exploratory behaviour,	1361 participants completed questionnaires	During early and mid-adolescence greater PA was associated with more favourable sleeping patterns, and better psychological functioning, including curiosity and exploratory behaviour and mental toughness;	Demonstrated PA and sports association with an array of mental health indicators.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
	and mental toughness during early to mid-adolescence.			
6	Brown (2007) U.S.A Aim: evaluate the associations of physical activity and sports team participation with suicidal behaviour among U.S. high school students.	2003 Youth Risk Behaviour Survey (N = 10,530 respondents); Exposure variables included physical activity (inactive, insufficient, moderately intensive, regular vigorously intensive, and frequent vigorously intensive) and sports team participation.	Compared with inactive students or sports team nonparticipants, the odds of suicide ideation were lower among boys reporting frequent vigorous-intensity physical activity and sports team participation; suicide attempts were lower among frequently vigorously active boys and sport team participants.	PA and sport participation protective against suicide ideation and attempts.
7	Chen (2012) Taiwan Aim: examine independent associations between leisure-time physical activity (LTPA), non-leisure-time physical activity (NLTPA), and specific parameters of physical activity (frequency, duration and intensity) with depressive symptoms in older adults.	2,727 persons aged ≥ 65 years participating in the 2005 Taiwan National Health Interview Survey	LTPA but not NLTPA was significantly inversely associated with depressive symptoms; compared with participants expending 2000+ kcal/week through LTPA, the risk of experiencing depressive symptoms was significantly higher for those expending 1-999 kcal/week, and those expending 0 kcal/week; only intensity was independently associated with depressive symptoms	High intensity leisure time physical activity inversely associated with depressive symptoms.
8	Dalton (2015) Australia Aim: examine relationship between indigenous participation in sport and positive health outcomes.	2012 Mission Australia Youth Survey (MAYS)	Among Indigenous youth aged 15-19 years there is a positive relationship between participation in sport and rating of overall health and risk of mental health disorder; Indigenous youth who participate in sport are 3.5 times more likely to report good general health and 1.6 times more likely to have no probable serious mental illness.	Health benefits for promotion young indigenous participation in sport.
9	de la Cruz-Sánchez (2011) Europe Aim: provide evidence of the association between different indicators of mental health in the Spanish adult population and leisure time physical activity.	Cross-sectional study; Spanish National Health Survey; 29 478 persons (11 645 men and 17 833 women, older than 16 years) were included.	Leisure time physical activity is associated with a higher prevalence of perceived health status and subjective mental health (GHQ scale); more positive indicators of mental well-being in more vigorously active subjects;	Physical activity during leisure time is associated with a lower prevalence of negative mental health indicators.
10	Donnelly (2016) U.S.A Aim: Examine if PA and physical fitness influence cognition, learning, brain structure, and brain function; and if sports programs influence standardized achievement test performance and concentration/attention?	Systematic review; 73 studies included	Research supports the view that physical fitness, single bouts of PA, and PA interventions benefit children's cognitive functioning. Limited evidence was available concerning the effects of PA on learning; PA has a relationship to areas of the brain that support complex cognitive processes.	Strong evidence for PA role in cognitive learning in children.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
11	Eime (2010) Australia Aim: examine health-related quality of life and life satisfaction in women who participate in three contrasting forms of PA: club sport, gym activities, and walking.	Cross-sectional study using (Short-Form Health Survey [SF-36]) and life satisfaction in 818 women living in rural Victoria, Australia, in 2007.	Four of the eight SF-36 subscales, the SF-36 mental health component summary score, and life satisfaction were significantly higher in the club sport group than that in the other groups.	Although not casual, an association was found between sport club participation and subjective wellbeing.
12	Eime (2013) Australia Aim: systematic review of the psychological and social health benefits of participation in sport by adults.	Systematic review	Club-based or team-based sport seems to be associated with improved health outcomes compared to individual activities, due to the social nature of the participation. Individual sport derive mental health benefits which can enhance the development of true-self-awareness and personal growth.	Strong evidence of social benefits from both individual and team sports.
13	Ericsson (2015) Sweden Aim: study relationships between physical activity and school performance among Swedish compulsory school students who fail to achieve sufficient grades to move on to upper secondary school.	389 students of which 76% (147 male, and 146 female)	Significant correlations were found between the level of physical activity and grade in PEH, as well as between physical activity and total grades. Students who had good self-esteem (n = 162) were significantly more physically active than those who had low self-esteem (n = 32).	Significant correlation between physical activity and school performance.
14	Gatab (2012) Iran Aim: investigate the effect of the selected exercise on male students' general health and happiness in a university setting.	Experimental group consisted of playing soccer in a creational and competitive way for 8 weeks, two sessions a week, each session lasting 60 to 90 minutes.	In sports and group activities, people will learn to help others, compatibility to individuals' teamwork, self-confidence, friendship, to have a happy life and learn to be happy and generally.	Regular exercise can increase happiness and improve general health in students.
15	Gísladóttir (2013) Iceland Aim: investigate the relationship between adolescents' sports clubs participation and self-reported mental and physical conditions and future expectations.	10,987 pupils in the final three years of their compulsory education aged 14-16.	Adolescents who work hard at sport not only believe they are in better mental and physical condition, they also believe they can succeed in other areas such as their studies. Sports clubs promote positive influence on adolescents' mental and physical conditions and their future expectations toward work and happiness.	Participation in organised sports clubs affects the participants in a positive way.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
16	Huang (2012) Canada Aim: investigate the relationship between participation in physical activity and self-reported happiness in the United States.	Data from the Behavioural Risk Factor Surveillance System between 2005 and 2009 and County Business Patterns	Individuals living in a county with greater access to sports facilities are more likely to participate in physical activity and also report higher life satisfaction. Both men and women gain happiness from participation, and men appear to benefit more from participation than women.	Access is a major factor in sports participation.
17	Ku (2016) Taiwan Aim: examine the longitudinal independent associations of objectively assessed physical activity at different intensities and sedentary behaviours, with dimensions of subjective well-being in older adults.	307 community-dwelling older adults aged 65 or older; 18-month follow-up	Moderate-to-vigorous physical activity was associated with higher levels of follow-up general and specific dimensions of well-being. Moderate-to-vigorous physical activity and light physical activity are associated with different dimensions of well-being, suggesting that different intensities of late-life physical activity make distinct contributions to well-being.	Positive longitudinal association between PA and mental wellbeing in older adults.
18	Lipscomb (2007) U.S.A Aim: investigate the extent to which involvement in school-sponsored clubs and sports constitutes human capital investment.	16,449 national educational longitudinal study (NELS) participants in 1988, 1990, and 1992.	Participating is associated with a 1.5 to 2 percent improvement in test scores and a 5 percent improvement in Bachelor's degree attainment expectations.	Innovative study quantified productivity gains.
19	Marlier (2015) Europe Aim: uncover how sport participation, physical activity, social capital and mental health are interrelated by examining these outcomes in one model.	A cross-sectional survey was conducted in nine disadvantaged communities; 200 adults; 18-56 years.	Sport participation ($\beta = .095$) and not total physical activity ($\beta = .027$) was associated with better mental health; individual social capital was directly associated with mental health	Emphasizes the importance of sport participation and individual social capital to improve mental health in disadvantaged communities.
20	Mason (2016) UK Aim: examine self-reported physical activity levels and the domains and diversity of sources of PA deprived neighbourhoods in Glasgow, UK, and their associations with measures of mental health, positive mental wellbeing, and physical and general health.	Cross-sectional survey data 2654 residents of 32 deprived neighbourhoods in Glasgow, UK.	People achieving PA from family activities, and those doing more diverse PAs, had better mental wellbeing. Active travel was associated with better mental wellbeing and mental health among the highly and moderately physically active. Highly active people who engaged in leisure-based PA had better mental health.	Important to encourage greater diversity of PA in disadvantaged areas, including leisure and family activities and active travel for those out of work with low PA.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
21	McMahon (2016) Europe Aim: In this cross-sectional study, physical activity, sport participation and associations with well-being, anxiety and depressive symptoms were examined in a large representative sample of European adolescents.	School-based survey was completed by 11,110 adolescents from ten European countries who took part in the SEYLE (Saving and Empowering Young Lives in Europe) study.	Frequency of physical activity and participation in sport were both found to independently contribute to greater well-being and lower levels of anxiety and depressive symptoms in both sexes.	Didn't find additional benefit to mental health associated with meeting the WHO-recommended levels of activity
22	Pawlowski (2014) Europe Aim: Investigate whether national pride from international sporting success contributes to well-being.	Sample size of n = 34,681 from 33 participant countries of the International Social Survey Programme (ISSP).	Findings do not support the hypothesis that pride following from sporting success can contribute distinctly to subjective wellbeing. Moreover, the hosting of events may be more important than success at them, a point suggested by the positive association between attendance at sporting events and subjective wellbeing.	Show that success isn't the key to subjective wellbeing, but rather attendance.
23	Perales (2014) Australia Aim: analyse the individual-level associations between participation in moderate to vigorous physical activity (MVPA) and psychological distress levels in a nationally representative sample.	3 waves of panel data from the Household, Income and Labour Dynamics in Australia Survey, consisting of 34 000 observations from 17 000 individuals and covering 2007, 2009, and 2011.	Substantial and highly statistically significant associations between the frequency of MVPA and different indicators of psychological distress. Frequent participation in MVPA reduces psychological distress and decreases the likelihood of falling into a high-risk category.	Physical activity should be at the core of health promotion initiatives.
24	Perron (2012) Canada Aim: examine the moderating role of sports participation in the concurrent and longitudinal links of peer victimization with depressive symptoms and externalizing problems.	1250 participants assessed between ages 7 and 10 years. Children's levels of peer victimization, depressive symptoms and externalizing problems were assessed by teachers. Mothers reported on children's sports participation.	Victimized children who participated in team sports at age 8 years displayed significantly fewer depressive symptoms compared to victims who rarely participated. Participation in team sports also counteracted the longitudinal effect of victimization on depression symptoms two years later. Moreover, victimized children who participated in team sports showed significantly fewer externalizing problems at age 10 compared to children who rarely participated. Victimized children who were part of a sporting team at age 8 were less victimized two years later, which accounted for part of the decrease in externalizing problems at age 10.	Sport participation had a longitudinal positive effect on peer victimization.
25	Pfeifer (2010) Europe Aim: analyse the impact of exercising sports during childhood and adolescence on educational attainment.	German Socio-Economic Panel (GSOEP) - a representative survey of persons and households in Germany.	Participation of German adolescents in sport activities has significant positive effects on educational attainment; the effect is generally larger for women than for men, especially if they participate in competitions. Results also point to the fact that taking part in competitions might offset (but not reverse) the beneficial effects of sports on the highest degrees, probably because both competitions and studying for the highest degrees are very time-consuming activities.	Positive association between sport participation and educational attainment – this should encourage politics to strengthen sport activities in school and out of school.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
26	Richards (2014) Africa Aim: examine the effects of a sport-for-development programme on adolescent physical fitness and mental health in Gulu, Uganda, a disadvantaged community.	Single-blinded RCT nested within an observational study with three unbalanced parallel groups. 1,462 adolescents aged 11-14 years. Intervention comprised an 11-week sporting programme.	There was a negative effect on DLS when comparing boys intervention vs. wait-listed (ES = 0.67 [0.33 to 1.00]) and intervention vs. non-registered (ES = 0.25 [0.00 to 0.49]).	No evidence that competitive sport-for-development interventions improve mental health is a post conflict, low-income and vulnerable population.
27	Richards (2015) Australia Aim: use a large multi-country dataset to assess the association of happiness with physical activity volume and its specificity to intensity and/or activity domain.	Eurobarometer 2002 data from 15 countries (n = 11,637)	When compared to inactive people, there was a positive dose-response association between physical activity volume and happiness (highly active: OR = 1.52 [1.28-1.80]; sufficiently active: OR = 1.29 [1.11-1.49]; insufficiently active: OR = 1.20 [1.03-1.39]).	The association of physical activity and happiness was domain specific
28	Ruseski (2014) Europe Aim: to establish causal evidence of a relationship between sport participation and self-reported happiness using instrumental variables (IV).	Data from a 2009 population survey of people living in Rheinberg, Germany.	Individuals who participate in sport have higher life happiness. The results suggest a U-shaped relationship between age and self-reported happiness. Higher income is associated with greater self-reported happiness, males are less happy than females, and single individuals are less happy than non-singles.	The impact of sport participation on general happiness lends support to the policy priority of many governments to increase sport participation at all levels of the general population.
29	Sabiston (2013) Canada Aim: examine depressive symptom trajectories during adolescence as predictors of physical activity (PA) in young adulthood.	20 data collections from 860 adolescents residing in Montreal, Canada (n=860) every 3-4 months during high school.	Three depression symptom trajectory groups: low and declining depressive symptom scores (group 1; 37.8%); moderate and stable depressive symptom scores (group 2; 41.6%); and high increasing depressive symptom scores (group 3; 20.6%). Group 2 and group 3 participated in less moderate-intensity PA and were less likely to participate in team sports compared to group 1.	Targeted approaches are needed to encourage adolescents with moderate to high depression symptoms to engage in PA and team sports.
30	Schumacher (2011) Europe Aim: Investigate the role of sport as a mediating variable in the onset or development of social anxiety symptoms in primary school children.	Two hundred and eight 7- to 8-year old, repeated-measures cohort study includes two data collections. The first data collection was carried out in 2007 and the second a year later in 2008.	Children practicing sport tended to score lower on all instruments in both 2007 and 2008. Repeated-measures analysis of variance indicated a reduction in social anxiety over time in children practicing a team sport.	Sport is a mediating factor in early indicators of anxiety in children.
31	Sorenson (2014) U.S.A Aim: To assess holistic life-span health and health-related quality-of-life (HRQL) among current and former National Collegiate Athletic Association student-athletes (SAs).	Cross-sectional study in a large Division I university of population-based sample of 496 university students and alumni (age 17-84 years).	Older alumni SAs reported greater joint health concerns than NAs; Joint health for current and younger alumni SAs was similar to that for NAs; Current SAs demonstrated evidence of better psychosocial health and mental component HRQL versus NAs.	Increased physical and mental benefits for elite student athletes but face deteriorating joint health in later life.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
32	<p>Soundy (2015)</p> <p>UK</p> <p>Aim: consider the impact of being introduced to a sport and sport participation on health indicators in people with schizophrenia.</p>	Systematic review (10 studies included)	The mean reduction in the Positive and Negative Symptoms score ranged from 2.4 points following 12 weeks of basketball to 7.4 points following a 40 week programme of horse riding. In general, sport has the potential to improve an individual's quality of life through providing a meaningful normalizing activity that leads to achievement, success and satisfaction.	Sport participation may result in reduced psychiatric symptoms in patients with schizophrenia.
33	<p>Southerland (2016)</p> <p>U.S.A</p> <p>Aim: assess the cross-sectional relationship between suicidal behaviours and PA among adolescents, especially among middle school-aged youth.</p>	2010 Tennessee Middle School Youth Risk Behaviour Survey data from 65,182 middle school students.	Of the three exposure variables: Sports team engagement, total PA or PE class attendance, only sports team engagement was negatively associated with suicidal thoughts, plans, and attempts even after controlling for other important variables.	Association between sports team engagement and reduced risk of suicidal indicators and attempts.
34	<p>Stephoe (1996)</p> <p>UK</p> <p>Aim: assess the association between extent of participation in regular sport or vigorous recreational activity and emotional wellbeing in adolescents aged 16 years.</p>	Cross-sectional study: 2223 boys and 2838 girls	Sport and vigorous recreational activity index was positively associated with emotional wellbeing independently of sex, social class, health status, and use of hospital services. This link is only a cross-sectional association and not causal in this study.	Emotional wellbeing is positively associated with extent of participation in sport and vigorous recreational activity among adolescents.
35	<p>Street (2007)</p> <p>Australia</p> <p>Aim: explore evidence relating to the mental health benefits of participation in organised physical recreation.</p>	Comprehensive literature review	Evaluations by Australian and US Governments found that people who participate in sports clubs and organised recreational activity enjoy better mental health, are more alert, and more resilient against the stresses of modern living. Participation in recreational groups and socially supported physical activity is shown to reduce stress, anxiety and depression, and reduce symptoms of Alzheimer's disease, yet more than one-third of adult Australians report no participation in sports and physical recreation.	Review supports the development and maintenance of organised sport and recreational activities that are socially and culturally appropriate.
36	<p>Taliaferro (2008)</p> <p>U.S.A</p> <p>Aim: examine the relative risk of hopelessness and suicidality associated with physical activity and sport participation.</p>	Data from the CDC's 2005 Youth Risk Behaviour Survey.	Frequent, vigorous activity reduced the risk of hopelessness and suicidality among male adolescents. Sport participation protected against hopelessness and suicidality.	Mechanisms other than physical activity contribute to the protective association between sport and reduced suicidality. Possibly social support and integration.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – mental health benefits	Comments
37	<p>Trudeau (2008)</p> <p>Canada</p> <p>Aim: review relationships of academic performance and some of its determinants to participation in school-based physical activities, including physical education (PE), free school physical activity (PA) and school sports.</p>	<p>Systematic review</p>	<p>Quasi-experimental data indicate that allocating up to an additional hour per day of curricular time to PA programmes does not affect the academic performance of primary school students negatively. Additional curricular emphasis on PE may result in small absolute gains in grade point average (GPA), and such findings strongly suggest a relative increase in performance per unit of academic teaching time. Cross-sectional observations show a positive association between academic performance and PA. PA has positive influences on concentration, memory and classroom behaviour.</p>	<p>PA can be added to the school curriculum by taking time from other subjects without risk of hindering student academic achievement.</p>
38	<p>Van Boekel (2016)</p> <p>U.S.A</p> <p>Aim: study the effects of participation in school-organized sports on academic achievement and students' perceptions of family support, teacher and community support, and school safety.</p>	<p>2010 administration of the Minnesota Student Survey including a sample of 29,535 12th grade students</p>	<p>Participation in school sports was associated with higher GPAs, favourable perceptions of school safety, and increased perceptions of family and teacher/community support.</p>	<p>One of several studies linking PA, sport participation and academic achievement.</p>
39	<p>Yang (2010)</p> <p>Finland</p> <p>Aim: examine the relationship between the leisure-time physical activity (LTPA) and the prevalence of job strain.</p>	<p>861 full-time employees (406 men and 455 women), aged 24-39 years in 2001, from the ongoing Cardiovascular Risk in Young Finns Study.</p>	<p>Baseline LTPA was inversely associated with job strain ($P < 0.001$) and job demands ($P < 0.05$) and directly associated with job control ($P < 0.05$) in both sexes. Compared with persistently active participants, persistently inactive participants had a 4.0-fold higher job strain.</p>	<p>Participation in regular LTPA during leisure may help young adults to cope with job strain.</p>

3. ECONOMIC BENEFITS

	Author (year), country, aim	Concepts/constructs/metrics	Main findings – economic benefits	Comments
1	<p>Agrusa, (2009)</p> <p>Hawaii</p> <p>Aim: To assess the economic benefits of the 2007 Honolulu Marathon by runners from outside the state of Hawaii and their travelling companions.</p>	<p>Instrument based on The Nordic Model (depicting impact of tourism on the economy) consisted of 18 questions regarding length of stay, accommodation, amount of money spent by the marathon participants for food, lodging, souvenirs and other items while attending the marathon activities in Honolulu.</p>	<p>A total of 1,643 participants completed survey. The Marathon accounted for an economic impact of \$108,890,000 that generated \$3.7 million in state taxes.</p>	<p>Exploratory nature precludes causative model.</p>
2	<p>Ahlert, (2006)</p> <p>Germany</p> <p>Aim: to estimate potential overall and regional economic effects on the German economy due to hosting the FIFA World Cup 2006.</p>	<p>Inter-industry-based macroeconomic simulation model. The model accounts for necessary investments for upgrading stadium facilities in venues of the event as well as tourism expenditure of incoming world cup visitors during the event in 2006.</p>	<p>Findings focus on the success of a predictive model, with \$ included in results tables (no overall amount but outputs relating to the complex simulation model).</p>	<p>Model is highly complex and utilises input-output of national data.</p>
3	<p>Anokye, (2014)</p> <p>England</p> <p>Aim: to explore how money and time prices are associated with PA in general, and specific activities.</p>	<p>Nationally representative telephone follow-up survey to Health Survey for England 2008. Questions focused on ex-post money and times prices, type and quantity of PA, perceived benefits of PA, SES information. Count regression models (all activities together, swimming, workout, walking separately) were fitted to investigate the variation in quantity of PA.</p>	<p>Of the 1683 respondents, 83% participated in one or more activity, and spent an average 2.40GBP. Among specific activities, the money price effect was highest for swimming with a 10% higher price associated with 29% fewer occasions of swimming, followed by workout (3% fewer occasions) and walking (2% fewer occasions). People who felt doing PA could help them get outdoors, have fun or lose weight were likely to do more PA.</p> <p>Policy implications were that positive financial incentives, e.g., subsidising price of participation, could generally lead to an increase in quantity of PA among those already exercising, and such policies could lead to desired PA goals if implemented at an individual activity level (e.g. 50% subsidy on swimming entrance charges) rather than a blanket implementation.</p>	<p>No economic model used except for self-reported cost related to activity entered into regression models.</p>
4	<p>Australian Government - Australian Sports Commission (2016). "Clearinghouse for Sport: Economic Contribution of Sport".</p> <p>Australia</p> <p>Aim: to assess the economic contribution of sport to Australia</p>	<p>This report is quite extensive and describes various literature surrounding the economic value of sport – the focus is on social utility.</p>		<p>No attempt to estimate the contribution of sport sector to GDP or aggregate employment – preliminary report included these details.</p>

Author (year), country, aim		Concepts/constructs/metrics	Main findings – economic benefits	Comments
5	Baade (2008) US Aim: to examine the economic impact of spectator sports of local economies.	Analysis of 1970 to 2004 of 63 metropolitan areas that played host to big-time college football programs. This study examines a large panel of institutions using annual data.	Neither the number of home games played, the winning percentage of the local team, nor winning a national championship had a significant impact on employment or personal income in the cities where teams play.	Findings suggest spectator sports do not have a large positive net economic impact on host cities.
6	Barajas, (2016) Spain Aim: to estimate the economic impact of a two-day event, the Rally Ourense, that takes place in Spain.	Followed the approach by Salgado et al. (2013) but considered only the direct monetary flows. Process started with identifying the different sources of cash flows. Then the flows from different agents (spectators, competitors, mass media etc.) were estimated using the information from the surveys and interviews. With this information, the direct monetary economic impact was computed as well as the return from the public money invested in the event.	Findings indicated favourable economic impact. For each euro spent by public authorities, the town experiences about a 10 euro increase in spending. The Rally therefore has a high return on the public investment.	Clear figure depicting model used (and associated data) to determine economic impact.
7	Cabane (2014) Germany Aim: to evaluate the impact of leisure sport participation on unemployment duration.	German Socio-Economic Panel.	Practicing sports during unemployment is highly and positively correlated to the probability of finding a job for people who experience at least two unemployment spells over the period (25 years) and who were not involved in sports participation, in volunteering, in politics or in religious practice weekly when they were employed (in the last 2 years).	No economic evaluation – moved to community benefits (reducing unemployment duration).
8	Gratton (2000) UK Aim: to report the results of an economic impact assessment of six major sports events held in the UK in 1997.	4306 questionnaires completed by visitors at six events, with ticket sales data. Proportional income multiplier used; (Direct + indirect + induced income)/initial visitor expenditure Once initial expenditure is measured, economic impact in terms of local income can be estimated by multiplying this initial expenditure by the local multiplier.	Wide variation was found across sports events in their ability to generate economic impact in the host city.	Individual \$ impact is reported for each sports event.
9	Coates (2007) US Aim: to explore the literature on the impact of professional sports teams and stadiums on their host communities.	Literature review (narrative).	Little academic research that investigates the effects ex post finds significant increases in income, employment, taxable sales, or tax revenues associated with sports and sports facilities. Measures of consumer surplus and public benefits of stadiums and franchises are often substantial. As large as these benefits are, rough calculations indicate that they are not necessarily large enough to justify subsidies of hundreds of millions of dollars.	Poor quality. Single author.

Author (year), country, aim		Concepts/constructs/metrics	Main findings – economic benefits	Comments
10	<p>Coleman (2011)</p> <p>UK, US, Europe</p> <p>Aim: examines the hidden financial benefits that non-elite events are capable of delivering for host cities.</p>	<p>Review.</p> <p>Studies typically utilise direct economic impact approach by calculating additional expenditure by visitors and organisers in the respective host economies.</p>	<p>For certain elite events there is the likelihood that extensive capital investment will be necessary to achieve benefits. Non-elite mass participation events provide a viable alternative with little outlay. Such events can generate substantial economic benefits for the host community comparable to, and in some cases greater than, those associated with elite events.</p>	<p>Unclear how economic value is derived – presumably each reviewed study used various methods.</p>
11	<p>Daniels (2004)</p> <p>US</p> <p>Aim: the purpose of this study was to demonstrate methods for estimating the income effects of sport tourism events.</p>	<p>Four models were constructed using data from a large, south eastern US road race.</p>	<p>Models are highly complex and detailed – findings suggest alternatives for estimating the income effects of sport tourism events.</p>	
12	<p>Davies (2013) UK</p> <p>Aim: establish the most practically-relevant methodology for analysing the economic impact of major events and to identify the key methodological issues for future consideration.</p>	<p>Draws on empirical research undertaken by the Sport Industry Research Centre</p>	<p>The direct expenditure approach (DEA) is the most pragmatic and cost-effective method for evaluating the economic impact of medium-sized major events.</p>	<p>balanced academic rigour with everyday practical realities</p>
13	<p>Davies (2004)</p> <p>UK</p> <p>Aim: examine the economic importance of the voluntary sector within the sports industry</p>	<p>Looks at economic contribution (value-added) of the voluntary sector to the sports industry; and the value of the volunteer labour market.</p>	<p>Need to collect primary data from sports clubs re estimating volunteer value, not just following national market value estimates.</p>	<p>Although an old paper, shows development of methodology.</p>
14	<p>Downward (2007)</p> <p>UK</p> <p>Aim: explores the decision to participate in sports activities in the United Kingdom and the subsequent frequency of participation.</p>	<p>Cross-sectional data from the Taking Part survey.</p>	<p>Social and personal capital are of paramount importance in determining sports participation.</p>	<p>These need policy focus</p>
15	<p>Drakakis (2014)</p> <p>Greece</p> <p>Aim: Studied contribution of golf, windsurfing, horse riding, and scuba diving to local economy in Messina, Greece.</p>	<p>Visitor expenditure surveys undertaken and analysed in terms of (a) average and total expenditures, (b) distribution among different categories of businesses, and (c) geographical distribution.</p>	<p>By examining the relative rather than individual contribution, golf can be viewed as a propulsive activity, not only to the local economy, but also in the sport tourism context.</p>	<p>Implications for multipliers during economic analyses</p>

Author (year), country, aim		Concepts/constructs/metrics	Main findings – economic benefits	Comments
16	Fourie (2011) South Africa Aim: Measure the economic impact of mega-events	Standard gravity model of bilateral tourism flows between 200 countries from 1995 to 2006	Benefit varies depending on the type of mega-event, the participating countries and whether the event is held during the peak season or off-season	Study included for economic method.
17	Hodur (2006) U.S Aim: Assess the economic impact of a multi-purpose sports and auditorium facility located in a small metropolitan area	Input output model: Intercept surveys at 11 representative events (expenditure data); facility operation and vendor outlays to estimate secondary impacts	Substantial economic impact; varied by event type and potential of attract attendees from outside the area.	Study included for economic method.
18	Huang (2014) China, U.S Aim: assess economic impact of Formula One Grand Prix (F1), the ATP World Tour Masters 1000 (ATP), and the Shanghai International Marathon (SIM) - on the host city in China.	Input-output model using computer software: types of attendees at the events, total attendee expenditure, assess the new money inflow into the host economy through an economic impact assessment	Useful method for estimating economic impact; confirms events are used to promote economic activity.	Study included for economic method.
19	Humphreys (2009) U.S Aim: to examine the dimensions of the sports market in the United States.	Used participation, attending sporting events, and following through media. Investigated demand side v supply side estimates.	Supply side estimate exceeds the two demand side estimates, mainly due to \$20 million athletic footwear market.	Included due to economic inputs.
20	Humphreys (2015) U.S Aim: assess which parts of a local economy a new professional sports facility and team impacts.	Monopolistic competition model: urban service consumption; production as well as spatial structure and property values.	Main impact were changes in property values, and increases local welfare.	Implications of property tax based financing
21	Jiménez-Naranjo (2016) Spain Aim: aims to analyse socioeconomic impact of the paddle tournament “Caceres International Open 2013”	Cost benefit analyses (CBA) used	calculate a benefit/cost ratio analysing the contribution made by two groups of respondents (attendees and participants)	Included for estimating novel area of sports economy.

Author (year), country, aim		Concepts/constructs/metrics	Main findings – economic benefits	Comments
22	Li (2013) China Aim: Assess the economic impact of the Beijing Olympics, in particular the tourism impact.	Computable general equilibrium (CGE) modelling	Economic impact small compared to total size of economy.	Study included for economic method.
23	Lu (2011) Taiwan Aim: assess the impact of sport participation on subjective well-being (SWB) and to estimate the relative monetary value that sport participation derives from SWB.	structural equation model (SEM)	Perform a confirmatory factor analysis, and assess the causal relationship between sport participation and SWB as well as the effect of the demographic variables on these two concepts.	Novel attempt at placing economic value on happiness
24	Mansfield (2015) UK Aim: aim is to engage previously inactive people in sustained sporting activity for 1×30 min a week and to examine associated health and well-being outcomes	incremental cost-effectiveness ratios and cost-effectiveness acceptability curves	HASE study is a partnership between local community sport deliverers and sport and public health researchers in designing, delivering and evaluating community sport interventions.	Useful study covering several value areas.
25	Patrick (2001) U.S Aim: estimate cost and outcomes of the Arthritis Foundation aquatic exercise classes from the societal perspective	Cost per quality-adjusted life year (QALY)	The Quality of Well-Being Scale (QWB) and Current Health Desirability Rating (CHDR) were used for economic evaluation, supplemented by the arthritis-specific Health Assessment Questionnaire (HAQ), Centre for Epidemiologic Studies-Depression Scale (CES-D), and Perceived Quality of Life Scale (PQOL) collected at baseline and post class.	QALY's used in large scale health evaluations.
26	Schut (2016) France Aim: Provide economic impact case study of the GDF-Suez Open of Seine-et-Marne.	Injection-outflow method is supported by a survey on the spectators (n = 646), organizers and partner companies.	Estimate funds coming from outside the regional area in order to calculate the injections of funds, deduct the outflow of funds out of the area, and to apply the regional multiplier estimated through a meta-analysis.	Used in other studies
27	Shephard (1989) Canada Aim: Investigate how to value impact of worksite fitness program.	Value derived from corporate image, recruitment of premium employees, productivity, decreased absenteeism and turnover, lower medical costs, an improved lifestyle (health savings), and reduced industrial injuries.	Immediate return may be as much as \$2 to \$5 per dollar invested.	Small-scale benefits are similar to large scale benefits

Author (year), country, aim		Concepts/constructs/metrics	Main findings – economic benefits	Comments
28	<p>Shipway (2012)</p> <p>South Africa</p> <p>Aim: Determine the impact of a marathon on the provincial economy – a manufacturing-based economy.</p>	<p>Social Accounting Matrix is used to quantify the impact of this spending stimulus on production, income and job creation within the province</p>	<p>Focus is on participants' spending behaviour during the event.</p>	<p>Novel method used</p>

4. COMMUNITY DEVELOPMENT / WELL-BEING

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – community benefits	Comments
1	<p>Cerkez (2015)</p> <p>Europe</p> <p>Aim: examine the gender-specific protective/risk factors for harmful alcohol drinking among adolescents.</p>	<p>Sample was composed of 1,015 17- to 18-year-old adolescents (426 boys and 589 girls).</p>	<p>Among boys, individual sports participation, higher paternal education, and lower self-reported conflict with parents were protective factors against harmful drinking. Among girls, higher conflict with parents was the single significant risk factor for harmful alcohol drinking.</p>	<p>Sport participation found to be protective against harmful drinking.</p>
2	<p>Eime (2016)</p> <p>Australia</p> <p>Aim: integrates sports club membership data from five popular team sports and investigates sport participation across the lifespan (4-100 years) by sex and region (metropolitan/ non-metropolitan).</p>	<p>Participant membership records from five sports (Australian rules football, basketball, cricket, hockey and netball), in the Australian state of Victoria for the period 2010–2012.</p>	<p>Overall participant numbers increased from 414,167 in 2010 to 465,403 in 2012; highest proportion of participants was in the 10-14 year age range, with participation rates of 36 % in 2010 and 40 % in 2012; considerably lower participation rate in the 15-19 year age group compared to the 10-14 age group; Participation rates were generally higher in non-metropolitan than metropolitan areas.</p>	<p>Participation rates decline sharply in late adolescence, particularly for females.</p>
3	<p>Grieve (2012)</p> <p>Australia</p> <p>Aim: investigate the community benefit derived from the development of a new sport facility, in this case the Darebin International Sports Centre (DISC), Melbourne, Australia.</p>	<p>Qualitative study of value perceptions</p>	<p>DISC provides a range of noneconomic benefits such as increased community visibility, enhanced community image and a range of social/psychic income benefits. The DISC increased participation and social cohesion; creation of a better lifestyle for the community; enhancing Darebin's profile in the community; as well as increasing the number of visitors to the municipality and local businesses (i.e. economic impacts).</p>	<p>Community benefits associated with new sporting venue.</p>
4	<p>Guèvremont (2014)</p> <p>Canada</p> <p>Aim: examine in-school and out-of-school extracurricular activities for 14- to 17-year-olds using a population-based sample of Canadian youth.</p>	<p>Population-based sample of Canadian youth.</p>	<p>Academic outcomes were associated with in-school and out-of-school sports and non-sport activities. Youth who participated weekly in non-sport activities regardless of the context were less likely to have tried smoking, alcohol, or marijuana. However, weekly participation in in-school sports was associated with an increased likelihood of failing a course; youth who participated weekly in out-of-school sports were more likely to have tried alcohol.</p>	<p>Participation in extracurricular activities, regardless of context, encourage positive youth development.</p>

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – community benefits	Comments
5	Hallmann (2013) Europe Aim: analyse what factors influence perceived national pride and happiness when athletes succeed at major national and/or international competitions.	Nation-wide survey, data was collected from n=2006 randomly selected Germans.	National pride and happiness were significantly explained through interest in elite sports, sport participation and socio-economic variables. Women, individuals with a low educational background, and low income and individuals having a migration background are the population segments who gain most from the sporting success of elite athletes.	Funding of elite sports and elite athletes can be considered as policy tool for social integration.
6	Hayhurst (2016) Canada & Australia Aim: examine two sport for development and peace (SDP) initiatives that focus on Indigenous young women residing in urban areas, one in Vancouver, Canada, and one in Perth, Australia.	Qualitative study	Sport for development and peace programs led by Indigenous peoples that are fundamentally shaped by Indigenous voices, epistemologies, concerns and standpoints would potentially be the most successful.	Sport can be used to achieve the goals of international development.
7	Henderson (2014) UK Aim: report the impact on participants of the 'Imagine Your Goals' programme, run by 16 Premier League football clubs in conjunction with England's Time to Change programme to reduce mental health-related stigma and discrimination.	Mixed methods evaluation used pre/post measures of well-being, access to social capital, focus groups held early on and towards the end of the two-year programmes, and questionnaires for coaching staff.	Programmes had largely met participants' expectations in terms of socializing, providing structure and improving fitness levels, exceeded expectations in relationships with coaching staff and additional activities.	Football clubs and the charitable foundations they set up can successfully deliver programmes to people with mental health problems which improve access to personal skills social capital and have other potential benefits.
8	Im (2016) U.S.A Aim: effect of participating in two domains of extracurricular activities (sports and performance arts/clubs) in Grades 7 and 8 on Grade 9 academic motivation and letter grades	Participants were 483 students (55% male; 33% Euro-American, 25% African American, and 39% Latino).	Delayed (Grade 8 only) and continuous participation (Grades 7 and 8) in sports predicted competence beliefs and valuing education; delayed and continuous participation in performance arts/clubs predicted teacher-rated engagement and letter grades. Benefits of participation were similar across gender and ethnicity.	Sporting club involvement during or after school predicted personal competence and valuing education.
9	Koshland (2004) U.S.A Aim: evaluated the use of a 12-week dance/movement therapy-based violence prevention program.	54 multicultural elementary school children.	Teachers noticed a significant decrease of these behaviours in their students instigating fights, failing to calm down, frustration intolerance, and throwing articles. The children reported significant decreases of these behaviours both seen and experienced: "someone doing something wrong," and "someone throwing something." Significant changes in the students' perceptions and feelings about experiencing or seeing aggression were noted in their "not feeling happy" when seeing such incidents, and their observations of handling themselves and responding in such situations showed a decrease of "feeling happy," and a decrease in "feeling scared."	Shows a novel use for sport/ recreation.

Author (year), country, aim		Concepts/ constructs / metrics	Main findings – community benefits	Comments
10	Kraaykamp (2013) Europe Aim: investigate the effects of parental, individual and partner characteristics on the starting of a sport.	72,491 person-years of 2276 individuals from the Family Survey Dutch Population 1998 and 2003 were analysed.	Results show that growing up in a family in which sport is common increases the likelihood of starting a sport. Parents from the higher social classes more often stimulate their children to start participating in a high status sport. Educational attainment is positively related to enrolment in sports.	Factors early in life discourse in the family home can have an impact on sport participation in later life.
11	Leaver-Dunn (2007) U.S.A Aim: assess the influence of organized activity participation on adolescent males' use of alcohol and intentions to use alcohol.	1,690 White males in a southern State enrolled in grades 10 through 12 in 4 public school systems. Data were collected utilizing the Adolescent Health Survey.	This study revealed protective effects of involvement in recreational activities on alcohol abuse and intentions but no effect of engagement in sports activities. Only club participation consistently appeared to be protective. With respect to binge drinking, male athletes reported increased levels compared to non-athletes, which was consistent with other studies.	These results were inconsistent with some studies that found substantially less alcohol use among youth who participated in organized sports.
12	Lunn (2015) Ireland Aim: examine the impact of participation in sport at secondary school on post-school pathways using a survey of Irish school-leavers.	Study used data from the School Leavers' Survey conducted in Spring/Summer 2007, which interviewed 2,025 individuals approximately two years after leaving school.	Those who continued playing sport through secondary school were significantly and substantially more likely to continue their education rather than to join the labour market.	Participation in sport has benefits beyond immediate enjoyment and a positive impact on health and fitness.
13	McConkey (2013) UK Aim: evaluate the outcomes from the Youth Unified Sports programme of Special Olympics with particular reference to the processes that were perceived to enhance social inclusion.	Individual and group interviews were held with athletes, partners, coaches, parents and community leaders: totalling around 40 informants per country (Germany, Hungary, Poland, Serbia and Ukraine)	Four thematic processes that facilitate social inclusion of athletes. These were: (1) the personal development of athletes and partners; (2) the creation of inclusive and equal bonds; (3) the promotion of positive perceptions of athletes; and (4) building alliances within local communities.	Sports provides a vehicle for promoting the social inclusion of people with intellectual disabilities.
14	Minnaert (2012) UK Aim: examine data from 7 Olympic cities (Atlanta, Nagano, Sydney, Salt Lake City, Athens, Turin and Beijing) and investigate benefits for socially excluded groups.	Semi-longitudinal and comparative perspective	Socially excluded groups in the host community are very rarely specifically targeted to be beneficiaries of the event. Little evidence of fruitful co-operations with existing networks, participation by socially excluded persons in planning, and delivery of targets during the pregnancy period of the Games. Only argued benefit is the trickle-down effect.	More needs to be done to leverage benefits for all of society from large events.
15	Nathan (2013) Australia Aim: study reports on an impact evaluation of a sport-for-development program in Australia, Football United.	A survey was undertaken with 142 young people in four Australian schools. Measured: emotional symptoms, peer problems and relationships, pro-social behaviour, other-group orientation, feelings of social inclusion and belonging and resilience.	The Football United boys had significantly lower scores on the peer problem scale and significantly higher scores on the pro-social scale; and also higher levels of other-group orientation. A lower score on peer problems and higher scores on pro-social behaviour in the survey were associated with regularity of attendance at Football United.	Sport programs can be tailored to impact social connectivity and social cohesion amongst populations.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – community benefits	Comments
16	Rich (2015) Canada Aim: evaluate an annual participatory sport event which aims to bring newcomers together to build capacity, connect communities, and facilitate further avenues to participation in community life.	Direct observation; semi-structured and focus group interviews with organizers, volunteers, and participants.	Sport, in and of itself, is not a sufficient condition to promote inclusion; sport as a “common interest” allowed them to connect to each other as well as locals both on and off the pitch; volunteering procured feelings of valued recognition, human development, involvement and engagement; players appreciated the opportunity to learn about Canadian society and the various cultures and national identities.	Explored another mechanism for creating social inclusiveness with immigrants having just arrived in Canada.
17	Rosso (2016) Australia Aim: The impact of community sport inclusion days in attracting groups prone to social isolation.	Interviews and questionnaire surveys were conducted with participants, community representatives, stakeholders and volunteers.	Regular, free soccer activities engaged 263 young people from a great variety of nationalities, including over 50% refugees, in secondary state school and community-based sites.	Alternative approaches can extend the health benefits of sport participation to disadvantaged children and youth who are excluded from traditional sport participation opportunities.
18	Sandford (2008) UK Aim: examine the existing evidence about the impact of sport/physical activity programmes on positive youth development in the context of education.	Monitoring and evaluation of the HSBC/Outward Bound project and Youth Sport Trust/BSkyB 'Living For Sport' programme – included 7000 students.	Positive impact on the behaviour and attendance of large numbers of pupils, impact is more likely to be sustained when some or all of the following project features are in place: effective matching of pupil needs with the specific project objectives; locating project activities outside of the 'normal' school context; working closely with pupils to choose activities, set targets and review progress; establishing positive relationships between project leaders/supporters (mentors) and pupils; and giving pupils the opportunity to work with and for others.	Programs can be designed and run through sporting avenues that impact anti-social behaviour in disadvantaged youth.
19	Schaillée (2015) Europe Aim: examine the relationship between peer group composition in sports programmes and positive youth development (PYD) in disadvantaged girls, as well as to determine whether it was moderated by personal characteristics.	Two hundred young women aged between 10 and 24 completed amongst others the “Youth Experience Survey for Sport”.	Extent to which disadvantaged girls derive benefits from their participation in sport also depends on the group composition. When girls participate in a group of similar peers, those from non-intact families will derive more benefits than their counterparts from intact families.	Group composition can be tailored for positive development in disadvantaged girls through sport.
20	Sengupta (2013) New Zealand Aim: develop and evaluate a broad-scale multilevel Random Coefficient model predicting residents' sense of community (belongingness in the community) and social capital.	Large nationally representative telephone sample of New Zealanders (N = 6631).	Sense of community is an important predictor of well-being and civic engagement. The model identified that improvements in noise pollution, local community sports, and diversity in the local arts scene are likely features of the individual and local community that can be targeted by local and national government to promote significant improvements in residents' sense of community. All three of these factors would seem to be (reasonably) easy to improve relative to other factors, and, critically, do not involve the change or promotion of a specific ideology or value system (as would policies promoting increased attendance at Church, for example).	Large comparable study showed investment in community sport to be a 'best-buy' for creating a sense of community and social capital.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – community benefits	Comments
21	Smith (2016) Australia Aim: examine barriers to participation by these underserved groups and the success of strategies for overcoming these.	22 community projects over 3 years in the VicHealth Participation in Community Sport and Recreation Program, in Victoria, Australia. Each year, in-depth interviews were undertaken with 50-60 activity providers and 30-40 project partners.	Major barriers to participation were cost, lack of transport, cultural differences, the environment of sporting groups and inaccessible facilities for people with disabilities. Projects that overcame these selected one or two priority groups, put significant effort into communication and building partnerships with community organizations, provided training to staff and volunteers and created new or modified forms of activity.	Significant barriers to sport participation in underserved groups were found, this needs to be addressed in future sports participation policy.
22	Spaaij (2009) Australia Aim: examine the forms of capital that are created in and through rural sport as well as the processes of social inclusion and exclusion that structure access to social networks and to the resources these networks contain.	The case study included individual and paired interviews with 53 people across AFL, soccer, council, health providers; local businesses and local teachers.	Compared to bonding and bridging capital, opportunities for linking social capital in and through sport are relatively limited in northwest Victoria; social networks and status positions in sport generally tend to reproduce social divisions rather than contest or resist them; sport is gendered; social pressure to join local sporting clubs; ability to acquire new skills and new forms of knowledge and experience through sport participation.	Social capital can be created through sport, but only if negative aspects are countered.
23	Stodolska (2004) U.S.A Aim: establish the role of recreational sport in the adaptation of new immigrants to the new life in United States.	Thirty semi-structured in-depth interviews were conducted with first and one and a half generation immigrants from Korea and Poland residing in metro Chicago and Urbana-Champaign areas.	Majority of interviewed immigrants experienced low levels of recreational sport participation during the first post-settlement period. The social class and ethnic background of immigrants, however, heavily influenced subsequent changes in their sport participation. Three distinct paths in the adaptation process. They either (1) acculturated to the culture of the White American mainstream; (2) assimilated to the sub-culture of their own ethnic community; or (3) preserved their ethnic values and promoted their ethnic group solidarity.	Shows the mechanism by which sport is used in the adaptation process for new immigrants.
24	Tonts (2005) Australia Aim: examines the links between sport and social capital in a rural region (the northern wheat belt)	Face-to-face interviews with 40 residents; and questionnaire survey that was sent to 285 (48.5%) households.	Sport was found to contribute strongly to social connectivity, Volunteering, social interaction and engagement. The darker side of sport in rural areas was that the networks and bonds associated with some clubs or particular sports acted to exclude certain citizens on the basis of race, class, gender and status. In the case of ethnicity.	Sport particularly good at building social capital around small, isolated rural areas.
25	Werner (2015) New Zealand Aim: explores the perceived impact of the 2011 Rugby World Cup (RWC 2011) on relationships and tie strength between Tourism Auckland (as the focal organisation) and its partner organisations.	Data were collected using semi-structured pre- and post-event interviews, a formal survey and a documentation review.	A mega-event provides significant opportunities to strengthen existing relationships, and to build a valuable portfolio of both strong and weak ties. The research has also demonstrated that the match and team allocation process can significantly impact on relationships in the host destination.	“Mega events and the opportunities they present are merely the seed capital; what hosts do with that capital is the key to realizing sustainable longer-term legacies” – novel look at capital creation through mega-events.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings – community benefits	Comments
26	<p>Yancey (2009)</p> <p>U.S.A</p> <p>Aim: commentary on building strategic alliances between professional sports and public health.</p>	<p>Commentary</p>	<p>There are many "win-win" opportunities, as sports venues regularly host huge numbers of spectators, offering food and entertainment, providing hours of exposure, and introducing new ideas for engaging fans in order to remain a competitive draw. There is more at stake in cost-benefit and risk-benefit assessment for sports executives, requiring greater caution and circumspection than is typical for public health projects; the core business of the corporate entity must be accommodated without undermining the health objectives; and health aims must be addressed in a way that is financially viable and delivers tangible value for profit-making concerns, in terms of marketing, revenues or brand enhancement.</p>	<p>Relevant commentary outlines some win-wins between sport and public health as well as areas of differing priorities.</p>

5. OTHER BENEFITS

Author (year), country, aim		Concepts/constructs/metrics	Main findings – miscellaneous benefits	Comments
1	<p>ABS (2013)</p> <p>Australia</p> <p>Aim: Provide data for use in value of sport estimates</p>	Expenditure by households, employment, volunteers, spectator attendance, industries, products	Average weekly household expenditure on sport and recreation products during 2009–10 was \$18.94; 1.6 million people involved in at least one non-playing role in organised sport; largest volunteer sector in Australia with 2.3 million	Data sources for economic models
2	<p>Joubert (2011)</p> <p>South Africa</p> <p>Aim: explore employees' experiences of the benefits of organisational (company) team sport activities</p>	Qualitative exploration study of two financial organisations that participate in organisational team sport using focus group interviews and follow-up interviews.	Strong bonds established between employees in the organisation during organisational team sport activities; employees' work values, i.e. self-actualisation, security and relationships improved; increased perceived productivity	Shows using sport to achieve social and organisational goals.
3	<p>Marlier (2015)</p> <p>Belgium</p> <p>Aim: to uncover how sport participation, physical activity, social capital and mental health are interrelated.</p>	cross-sectional survey; questionnaire on socio-demographics, sport participation, physical activity, social capital and mental health; Structural Equation Modelling analysis	Sport participation and not total physical activity was associated with better mental health; only community social capital was linked with physical activity.	Shows social dimension of sport rather than health.
4	<p>Pierce (2010)</p> <p>Australia</p> <p>Aim: assess impact of 'coach the coach' program of using AFL role models to help advocate for seeking mental health support</p>	Pre-post evaluation of equipping role models with Mental Health First Aid to recognise depression and schizophrenia in individuals.	Rural football clubs appear to be appropriate social structures to promote rural mental health awareness	Shows the use of sport as vehicle for social change
5	<p>Priest (2008)</p> <p>Systematic review</p> <p>Aim: review of all controlled studies evaluating interventions implemented through sporting organisations to increase participation.</p>	Absence of high quality evidence to support interventions designed and delivered by sporting organisations to increase participation in sport.	We found no rigorous studies evaluating the effects of interventions organised through sporting organisations to increase participation in sport.	Shows gap in research

APPENDIX 2 UNINTENDED EFFECTS – TABULATION OF EVIDENCE

1. INDIVIDUAL PHYSICAL/MENTAL HEALTH EFFECTS

	Author (year), setting, aim	Concepts/ constructs / metrics	Unintended effects: physical, mental health	Comments
1	Barnett (2007) USA Aim: Explore the process of trying out for competitive team sports by school students.	Pre-post qualitative interviewing	Post-outcome assessments indicated significant differences in measures of subjective state (positive and negative emotions, arousal, and investment), classroom performance (attentiveness, grades), attendance/truancy, and feelings about self and about school between girls who made the team and those who did not.	Lasting self-esteem issues of trying out for competitive school sports in children.
2	Bean (2014) USA Aim: conduct a review of papers on the negative effects of organized sport on the youth athlete and their parents and siblings.	Comprehensive literature review	Issues of consideration included: physical and psychological effects on the youth athlete; the straining financial and practical investments that parents undertake with having child(ren) in organised sport, often leading to issues surrounding parental mental health, and psychosocial effects on siblings such as feelings of resentment and jealousy towards their brother or sister.	Negative side of sport on the family unit
3	Bissell (2004) U.S.A Aim: examine the role that sports media exposure and sport participation played in predicting body satisfaction in woman ages 18 to 75.	Qualitative study	Audiences of 'lean sports' such as ice skating, gymnastics and swimming during the Olympic games were more likely to have negative body imagery amongst women, potentially due to high focus on the body of the athlete. While those of 'non lean sports' such as basketball, soccer and tennis had more positive attitudes as the body is more seen as an instrument of athletic ability.	Media can create positive and negative body image from its focus.
4	Finch (2014) Australia Aim: determine the population-level burden of sports injuries compared with that for road traffic injury for children aged <15 years in Victoria, Australia.	Retrospective observational study	Over 7 year period frequency of non-fatal hospital-treated sports injury increased significantly by 29%, compared to non-fatal hospital-treated road traffic injury that decreased by 26%. Sports injury accounted for a larger population health burden than did road traffic injury on all measures: 3-fold the number of YLDs; 1.9-fold the number of bed-days and 2.6-fold the direct hospital costs.	Indicates an urgent need to prioritise sports injury prevention in this age group.
5	Finch (2015) Australia Aim: (1) describe the trends in the population incidence and burden of all hospital-treated sports injury in Victoria, Australia in adults aged 15+ years; (2) determine the incidence of lower limb and knee injuries; and (3) quantify their population health burden as average direct hospital costs per injury and lengths of stay.	Economic cost, trends and incidence of sports injury	The overall annual rate of hospital treated sports injuries increased by 24%, and lower limb injuries by 26% over the 7 years. The associated accumulated economic burden was \$265 million for all sports injuries and \$110 million for lower limb injuries over the 7-years.	As previous sports injury is a risk factor for the development of osteoarthritis, the future incidence will escalate.

Author (year), setting, aim		Concepts/ constructs / metrics	Unintended effects: physical, mental health	Comments
6	Giel (2016) Germany Aim: investigate eating disorder pathology in German elite adolescent athletes.	German Young Olympic Athletes' Lifestyle and Health Management Study (GOAL) which conducted a survey in 1138 elite adolescent athletes.	High risk groups comprised (a) athletes competing in weight dependent sports, (b) athletes who are high on negative affectivity, (c) female athletes and (d) male athletes competing in endurance, technical or power sports. Athletes reporting eating disorder pathology showed higher levels of depression and anxiety than athletes without eating disorder pathology.	Pressure on athletes to maintain a certain weight can lead to depression and anxiety
7	Green (2014) U.S Aim: analyse the long-term effects of involvement in organized athletics among both current and former sport participants and how this compares to patterns of binge drinking.	Sport participation, binge drinking, race, gender	(1) Organized sports participation is associated with binge drinking; (2) that this relationship holds across racial and gendered lines; (3) that the effects of exposure extend beyond time of involvement.	Binge drinking culture amongst athletes has long term effect.
8	House (2013) U.S Aim: discuss the definition and prevalence of the triad (interplay between low energy availability (LEA), menstrual disturbances, and decreased bone mineral density (BMD)) and prevention, detection, and treatment strategies.	Discussion of the definition and prevalence of the triad and prevention, detection, and treatment strategies.	The female athlete triad is a problem with important long-term consequences. Education should be geared toward athletes as well as coaches, athletic trainers, school nurses, primary care providers, and others involved in female athletics to allow early identification and intervention.	Long term impact from youth elite sport induced syndrome.
9	Jankauskiene (2007) Europe Aim: investigate muscle size satisfaction and predisposition to health harmful muscle gain practice in bodybuilders and recreational gymnasium users and to evaluate its relationship with sport mastery.	Variables were evaluated using a 23-item questionnaire.	Being a bodybuilder was associated with 5.7-times higher predisposition for a health harmful practice than casual weightlifters. Entering bodybuilding competitions was associated with a 3.2-times higher muscle size dissatisfaction and a 4.8-fold increase in reported predisposition for health harmful muscle gain practice.	Body building can lead to low body satisfaction and unhealthy practices.
10	Lowenstein (2000) Europe Aim: examine if elite or social sport can protect against drug abuse and addiction.	1111 questionnaires collected from persons consulting 20 health centres, 2 self-help groups and a general practitioner network working in the field of alcohol or heroine abuse.	Intensive sports or physical training should not be seen as a protective factor nor as a way of improving addictive behaviours.	Elite sport and training doesn't protect against addictive and harmful behaviours.

Author (year), setting, aim		Concepts/ constructs / metrics	Unintended effects: physical, mental health	Comments
11	Merten (2008) U.S.A Aim: examine the relationship between measures of sports participation, competitiveness, the need to win and the acceptability of violence in dating relationships.	Questionnaires were delivered to 661 male and female late adolescents.	Only the need to win is related (positively) to the acceptability of dating violence, not sports participation or competitiveness.	The need for aggression in some sport can seep into other areas of society.
12	Nelson (2001) U.S.A Aim: examine heavy episodic alcohol consumption and associated harms in collegiate athletes in the United States. The factors which may promote or deter such use are explored.	Randomly selected students in a nationally representative sample of 4-yr colleges in the United States completed self-report questionnaires	Athletes reported more binge drinking, heavier alcohol use, and a greater number of drinking-related harms. Athletes are more likely to exhibit the strong social ties found to be associated with binge drinking. Athletes, despite drinking more heavily than other students, report greater exposure to alcohol prevention efforts and possess unique motivations to limit their alcohol use.	Athletes are a high-risk group for binge drinking and alcohol-related harms.
13	Nixdorf (2016) Europe Aim: Examine the notion that individual athletes are more prone to depression than team sport athletes and the mechanisms that cause this.	Cross-sectional study, 199 German junior elite athletes (Mage = 14.96; SD = 1.56) participated and completed questionnaires on perfectionism, cohesion, attribution after failure, and depressive symptoms. Mediation analysis using path analysis with bootstrapping was used for data analysis.	Athletes competing in individual sports were found to be more prone to depressive symptoms than athletes competing in team sports; negative attribution after failure was associated with individual sports ($\beta = 0.27$; $p < 0.001$), as well as with the dependent variable depression ($\beta = 0.26$; $p < 0.01$).	Individual athletes need higher degree of psychological attention than those in team sports.
14	Ravaldi (2003) Europe Aim: Examine body image, depression and anxiety amongst ballet dancers, gym users, and non-competitive body builders.	Body Uneasiness Test, the State-Trait Anxiety Inventory, the Beck Depression Inventory, and the Eating Disorder Examination 12th edition (EDE-12).	Non-elite ballet dancers reported the highest prevalence of eating disorders followed by gymnasium users. The study concluded that Non-professional performers of sports emphasising thinness or muscularity, such as ballet and body-building, show a high degree of body uneasiness and inappropriate eating attitudes and behaviours.	Harmful eating practices present in non-elite sports as well as elite.
15	Schwenk (2007) USA Aim: assess the prevalence of depressive symptoms and difficulty with pain in retired professional football players, difficulties with the transition from active athletic competition to retirement, perceptions of barriers to receiving assistance for those difficulties, and recommended programs to provide such assistance.	Survey sent to 1617 retired members of the National Football League Players Association (NFLPA).	Retired professional football players experience levels of depressive symptoms similar to those of the general population, but the impact of these symptoms is compounded by high levels of difficulty with pain.	Sport can lead to decreased quality of life in older age.
16	Slater (2011) Australia Aim: examine gender differences in adolescent participation in sport and physical activity, in teasing experiences specific to the physical activity domain, and the relationship between adolescent physical activity and body image.	A sample of 714 adolescents (332 girls, 382 boys) aged between 12 and 16 years completed a pre-designed questionnaire.	Adolescent girls participated in organised sport at a lower rate than boys, but experienced higher levels of teasing. It was concluded that teasing and body image concerns may contribute to adolescent girls' reduced rates of participation in sports and other physical activities.	Stigma around female participation in sport still a barrier.

	Author (year), setting, aim	Concepts/ constructs / metrics	Unintended effects: physical, mental health	Comments
17	Stafford (2013) UK Aim: Examine violence, abuse, physical harm and sporting ethos amongst young athletes.	A convenience sample of 6124 young people (age 18–22) who completed an online questionnaire and 89 follow-up interviews.	Just as the educational field began to realise 15 years ago that children's voices were being excluded from education decision-making, the same may be argued about the absence of children's voices in informing decision-making in organised sport, helping shape a new positive 'sporting culture', understanding violence and bullying and its impact in sport, and in the development of guidelines for children's participation in sport.	Aggressive coaching culture may allow physical aggression and violence between young people to thrive.
18	Strachan (2009) Canada Aim: examine two different trajectories of sport participation (specialisation v sampler) and explore any similarities or differences that may result regarding personal development and sport outcomes.	Seventy-four youth athletes (40 "specializes" and 34 "samplers") were recruited and four measures were employed to assess sport experiences and outcomes.	The "samplers" reported more experiences regarding the integration of sport and family as well as linkages to the community. Although the "specialisers" reported higher levels of physical/emotional exhaustion than did the "samplers, they also reported more experiences related to diverse peer groups.	Different sporting pathways have different impacts on participants.
19	Toro (2005) Europe Aim: determine the prevalence of eating disorders and risk factors for their development in female athletes.	Two hundred and eighty-three elite sportswomen, competing in 20 different sports were assessed.	The proportion of athletes suffering from some kind of eating disorder was five times higher than in the general population. Exposure of the body in public seems to be a risk factor for eating disorders in general, and pressure from coaches seems to be a risk factor for bulimia.	Unhealthy eating habits/disorders are common in young elite athletes.
20	Vertommen (2016) Europe Aim: report on the first large-scale prevalence study on interpersonal violence against children in sport in the Netherlands and Belgium.	4,000 adults completed a dedicated online questionnaire.	The survey showed that 38% of all respondents reported experiences with psychological violence, 11% with physical violence, and 14% with sexual violence. Ethnic minority, lesbian/gay/bisexual (LGB) and disabled athletes, and those competing at the international level report significantly more experiences of interpersonal violence in sport.	Policies need to impact negative cultures in sport
2	Thorlindsson (2010) Iceland Aim: investigates the use of anabolic androgenic steroids (AAS) among a national representative sample of high school students	Logistic regression and predicted probabilities to analyse data from a national representative survey of 11031 Icelandic high school students.	High school students participating in fitness and informal training outside of formally organized sport clubs (i.e. active recreation) are the main risk group.	Included for novel harm area
21	Yue (2016) U.S.A Aim: characterise the demographics of sports-related traumatic brain injuries in the paediatric population and identify predictors of prolonged hospitalisation and of increased morbidity and mortality rates.	The authors retrospectively analysed sports-related traumatic brain injury data from children (age 0-17 years) across 5 sports from the National Sample Program of the National Trauma Data Bank (NTDB).	In paediatric sports-related traumatic brain injuries, the severities of head and extra-cranial traumas are important predictors of patients developing acute medical complications, prolonged hospital and ICU length of stay, in-hospital mortality rates, and failure to discharge to home.	Increased need to promote headgear in youth impact sports.

2. INDIVIDUAL ECONOMIC HARM

Author (year), country, aim		Concepts / constructs / metrics	Unintended effects: economic	Comments
1	Aitkin (2008) Australia Aim: investigate how much households with dependent children spend on active compared with screen-based recreation	Analysed data from the 2003-04 Australian Bureau of Statistics Household Expenditure Survey	Australian families spend more money on screen recreation than active recreation; strong economic and cultural gradients in their patterns of expenditure on both; costs of active recreation may be a barrier to participation for some families, there are also social and cultural values influencing choices	Novel approach to identifying barriers to sport participation in Australia.
2	Anokye (2012) UK Aim: investigate the determinants of demand for sports and exercise.	face-to-face interviews; 60 adults at Brunel University, West London	Demand for sport and exercise was negatively associated with time (travel or access time) and 'variable' price and positively correlated with 'fixed' price.	Time cost is significant barrier to participation
3	Barros (2006) Portugal Aim: estimate the willingness to pay for a sporting event: the Euro 2004 Soccer Championships	Tobit regression model – looking at weather willingness to pay equals the cost of the event	The event is not an improvement of the public good, since the aggregated willingness-to-pay is lower than the estimated total costs.	Novel way to measure/assess value
4	Hickey (2014) Australia Aim: estimate the financial cost of games missed due to hamstring injuries in the AFL	Data used: injury reports (publicly available); athlete salary; injury epidemiology data	Average yearly financial cost of HSIs per club increased by 71% compared with a 43% increase in average yearly athlete salary; single HSI increased by 56% from \$A25 603 in 2003 to \$A40 021 in 2012	One method of estimating a cost input for an economic model
5	Kirk (1997) Australia Aim: The study investigated the socio-economic consequences for families of participation in junior sport	Survey of 220 families in QLD and VIC from the sports of cricket, Australian football, gymnastics, hockey, netball and tennis	Sport is a substantial economic cost for most families; different sports made different financial demands; family income and structure are the key factors in determining the likelihood of a child's involvement in junior sport, and that for many Australian children, financial factors may be barriers to their participation in junior sport.	Shows a strong barrier/cost for sport to families.
6	Lera-López (2007) Spain Aim: analyse the sociodemographic and economic determinants underlying sport participation and consumer expenditure on sport.	Methodological approach is based on ordered probit models; data obtained by means of a questionnaire survey	Time availability is a major barrier to expand the base of participants or increase the intensity of participation; consumer expenditure on sport is determined by gender, education and income levels; neither low levels of education nor personal income are barriers to the practice of sport.	Novel method for estimates; shows major cost to/of participation

	Author (year), country, aim	Concepts / constructs / metrics	Unintended effects: economic	Comments
7	Nicholl (1994) UK Aim: assess the value of promoting health through exercise, using the 'avoided healthcare' costs argument.	Literature searches were undertaken to derive estimates of the relative risk of both injuries and health effects of physical inactivity.	In younger adults, average annual medical care costs incurred due to participation in sport and exercise exceed the costs avoided by the disease-prevention effects of exercise. In older adults (> 45) the estimated costs avoided greatly outweigh the costs that would be incurred.	Important contribution to argument of avoided healthcare costs for sport participation
8	Nichols (2015) UK Aim: Show how privatizing the 2012 Olympics led to costs associated with not being able to generate sports volunteers to continue after games.	Review / opinion piece	Privatisation led to people employed rather than volunteering. This decreased opportunity to spur volunteers in sport beyond the games. Also led to separation of available synergies between sport England volunteer push and that of the games. Privatisation also led to 'non-disclosure agreement' between employees and contractors which decreased knowledge transfers.	Shows hidden/significant costs.
9	Veal (2016) UK Aim: examines the relationship between income inequality and leisure time on a world-wide basis, and ten measures of cultural participation and two of sport and physical recreation participation in European countries.	Cross-national secondary data from the United Nations	More equal countries have more leisure time and higher levels of cultural and sporting participation; in more equal countries increased leisure time and higher levels of participation in cultural and sporting leisure activities are experienced across all income/socio-economic groups.	Shows income inequality is major barrier for participation
10	Costa (2013) Brazil Aim: analysis focuses on the negative social and economic effects of 2014 World Cup and 2016 Olympics have on Rio, Brazil.	Review of literature	Job creation from these big events usually temporary; the spotlight of big events can magnify social strengths as well as weaknesses of a city; can lead to violation of human rights (2016 Rio-exacerbated poverty, 1968 Mexico – protestors killed)	Novel look at negative impacts of big events

3. EXPOSURE TO HARMFUL MARKETING

Author (year), country, aim		Concepts/ constructs/metrics	Unintended effects: marketing exposure	Comments
1	Carter (2013) New Zealand Aim: identify the characteristics and extent of sponsorships and associated marketing by food and non-alcoholic beverage brands and companies through a case study of New Zealand sport.	Systematic review of 308 websites of national and regional New Zealand sporting organisations.	Food and beverage sponsorship isn't common in NZ. However those that do are predominantly unhealthy food and beverages with marketing aimed at children. Sports organisations felt concerned about associating themselves with unhealthy foods or beverages, others considered sponsorship income more important.	Similar findings in Australia
2	Cody (2016) New Zealand Aim: examines the politics and policy implications of alcohol sponsorship of sport in New Zealand in the wake of Curbing the harm.	Multi-method approach: nature of the relationship and its potential impact on the nation's binge drinking culture, how it is regulated by both states and sport organisations within the international community and, finally, the perspectives of key stakeholders in the debate.	Social change related to alcohol was halted through competing interests of stakeholders.	Conflict between reducing harmful drinking and sponsorship.
3	de Bruijn (2016) Europe Aim: examine the effect of alcohol marketing exposure on adolescents' drinking	Prospective observational study (11–12- and 14–17-month intervals), using a three-wave autoregressive cross-lagged model.	Alcohol sponsorship led to higher incidence of drinking over time in adolescents exposed.	Strong argument for decreasing alcohol sponsorship.
4	Ellickson (2005) USA Aim: examine the relationship between exposure to different forms of alcohol advertising and subsequent drinking	Regression models with multiple control variables examined the relationship between exposure to alcohol advertising in grade 8 and grade 9 drinking for two groups of South Dakotan adolescents: (1) seventh-grade non-drinkers (n = 1206) and (2) seventh-grade drinkers (n = 1905)	Several forms of alcohol advertising predict adolescent drinking; which sources dominate depends on the child's prior experience with alcohol.	Showed alcohol advertising influenced drinking age.
5	Gainsbury (2015) Australia Aim: investigate subgroups of gamblers to identify the potential harms associated with various forms and modes of gambling.	Online survey was completed by 4,594 respondents identified as Internet-only (IG), land-based only (LBGs), or mixed-mode (MMG) gamblers.	Mixed mode gamblers engaged in the greatest variety of gambling forms, had the highest average problem gambling severity scores, and were more likely to attribute problems to sports betting than the other groups.	Showed link between problem gamblers and sports gambling.
6	Hing (2014) Australia Aim: explore whether exposure and attitude to gambling promotions during televised sport predict sports betting intention and whether this relationship varies with problem gambling severity.	Underpinned by the Theory of Reasoned Action, Surveys were conducted with 1,000 adults in Queensland, Australia.	The audience most likely to be stimulated by sport gambling promotions are problem gamblers because they have greatest exposure and a favourable disposition to them, and report they have maintained or worsened their problem sports betting behaviours.	Gambling promotion maintained/worsened problem gambler addictions.

Author (year), country, aim		Concepts/ constructs/metrics	Unintended effects: marketing exposure	Comments
7	Hing (2013) Australia Aim: explore relationships between gambling sponsorship, and attitudes and intentions relating to gambling, in the context of a major Australian football competition heavily sponsored by gambling companies.	Data were gathered via two online surveys (N = 212)	Exposure to gambling promotions during televised sport may encourage gambling intentions, and that gamblers scoring higher on the PGSI are more likely to be exposed to these promotions, view them favourably, be interested in the sponsor's products and be willing to use them.	Promotions may trigger gambling amongst problem and recovering problem gamblers.
8	Kelly (2014) Australia Aim: describe Australian children's exposure to organised sport, and compare time spent in specific sports with patterns of sponsorship of children's sport identified in previous studies.	Cross-sectional survey on children's sport participation collected by proxy report using a random-digit-dialling survey of 3416 parents.	77.3% of Australian children aged 5-14 participated in organised sport. In NSW, weekly total person-time exposure for children was highest for outdoor soccer (91,200 children × median frequency of 2 sessions per week of 1. h duration = 182,400. h/week). Considering rates of sponsorship at different sports, children would be exposed to food/beverage sponsorship to the greatest extent for rugby league and outdoor cricket	Children's high frequency of sport participation highlights the potentially huge reach of food/beverage sponsorship promotions.
9	Kelly (2013) Australia Aim: To determine parents' and children's attitudes towards food, beverage and alcohol sponsorship of elite and children's sports and the acceptability of policies and alternative funding models to limit this sponsorship.	Telephone surveys were conducted. One child from each household was invited to complete an online survey.	Three-quarters of parents supported the introduction of policies to restrict unhealthy food, beverage and alcohol sponsorship of children's and elite sports. More parents (81 %) supported the introduction of alternative funding models to allow these companies to sponsor sport provided there was no visible branding. Two-thirds of children recalled sponsors of their favourite elite sports team/athlete, with 428 sponsors recalled. Of these, 11 % were food/beverage companies and 3 % were alcohol-related. For 39 % of sponsors, children reported feeling better about the company after it had sponsored a team/athlete.	Australian parents support restrictions on unhealthy food, beverage and alcohol sport sponsorship.
10	Kingsland (2015) Australia Aim: examine the effectiveness of an alcohol management intervention in reducing risky alcohol consumption and the risk of alcohol-related harm among community football club members.	A cluster randomised controlled trial of an alcohol management intervention was undertaken with non-elite, community football clubs and their members in New South Wales, Australia.	A significantly lower proportion of intervention club members reported: risky alcohol consumption at the club; risk of alcohol-related harm; alcohol consumption risk and possible alcohol dependence.	Enhancing club based alcohol management interventions could make a substantial contribution to reducing the burden of alcohol misuse in communities.
11	Macniven (2015) Australia Aim: this study investigated the nature and extent of unhealthy food, beverage, alcohol and gambling sponsorship across peak Australian sporting organisations.	A structured survey tool identified and assessed sponsoring companies and products displayed on the websites of the 53 national and state/territory sport governing bodies in Australia receiving government funding. Identified products were categorised as healthy or unhealthy, based on criteria developed by health experts.	Sponsorship of Australian sport governing bodies by companies promoting unhealthy food and beverage, alcohol and gambling products is prevalent at the state/territory and national level. Cricket had the highest percent of unhealthy sponsors (27%) and the highest number of unhealthy food and beverage sponsors (n≤19). Rugby Union (n≤16) and Australian Football (n≤4) had the highest numbers of alcohol and gambling sponsors respectively.	Shows high prevalence of unhealthy sponsoring.

Author (year), country, aim		Concepts/ constructs/metrics	Unintended effects: marketing exposure	Comments
12	<p>Outram (2015)</p> <p>Australia</p> <p>Aim: proposes that the sponsorship of sport by nutritional supplements and sport drinks companies should be re-examined in the light of ethical concerns.</p>	Opinion piece	It is argued that sport may have found itself lending unwarranted credibility to products which would otherwise not necessarily be seen as beneficial for participation in sports and exercise or as inherently healthy products.	Sponsorship of sport by unhealthy products could be considered unethical
13	<p>Pettigrew (2012)</p> <p>Australia</p> <p>Aim: This study investigated community attitudes to fast food companies' sponsorship of community events.</p>	Large sample of Western Australian adults (n=2,005) responded to a community attitudes telephone survey that included questions relating to event sponsorship	50% thought promotion of fast foods inappropriate at community events; 33% thought it appropriate at events where kids are present; 66% felt unhealthy food/drink sponsorship at sport events to be contradictory.	Decreasing unhealthy sponsorship supported by Aus. families
14	<p>Rowland (2015)</p> <p>Australia</p> <p>Aim: assess if a club's alcohol management strategies were related to risky alcohol consumption by members and levels of social capital.</p>	723 sports club members from 33 community football clubs in New South Wales, Australia, completed a computer assisted telephone interview (CATI) and a management representative from each club also completed a CATI.	Having the bar open for more than four hours; having alcohol promotions; and serving intoxicated patrons were associated with increased risky alcohol consumption while at the club; which in turn was associated with lower levels of perceived club safety and member participation.	Positive contribution of community sports clubs to the community may be diminished by poor alcohol management practices.
15	<p>Stevens (2010)</p> <p>Australia</p> <p>Aim: Identify independent correlates of reported gambling problems amongst the Indigenous population of Australia.</p>	A cross-sectional design was applied to a nationally representative sample of the Indigenous population.	In remote areas, multifamily households, participation in sports and cultural events, and reporting of community problems were associated with higher reported gambling problems.	Participation in sports in remote Aboriginal communities caused harm for problem gamblers.
16	<p>Watson (2016)</p> <p>Australia</p> <p>Aim: investigate the nature and extent of unhealthy food, beverage, alcohol and gambling sponsors of children's sport development programs.</p>	Websites of junior development sport programs (n=56) associated with sporting organisations that received funding from the Australian Sporting Commission were analysed.	Eleven sponsors were food, beverage, alcohol or gambling companies of which 10 (91%) were unhealthy.	The majority of food and beverage company sponsors in sport development programs are companies associated with unhealthy products.

4. ANTI-SOCIAL BEHAVIOUR

	Author (year), country, aim	Concepts/ constructs / metrics	Unintended effects: anti-social behaviour	Comments
1	Cohen (2007) USA Aim: Examine the impact of extracurricular sports programs on high-risk behaviours	A survey of Los Angeles County public high schools was undertaken. This was crossed with community data on rates of arrests, births, and sexually transmitted diseases (STDs) among youth.	Controlling for area-level demographics, juvenile arrest rates and teen birth rates, but not STD rates, were lower in areas where schools offered more extracurricular sports	Shows novel value area.
2	Crundall (2012) Australia Aim: investigate whether improved alcohol management delivers additional benefits to clubs in the form of financial viability, expanded membership, increased spectators and greater capacity for competition	Measures were derived from 657 Australian community sporting clubs enrolled in the Good Sports program. The program assists clubs to manage alcohol through an accreditation process that sets minimum standards for regulatory compliance, club practices and policies.	Income was found to increase and reliance on alcohol as a funding source was found to diminish over time. Membership increased and was accelerated among females, young people and non-players. No changes in the number of junior and senior teams or players were found.	Improved sport clubs alcohol management produced a range of benefits.
3	Deakin (2007) UK Aim: analyse effects of the 2006 World Cup football matches on call volumes and profiles of emergency use	Emergency calls to the Hampshire Ambulance Service NHS Trust during the first weekend of the 2006 World Cup football matches were analysed by call volume and classification of call (call type)	Call volumes on the first day of the world cup increased by over 50%. These were categorized by increases in alcohol-related emergencies, including collapse, unconsciousness, assault and road traffic accidents.	Harm stream – emergency costs
4	Endresen (2005) Norway Aim: Examine the relationship between participation in power or fight and strength sports (boxing, wrestling, weightlifting, and oriental martial arts) and violent and antisocial behaviour.	Longitudinal study design of sample of 477 boys, aged 11 to 13 years at time 1, over a two-year period.	Results strongly suggests that participation in power sports actually leads to an increase or enhancement of antisocial involvement in the form of elevated levels of violent as well as non-violent antisocial behaviour outside sports.	Aggressive sports can lead to aggression of the individual in society.
5	Guagliardo (2006) Europe Aim: assess the prevalence of cigarette, alcohol and cannabis consumption among top-ranked French student athletes, and to identify correlating factors.	837 student athletes were surveyed.	Amongst females, higher sport volume led to decreased cigarette smoking and cannabis use. Amongst males, higher sport volume led to higher smoking rates. Two major risk factors for young adult athletes were the existence of high psychological distress (for both sexes) and a lack of family support (particularly in the case of males).	Risky behaviours can be higher in young athletes
6	Kingsland (2013) Australia Aim: examine the association between the alcohol management practices and characteristics of community football clubs and at-risk alcohol consumption by club members.	Cross sectional survey of community football club management representatives and members was conducted. Logistic regression analysis was used to determine the association between the alcohol management practices and characteristics of sporting clubs and at-risk alcohol consumption by club members.	Members of clubs that served alcohol to intoxicated people, conducted 'happy hour' promotions or provided alcohol-only awards and prizes were at significantly greater odds of consuming alcohol at risky levels than members of clubs that did not have such alcohol management practices.	Results replicated in other comparable studies.
7	Kwan (2014) Canada Aim: examine the relationship between sport participation and alcohol and drug use among adolescents.	Systematic review of 17 longitudinal studies	Sport participation is associated with alcohol use, but negatively associated with illicit use (particularly non-cannabis drugs).	Study shows sports participation is associated with alcohol use.

Author (year), country, aim		Concepts/ constructs / metrics	Unintended effects: anti-social behaviour	Comments
8	<p>Lyne (2012)</p> <p>New Zealand</p> <p>Aim: assess the implementation and effectiveness of strategies and actions to eliminate and/or reduce alcohol-related problems at large sports and entertainment events in New Zealand.</p>	<p>Site visits were conducted and monitoring observations at venues before, during and after a variety of large events between March 2009 and November 2010. Thirteen events were attended at nine different venues.</p>	<p>Common contexts at events where alcohol-related problems were seen included: inadequate alcohol control and management by security staff; the ability to purchase four alcoholic drinks (rather than two) at a time; inexperienced bar staff untrained in responsible alcohol service; no or little promotion of low and non-alcoholic drinks; and a lack of monitoring and enforcement of the law on intoxication.</p>	<p>Alcohol management a major theme for participation/club safety.</p>
9	<p>Martha (2009)</p> <p>Europe</p> <p>Aim: Examine the link between involvement in sports and alcohol consumption.</p>	<p>Repeated cross-sectional study</p>	<p>Among males, practicing sport in a formal context, team sports, and competitive participation at a departmental or regional level represented risk factors for binge drinking, while practicing an individual sport was a protective factor among females.</p>	<p>Link between sport and binge drinking</p>
10	<p>Mays (2010)</p> <p>USA</p> <p>Aim: Investigate the relationship between school-based sports participation and alcohol-related behaviours</p>	<p>Nationally representative data from the National Longitudinal Study of Adolescent Health, collected between 1994 and 2001, were analysed in 2009 (n=8271).</p>	<p>Greater involvement in sports during adolescence was associated with faster average acceleration in problem alcohol use over time among youths who took part in only sports.</p>	<p>Link between sport and binge drinking</p>
11	<p>Nelson (2007)</p> <p>USA</p> <p>Aim: Assess differences in gambling habits in students attending sporting colleges.</p>	<p>Multilevel statistical analysis used to assess gambling habits in athletes, sports fans, and other students (N = 10,559) at 119 colleges in the United States.</p>	<p>Students attending schools with a greater "sports interest" were more likely to gamble on college sports, and were cited as appropriate targets for prevention efforts.</p>	<p>Sport can instil gambling habits at young age.</p>
12	<p>O'Brien (2013)</p> <p>Australia</p> <p>Aim: examine the association between receipt of alcohol industry sponsorship, and attendance at alcohol sponsor's drinking establishments (e.g. bars), and alcohol-related aggression and antisocial behaviour in university students who play sport.</p>	<p>University sportspeople (n=652) completed surveys assessing receipt of alcohol industry sponsorship, attendance at sponsor's establishments and confounders [i.e. age, gender, sport type, location and alcohol consumption measured by Alcohol Use Disorders Identification Test-alcohol consumption (AUDIT-C) scores]. Participants also completed measures assessing displays and receipt of aggressive and antisocial behaviours.</p>	<p>Higher AUDIT-C scores, gender and receipt of alcohol industry sponsorship were associated with alcohol-related aggression/antisocial behaviours in university sportspeople.</p>	<p>Link between alcohol sponsorship and aggression and anti-social behaviour.</p>
13	<p>Partington (2013) UK</p> <p>Aim: Compare members of UK university sport groups with students not engaged in UK university sport in terms of alcohol consumption and risk for alcohol-related harm.</p>	<p>Cross-sectional survey using the Alcohol Use Disorders Identification Test (AUDIT) and a demographic questionnaire</p>	<p>University sport members had a higher median AUDIT score of 11.5 v 8. Levels of alcohol-related risk and harm are high in members of UK university sport groups. University sports members particularly team sports may be an 'at risk group' for alcohol-related problems and require targeted interventions.</p>	<p>Culture of alcohol in university sports compared to general public</p>

	Author (year), country, aim	Concepts/ constructs / metrics	Unintended effects: anti-social behaviour	Comments
14	<p>Ricijas (2016) Europe</p> <p>Aim: To test whether various cognitive, motivational and behavioural factors were associated with psychosocial consequences and loss of control, and with interpersonal and financial consequences of gambling, as measured by the Canadian Adolescent Gambling Inventory.</p>	<p>Data was collected on a convenience sample of 1330 male Croatian students</p>	<p>A high proportion of adolescents gamble, and almost half of them are either at risk or can already be considered problem gamblers. Sport betting, VLT machines and betting on virtual horse races were the most frequent gambling activities for Croatian high-school boys.</p>	<p>For young problem gamblers, sports betting was common.</p>
15	<p>Rowland (2015) Australia</p> <p>Aim: examine if sporting club alcohol management practices are associated with risky consumption of alcohol by club members while at the club, and also whether such consumption is directly and indirectly associated with club member overall hazardous alcohol consumption.</p>	<p>Telephone surveys were conducted with a representative from 72 community football clubs in New South Wales, Australia, and 1428 club members. A path and mediation analysis was undertaken.</p>	<p>Three alcohol management practices were associated with an increased probability of risky drinking while at the club: having alcohol promotions; serving intoxicated patrons; and having bar open longer than 4h.</p>	<p>Alcohol management important for club safety.</p>
16	<p>Sajber (2016) Europe</p> <p>Aim: examine the prevalence of alcohol drinking, and the factors associated with harmful drinking (HD) in Kosovar 17-18 years old adolescents.</p>	<p>636 girls and 366 boys (17-18 years old) from Pristina, Kosovo were surveyed.</p>	<p>Heavy drinking is more frequent among boys who have participated longer in sports (OR = 1.49), whose fathers have an advanced education, and who reported higher level of familial conflict.</p>	<p>Link between sports participation and heavy drinking</p>
17	<p>Sekulic (2012) Europe</p> <p>Aim: investigate substance abuse among adolescents in Bosnia and Herzegovina and to study the potential gender-specific relationships between a) sport factors (physical activity/exercise/athletic participation) and substance abuse and b) scholastic achievement and substance abuse.</p>	<p>Self-administered questionnaire of a sample of 1,032 adolescents who were 17 to 18 years old (435 boys and 597 girls) and who were in the final grade of high school.</p>	<p>Sport factors were weakly correlated with substance abuse in boys. In girls, participation in team sports was related with a higher incidence of smoking, but there was no evidence of sport factors having an influence on the consumption of alcohol.</p>	<p>Sport involvement linked with substance abuse in boys, and smoking in girls.</p>
18	<p>Stafström (2005) Sweden</p> <p>Aim: analyse the impact and possible causal interrelationships of psychological, psychosocial and socioeconomic factors on frequent high consumption of alcoholic beverages in a Swedish secondary-school student population.</p>	<p>Cross-sectional study via questionnaire was administered to 1,384 high school students</p>	<p>Participation in organized team sports was associated with increased risk among boys (OR = 3.0, 95% CI: 2.0-4.7; PAF = 32%), but not girls (OR = 1.0, 95% CI: 0.7-1.5; PAF = 0%).</p>	<p>Team sports associated with risk drinking in boys.</p>
19	<p>Swain (2013) New Zealand</p> <p>Aim: Investigate the workload of pre-hospital triage and treatment facilities established in Wellington for the 2011 and 2012 International Rugby Sevens, and the Rugby World Cup 2011 (RWC)</p>	<p>Prospective analysis of alcohol questionnaire, costs and savings were calculated.</p>	<p>Alcohol was a contributory or causative factor for the patient's attendance in 80-90% of cases. Approximately 60% of the 121 patients seen at the last two events would have had to be transferred to the ED in the absence of the treatment centre. Cost savings for the ambulance service and ED for the RWC and 2012 Sevens are estimated to be NZ\$70,000.</p>	<p>Major events with alcohol can lead to increases in healthcare costs.</p>

	Author (year), country, aim	Concepts/ constructs / metrics	Unintended effects: anti-social behaviour	Comments
20	Tavalacci (2016) Europe Aim: assess the prevalence of binge drinking and associated behaviours across a large sample of college students in Upper Normandy (France).	A cross sectional study was performed between November 2009 and February 2013 and data on socioeconomic characteristics and behavioural risk factors were collected: alcohol (consumption and misuse of alcohol, occasional and frequent binge drinking), tobacco, cannabis, cyber addiction, stress and depression.	This study highlights the spread of binge drinking among college students and identifies student populations at risk: male gender, living in rented accommodation, regular practice of sport, and other risk behaviours such as use of tobacco, cannabis and alcohol.	Sport involvement was associated with binge drinking.
21	Wessels (2013) South Africa Aim: Investigate the link between societies that practice passive forms of sport and those engaged in sports with aggression.	Opinion peace	Spectator violence and forceful contact sport has allowed for society to become immune to violence and this is a grave challenges. Link between peaceful societies who practice passive forms of sport as opposed to violent states who promote for sports which releases aggressive emotions.	Novel look on sports role in conflict in society.
22	Woolsey (2010) USA Aim: measure athletes' alcohol, energy drink, and combined-use and compare athletes' reported risk-taking and consequences while using alcohol-only and in combination with energy drinks.	Cross-sectional survey of 401 intercollegiate student-athletes.	Combined users consumed significantly more alcohol and had riskier drinking habits (e.g., heavy binge drinking) than athletes who used alcohol only. The combined use of alcohol and energy drinks could potentially contribute to increased risk-taking and negative consequences.	Need to include information about energy drinks in existing athlete alcohol education and prevention programs.

APPENDIX 3 EVIDENCE FROM GREY LITERATURE – TABULATED BY COUNTRY

Australia

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
1	ACIL Tasman (2010) Australia Aim: examine sport and physical recreation's role in the Australian Capital Territory.	<ul style="list-style-type: none"> - direct contribution of sport and recreation organisations - contribution from retail spending on sporting equipment - preventative health benefits provided by physical activity - Benefits of sports-related tourism' 	The economic contribution of sport and recreation in the ACT is estimated to be \$245.2 million in 2008-09.	Lacking qualitative measures of social impact in methods.
2	PKF Corporate Advisory Australia Aim: provide a qualitative and quantitative assessment of the value of sport to Queensland in terms of the economic, productivity, health and civic benefits as well as the benefits of elite sport.	<ul style="list-style-type: none"> - Economic benefits: direct jobs, indirect jobs - Productivity: due to physical activity, due to physical inactivity (amount that Queensland could increase its gross state product if all Queenslanders became physically active) - Health benefits: savings in the healthcare system as well as benefits from decreased mortality. - Civic benefits: Cost to replace Queensland's volunteers in sport; Full time equivalent jobs provided by volunteers; Criminal and social justice benefits of sport - Elite sport: heightened sense of satisfaction and national pride 	Sport contributes a total of \$7.9 billion, or 3% of Gross State Product'; 11,763 Queenslanders had their main job in a sport related occupation, with 85,870 jobs created indirectly; productivity benefits due to physical activity was estimated to be \$1,591 million in 2007/08 with productivity loss due to physical inactivity was estimated to be \$1,883 million; health benefits due to physical activity was \$775 million per annum; it would cost Queensland \$866 million to replace the volunteers in sporting organisations, who contribute the equivalent of approximately 14,792 full time jobs.	Wide range of variables included
3	Frontier Economics Australia Aim: assess the economic contribution of sport to Australia	<ul style="list-style-type: none"> - Sport activities that are conducted at a community level contributes to well-being through impacts on health, social cohesion and socialisation - Elite sport activities contribute to well-being because of the value Australian attached to international sporting success 	The report contrasted its approach with one that would focus on the GDP impacts of sport. Such approach is unlikely to adequately capture the benefits conveyed by sport.	
4	Government of Western Australia Australia Aim: assess the contribution of sport and active recreation to Western Australia.	Events, tourism, employment, increasing productivity, reduced healthcare costs, urban and regional regeneration, environmental value, reduced pollution	Every dollar invested by the State Government in the Community Sporting and Recreation Facilities Fund generates \$2.36 in direct economic activity and \$6.51 in total economic activity.	Showed high return on investment; mainly economic impact variables as input.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
5	Hone (2005) Australia Aim: Assess the Contribution of Sport to the Economy	A set of alternative measures of the economic contribution of sport to the economy have been suggested based on possible public policy questions. Two of these measures are based on the principles of welfare economics and the practice of cost benefit analysis. The third is based on national income accounting practices.	Traditional economic impact studies are founded on the notions of national income accounting. They have little relevance to the essentially microeconomic questions that face the sports policy community.	Shows development of methods for quantification of economic impact.
6	Muller (2011) Australia Aim: assess the economic contribution of sport and recreation to Tasmania	- Health benefits (avoided costs; stat. value of human life; disability adjusted life years) - Productivity - Leisure - Government (tax, civic) - Sport and recreation industries - Costs: household; Gov; businesses; opportunity cost (participation, volunteering & infrastructure)	For every \$1 invested, Tasmania receives over \$4 in benefits, with the combined annual value of these benefits conservatively estimated to be \$5.6 billion.	Comprehensive assessment of economic impact from sport.
7	Sports medicine Australia Australia Aim: comment on Australian sports injury statistics.	Injury epidemiology in Australia	One million sports injuries occur each year, which suggests one in 17 Australians, suffer an injury; Sports injury rates are lower among females; The annual cost of sports injuries in Australia is an estimated \$1.65 billion.	Injury epidemiology possible inclusion due to impact on public health economy, personal costs and decreased quality of life.
8	ABS (2013) Australia Aim: assess the Australian sports industry.	Sport exports; income; employment	Sport and recreation industries generated \$12.8 billion in income and employed around 134,000 Australians in 2011-12; Australia exported over \$358 million in sport and recreation goods in 2012-13; Australian households spent over \$8.2 billion on selected sport and recreation products	Good look at ABS data available as model inputs.
9	Ware (2013) Australia Aim: assess the impact of sport and recreation on Aboriginal and Torres strait islanders.	Review of literature and program evaluations.	In regional and urban areas where Indigenous individuals and communities are in the minority, these activities provide an opportunity for improved social inclusion in the broader community; Participation in these activities is also seen as a protective factor against substance abuse, self-harm and other negative behaviours.	Sport and active recreation has a unique role in rural and indigenous communities that needs further strategic consideration.

New Zealand

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
1	Dalziel (2015) New Zealand Aim: assess the economic value of sport and outdoor recreation to New Zealand	<ul style="list-style-type: none"> - 17 sport and recreation industries - Physical and human infrastructure - Market value of volunteers - Value of other industries reliant on S & R activities 	The contribution of the sport and outdoor recreation sector (narrowly defined) to GDP in 2008/09 is estimated to have been \$2.9 billion, or 1.5 per cent; broadly defined is \$3.6 billion, or 1.9 per cent and including volunteered services in 2008/09 is estimated to have been \$4.3 billion, or 2.2 per cent.	Unique concept of value creation developed in this report.

North America

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
1	National Recreation and Park Association (2010) U.S.A Aim: assess the economic value of parks and recreation.	<ul style="list-style-type: none"> - economic value - Health and Environmental Benefits - Social Importance 	<ul style="list-style-type: none"> - property value; local tax base and economic activity from hospitality expenditures, tourism, fuel, recreational equipment sales, and many other private sector businesses is of true and sustained value to local and regional economies. - 25 percent increase of residents who exercise at least three times per week. - adds tangible improvements to quality of life. 	Economic impact of parks is a large field of study, particularly in the U.S.
2	Berrett (2011) U.S.A Aim: assess the economic significance of recreation and parks	The most appropriate means of determining the significance of a particular sector in the economy is through the expenditure method. This entails summing the following components of expenditure: private household consumption, public (government) expenditure, private investment, and balance of trade. Of these components, household consumption and public expenditures are generally the largest final expenditures.	Recreation and parks agencies have traditionally used a financial reporting approach to illustrate their effectiveness. This contrasts with tourism agencies, which have tended to provide economic reports, which highlight the overall impacts associated with hosting events in a community.	Shows the use of financial reporting method (SFR).
3	Bloom (2005) Canada Aim: assess the Socio-economic Benefits of Sport Participation in Canada	<ul style="list-style-type: none"> • It changes individuals—including their health and well-being, their social networks and sense of social connection, and their skills; • It affects communities—including the social cohesion and social capital of communities; • It has an impact on the economy—creating jobs and providing work for thousands of Canadians in manufacturing, retail and service industries; and • It helps to shape our national and cultural identity. 	Sport spending totals almost \$16 billion per annum—about 2.2 per cent of consumer spending and 1.2 per cent of GDP in 2004.	Social impact surveys developed during SAVE method.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
4	Crompton (2010) U.S.A Aim: Measure the Economic Impact of Park and Recreation Services	The economic impact of visitor spending is estimated by the formula: number of visitors x average spending per visitor x multiplier. This formula indicates there are four steps involved: (1) define who qualifies as a visitor; (2) estimate the number of visitors attracted to the community by the park and recreation event or facility; (3) estimate the average level of spending of visitors in the local area; and (4) determine the ripple effects of this new money through the community by applying appropriate multipliers.	Most recreation facilities are intended to be used by local residents, they are unlikely to attract new money to the community and have any economic impact, unless they are hosting a sports tournament or special event.	Found park and recreation centres unlikely to have economic impact.
5	Robert Wood Johnson foundation (2010) U.S.A Aim: economic benefits of open space, recreation facilities and walkable community design	Hedonic pricing methods, attempt to value nonmarket benefits by asking respondents about their willingness to pay for an amenity.	People living in walkable neighbourhoods get about 35–45 more minutes of moderate-intensity physical activity per week, and are substantially less likely to be overweight or obese, than do people of similar socioeconomic status living in neighbourhoods that are not walkable. Living close to parks and other recreation facilities also is consistently related to higher physical activity levels for both adults and youth.	Improving the walkability of neighbourhoods and increasing access to recreation facilities are essential strategies for preventing childhood obesity.
6	Michigan Recreation and Park Association (2007) U.S.A Aim: develop a how-to guide for assessing the Economic Value of Recreation and Parks.	Real Estate Values, Health (annual cost of: coronary heart disease, obesity, diabetes, high blood pressure, cancer, strokes, osteoporosis), Crime, Community Support.	Show the community benefits that parks and recreation can have by highlighting: - The impact on health and wellness of physical activity - The negative impacts of physical inactivity and the associated costs - The correlation between access to parks and programs and increased physical activity - Show the role of parks and recreation in supporting and enhancing the quality of life for community residents	Possible inclusion of increased real estate prices from active living spaces in economic model.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
1	Sport and recreation alliance (2016) UK Aim: uncover the social value of sport.	Volunteering: Self-esteem, emotional well-being and emotional resilience; likeliness of worry; feeling proud; likely to feel what they do is important.	10% higher Self-esteem, emotional well-being and emotional resilience, 15% less likely to worry; 18% more likely to feel proud; 28% more likely to feel what they do has importance.	Inclusion of personal quality of life inputs of emotional well-being and emotional resilience.
2	Davies (2016) UK Aim: assess the social return on investment in sport and develop a participation wide model for England.	Social indicators and their value: - Reduced risk of dementia worth £2.1 billion - Reduced risk of heart disease and stroke worth £1.14 billion - Lower risk of Type 2 diabetes worth £239 million - Lower risk of breast cancer worth £132 million - Reduced risk of colon cancer worth £48 million - Reduction in crime worth £41 million - Improved life satisfaction worth £30.4 billion to society - Improved educational performance worth £5 million	For every £1 invested in sport in England, benefits worth £1.91 are generated for society. In 2013/14, £23.46 billion was spent on participating in sport by the public and private sectors, social benefits created totalled £44.75 billion.	Sport England report that included estimations of crime prevented.
3	Dubai Sports Council- Deloitte (2015) Middle East Aim: report on the economic impact of Sport in Dubai.	- Total gross expenditure related to sport in Dubai is \$1.7bn, including direct and indirect spending from all sources, local and international; - Sport accounts for approximately 0.8% of Dubai's GDP; - Sponsorship is a well-developed market, with globally recognised brands from Dubai and overseas sponsoring events. Total value is estimated at c.\$100m - The sport industry in Dubai is estimated to employ c.14,500 people as "Full Time Equivalents" (FTE), 0.6% of the city's total workforce.	\$670m of economic impact with an economic footprint of more than \$1.7 billion a year.	Largely market valuation of sports industry.
4	European Union (2012) UK Aim: report on the Contribution of Sport to Economic Growth and Employment in the EU.	The methodology utilised a specific adaptation of the National Accounts of the Member States, using these accounts to make a Multiregional Input-Output Table: Sport (MRIOT:S) which is based on 27 national Input Output Tables: Sport. This uses a country's System of National Accounts to construct "a robust statistical framework to measure the economic importance of the sport industry in the national economy".	Sport-related gross value added of total EU gross value added is 1.13% for the narrow definition and 1.76% for the broad definition of sport.	Longer term goal for Australian states perhaps.
5	Coalter (2005) UK Aim: An overview of the social benefits of sport	Economic benefits of an active population; Sport-related consumer expenditure; Sport-related Employment – National; Sport-related Employment – Local; Academic Achievement; volunteering; social capital; crime aversion	If the level of inactive Scots was reduced by one percentage point per year for five years, it could produce total savings to the NHS of £3.5m, resulting from reduced admissions for coronary heart disease, stroke and colon cancer.	Array of inputs included, not a recent valuation.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
6	Fujiwara (2014) UK Aim: To develop the evidence base on the wellbeing impacts of cultural engagement and sport participation.	Wellbeing Valuation Approach	Sport participation was also found to be associated with higher wellbeing. This increase is valued at £1,127 per person per year, or £94 per person per month.	Novel well-being method used.
7	Downward (2007) UK Aim: explore the decision to participate in sports activities in the United Kingdom and the subsequent frequency of participation.	Cluster analysis is combined with a Heckman analysis to examine the empirical evidence provided by the General Household Survey in 2002.	Broadly speaking, the results indicate that for sports participation, investment in personal consumption capital and social capital can increase the chance of cases participating in sport, as well as their frequency of participation. However, work-related income-time constraints can mitigate against more frequent participation.	Used surveying approach to look at social and economic impact.
8	Delaney (2005) Ireland Aim: quantify the economic and social value of sport	Volunteering; expenditure on club memberships; Spending on Attendances; Expenditure on Playing	The estimate of the value of the labour provided by Irish sports volunteers is €267 million per year. This is not counting the provision of equipment by volunteers such as the use of their home or car. Furthermore, it is assuming that the opportunity cost of their time is the minimum wage. <ul style="list-style-type: none"> • Approximately €200 million per year is spent annually on membership subscriptions to sports clubs. • Economic activity generated by attendances at sports events is in the region of €525 million per year. This includes both ticket prices and the costs of travel and accommodation associated with attending matches. • Approximately €400 million per year is spent on sports equipment, sports clothing and related costs of playing sport. 	Included market value of volunteers to Irish economy.
9	Taylor (2015) UK Aim: A review of the Social Impacts of Culture and Sport.	- changes in health care costs, derived from health changes of individuals; - changes in criminal justice system costs, derived from changes in crime and anti-social behaviour and in prosocial behaviour and citizenship; - the value of changes in human capital and productivity for society, derived from education changes for individuals; - the value of changes in social capital, derived from bonding, bridging and linkage capital changes, and changes in volunteering; - the value of combined social impacts, i.e. combinations of the above, or broad measures of externalities and public/merit good impacts	Sport has a considerable literature relevant to social impacts and might be seen to have 'turned a corner' from the previous state which was criticised by many academics as being under-researched.	Emphasis on social and personal capital gains from sport, as well as crime aversion as input.

	Author (year), country, aim	Concepts/ constructs / metrics	Main findings	Comments
10	Sports Council Wales (2008) UK Aim: Assess the economic importance of sport in Wales.	Consumers' Expenditure on Sport; Value Added; Employment in Sport.	<ul style="list-style-type: none"> - Consumers' expenditure on sport in 2004 was £707 million, or 2.3% of total consumers' expenditure in Wales. The comparable figure for 1998 is 2.2%. - Value-added to the Welsh economy in 2004 by sport-related economic activity was £704 million, or 1.8% of Gross Value Added (at basic prices). The comparable figures for 1998 are £531 million and 1.7%. - Employment in sport was 23,200 in 2004 compared to 19,400 in 1998, representing an increase of almost 20%. Employment in sport accounts for 1.8% of total employment in 2004 compared to 1.6% of total employment in 1998. 	Used three simple inputs that had most economic value. Largely avoided social impact.

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