

Challenges facing the health service:

- An ageing population combined with growing public health issues and increasing patient expectations are placing an excessive demand on a financially constrained health service (Bevan Commission 2013).
- The number of prescriptions made by GPs in Wales has more than tripled since the 1970s. This is reflected in the NHS Wales expenditure which increased by 72% between 1999/2000 and 2008/09 alone (NHS Wales Informatics Service and NHS Wales Finance, cited in Welsh Assembly Government 2011).
- In April 2014 77,293 patients were treated at an NHS Wales hospital with a further 424,009 patients waiting to start treatment at the end of the month (Welsh Government 2014).
- Physically inactive individuals spend an average of 38% more days in hospital, make 5.5% more GP visits, access 13% more specialist services and 12% more nurse visits than an active individual (Jones et al., 2012).
- It is estimated that of NHS Wales' total expenditure for 2006/07 £325 million was attributable to physical inactivity.

Impact of sport and physical activity:

- European Commission's White Paper on Sport stated that 'as a tool for health enhancing physical activity, the sport movement has a greater influence than any other social movement' (European Commission 2007).
- The all-cause mortality risk is reduced by 30% amongst those who are regularly physically active (Department of Health 2011).
- Sport and physical activity can play a major role in lowering the risk of cardiovascular disease, certain cancers, type 2 diabetes and obesity (O'Donovan et al 2010).
- Young people who participate in organised sports are less likely to smoke cigarettes and use illicit drugs (Jones-Palm and Palm 2005, Baumert et al 1998, Diehl et al 2012). Furthermore, evidence indicates that sports participants are more likely to engage in healthy nutritional practices such as the consumption of fruit and vegetables (Pate et al 2000).
- Adults who participate in daily physical activity have a 20-30% lower risk of developing depression (Chief medical officers 2011). For existing sufferers, physical activity is an effective means of reducing symptoms (US Department of Health and Human Services 2008).

- There is 'a general consensus that participation in sport for children and adolescents is associated with improved psychological and social health, above and beyond other forms of leisure-time PA' (Eime et al 2013).

Introduction

The World Health Organisation (WHO) has defined health as ‘a state of complete, physical, mental and social well-being and not merely the absence of disease or infirmity’ (WHO, 1946). This state of optimal being, which encompasses all dimensions of life, is critical for the fulfilment of our potential as human beings and the realisation of our full capacity as a nation. Health equips children and young people with the strength and vitality required to enjoy and navigate their way through the inevitable challenges of youth, whilst in the case of adults the absence of health can severely impede one’s ability to contribute and earn a living as an active member of society. The loss of income which often accompanies poor health can be paralysing for families and on a mass scale can have serious implications for the wider economy. In this light, it is clear to see why the WHO considers the ‘highest attainable standard of health’ to be ‘one of the fundamental rights of every human being’ (WHO, 1946).

Self-assessed and subjective reports of wellbeing are central indicators of health and are strongly associated with levels of morbidity, mortality and usage of health services (Wu et al, 2013). Such measures were utilised in Sport Wales’ 2012 Active Adults Survey which revealed that 68% of adults in Wales considered their health to be ‘good or very good’, whilst 10% reported their health as ‘bad or very bad’ (Sport Wales, 2014). While these figures are indicative of the major advances that have been made in medicine and public health over the past century, analysis of 2011 Census data covering other countries within the United Kingdom suggests that overall levels of general health in Wales tend to fall below those found in England, Scotland and Northern Ireland (Northern Ireland Statistics & Research Agency, 2012; Office for National Statistics 2013; Registrar General for Scotland 2014). Findings from the Health Behaviour in School Aged Children Study (HBSC) identified the same trend amongst children where the proportion of children aged 11-16 reporting ‘excellent or good’ health was lower in Wales in comparison with England, Ireland and Scotland (Currie et al, 2012).

Inequalities in health are of course, not just to be found at the level of the nation. Within Wales there exist profound disparities in both the social and spatial distribution of this fundamental life asset, and the gap is growing (Public Health Wales NHS Trust, 2011; Welsh Assembly Government 2012). Of those adults in Wales reporting ‘bad or very bad’ health 76% belonged to a household with an annual income of less than £20,799 (Sport Wales, 2014). It is of no surprise then, that non-communicable diseases (such as cardiovascular disease, cancers, type 2 diabetes and mental illnesses) which now dominate the disease burden in Wales, are also more prevalent amongst the most deprived members of society (National Public Health Service for Wales, 2004; Welsh Government, 2014).

With advances in the diagnosis and treatment of disease Wales has witnessed an increase in survival rates and a concomitant reduction in overall age-standardised mortality rates of approximately 47% over the past forty years (Welsh Assembly Government, 2011). This shift is reflected in the length of human life spans in Wales which have on average increased by approximately eight years for males and six years for females since the early 1980s (Office for National Statistics, 2014). Similar rates of increase have also been observed for measures of ‘healthy life expectancy’ which suggests that lives are not merely being extended but that health is also being sustained for longer (Office for National Statistics, 2012). These advances in population health have however come at an additional cost. The growth and ageing of the population, along with the relatively high price of new and diverse medical technologies has seen the expenditure of the NHS in Wales rise significantly since its genesis in 1948 (Appleby, 2012). The number of prescriptions made by GPs in Wales has more than tripled since the 1970s and between

1999/2000 and 2008/09 alone NHS Wales expenditure increased by 72% (NHS Wales Informatics Service and NHS Wales Finance, cited in Welsh Assembly Government, 2011). In 2013 over 70,000 people were directly employed by NHS Wales, with patients coming into contact with the service approximately 20 million times each year (Welsh Government, 2013). The total expenditure for NHS Wales in 2012/13 was £5,427.5 million, which equates to £1,765.57 per head of population (Welsh Government, 2014).

In April 2014:

- 77,293 patients (3% of the Welsh population) were treated at an NHS Wales hospital.
- A further 424,009 patients (14% of the Welsh population) were waiting to start treatment at the end of the month.

Source: Welsh Government, 2014

These figures illustrate the degree of proficiency which has been attained in treating and managing disease in Wales. They also indicate, however, the huge level of demand and dependency on the NHS which is being fuelled by a growing and ageing population with ever increasing expectations. Furthermore, age-standardised incident rates for many conditions and diseases in Wales (including certain cancers, diabetes, mental illnesses, hypertension and obesity) show little sign of decline, and in many cases are on the rise (Welsh Government, 2013; Public Health Wales NHS Trust, 2014). The continuation of this trend will only serve to exacerbate future demands on the NHS in Wales.

Given the severe financial pressures and excess demands that are already compromising the delivery of quality healthcare in Wales it is clear that the existing modus operandi is unsustainable. There is thus an urgent need for bold solutions and radical reform if we are to avert the decimation of our Health service (Bevan Commission, 2013). It is Sport Wales' belief that reducing the demand on the health service is a priority area in a 'prudent healthcare' approach, and that sport, as an efficacious form of preventative medicine, has an integral part to play in this solution.

The Council of Europe defines sport as 'all forms of physical activity which, through casual or organised participation **aim at expressing or improving physical fitness and mental wellbeing, forming social relationships** [emphasis added] or obtaining results in competition at all levels' (Council of Europe, 2001). The aims included in this definition perfectly parallel the three aforementioned facets of health which were articulated by the WHO. Accordingly, this paper sets out the strengths and limitations of sport as a vehicle for achieving these outcomes before suggesting how sport's health potential can most effectively be realised.

Sport and Health

Sport and Physical Health

The benefits of regular sport and physical activity for physical health have been well documented. For example, an NHS guide, published in 2012, stated that 'The evidence that physical activity prevents major chronic disease is indisputable' (Jones *et al.*, 2012). In particular sport and physical activity can play a major role in lowering the risk of cardiovascular disease, certain cancers, type 2 diabetes and obesity.

The British Association of Sport and Exercise Sciences utilised a panel of experts to produce a literature review and subsequent guidance on the relationship between physical activity and health in 2010 (O'Donovan *et al.*, 2010). The panel concluded from the cohort studies reviewed that, after adjusting for confounding variables, inactivity results in a two-fold increase in the risk of cardiovascular disease, type 2 diabetes and overweight and obesity. The cohort studies also showed strong evidence that physical activity has a causal relationship with a reduction in the risk of post-menopausal breast cancer, and moderate evidence that this is the case for colon cancer and prostate cancer.

This supports earlier findings from a study which explored the evidence from over 150 pieces of observational and randomised research on the health benefits of physical activity. The authors found that existing research showed irrefutable evidence that regular physical activity is effective in the primary and secondary prevention of premature death and the prevention of chronic diseases including cardiovascular disease, diabetes, cancer, hypertension, obesity and osteoporosis. Their summary stated that 'there appears to be a graded linear relation between the volume of physical activity and health status, such that the most physically active people are at the lowest risk. However, the greatest improvements in health status are seen when people who are least fit become physically active' (Warburton *et al.*, 2006).

In a prospective cohort study with 416,175 Taiwanese people between 1996 and 2008 (average follow up of 8.05 years), participants self-reported their amount of weekly exercise, which the researchers categorised into one of five levels of exercise intensity: inactive, low, medium, high or very high activity. These groups were then compared for their risk of mortality and life expectancy. The low level activity group was characterised by an average of 15 minutes physical activity a day and had a 14% lower risk of all-cause mortality and a three year longer life expectancy than those in the inactive group. Wen *et al.* (2011) found that every additional 15 minutes of physical activity beyond the initial 15 minutes resulted in a further 4% reduction in all-cause mortality and a 1% reduction in cancer mortality. These findings remained true when accounting for age, gender and risk of cardiovascular disease. This research suggests that some exercise is better for our health than none.

The table below, which uses statistics from the Chief Medical Officers' report, shows the dramatic effects which being active have on all-cause mortality and on some of the major diseases.

The physical health benefits of sport

Reduction of risk, if regularly physically active

	Reduction in risk (%)
All-cause mortality	30%
Type 2 diabetes	30-40%
Metabolic disease	30-40%
Cardiovascular disease	20-35%
Coronary heart disease	20-35%
Stroke	20-35%
Falls in older adults	30%
Colon cancer	30%
Breast cancer	20%

Adapted from *Start Active, Stay Active (2011) A report on physical activity for health from the four home countries' Chief Medical Officers*

Recent research shows that our bodies resist maintenance of weight loss: it's easier to prevent obesity than to encourage permanent weight loss later (Sumithran *et al.*, 2011; Johannsen *et al.*, 2012).

There is increasing evidence that physical activity in childhood and adolescence is associated with a number of health benefits, including greater bone density (Hind and Burrows, 2007), reduced risk of obesity (Ness *et al.*, 2007) and reduced clustering of cardiovascular disease risk factors (Andersen *et al.*, 2006; Ferreira *et al.*, 2007).

These studies and numerous others show the importance of engaging in regular physical activity from a young age. 'Physical activity can therefore produce an immediate benefit, but is also an investment for the future well-being and health of the individual'. (Blackwell, cited in Merchant *et al.*, 2006)

Sport and Mental Health

In 2008, the Physical Activity Guidelines Advisory Committee for the US Department of Health and Human Services produced a comprehensive report studying the scientific literature around physical activity and its various health benefits.

The committee stated that poor mental health reduces the quality of life and adds a burden on public health. People with anxiety or depression disorders are more likely to have chronic physical conditions (Scott *et al.*, 2007), and depression and dementia were among the 10 leading risk factors of disability-

adjusted life expectancy in high-income nations worldwide during 2001 (Lopez *et al.*, 2006). They are projected to rank first and third by the year 2030 (Mathers and Loncar, 2006).

The committee report considered only randomised control trials and observational studies that used a prospective cohort design when determining whether there were evidence based associations between physical activity and mood disorders. The evidence supported the overall conclusion that regular participation in moderate-to-vigorous physical activity is associated with improved aspects of mental well-being and reduced symptoms of several mental health disorders, which are discussed further below.

Depression

Population-based, prospective cohort studies provide substantial evidence that regular physical activity both protects against the onset of depression symptoms and major depressive disorder, and the committee also found that the results of RCTs indicate that participation in physical activity programs reduced depression symptoms in people diagnosed as depressed, healthy adults, and medical patients without psychiatric disorders. Positively, the available evidence supported the conclusion that regular physical activity reduces depression symptoms regardless of age, sex, race/ethnicity, or medical condition. No negative effects of exercise have been noted in depressed populations.

In the literature review 'Minding our Bodies', Paula Bude Bingham (2009) also recorded how epidemiological evidence shows that physical activity is associated with a decreased risk of developing clinically defined depression. She cites Mutrie (2000) on how experimental studies have shown that aerobic and resistance exercise may be used to treat moderate and more severe depression, usually as an adjunct to standard treatment. The anti-depressant effect of exercise can be of the same magnitude as that found for other psychotherapeutic interventions.

Anxiety

The evidence around anxiety was less clear. In the report *Minding our Bodies*, the authors reported that Fox (1999) showed that exercise has a moderate reducing effect on state and trait anxiety and that aerobic and resistance exercise enhance mood states. Schmitz *et al.* (2004, cited in 'Minding our Bodies') reported that physical activity has been found to improve mental health conditions, particularly anxiety, depression and general well-being, while Taylor (2000) reported that exercise has a low-to-moderate effect in reducing anxiety. Exercise training can reduce trait anxiety; single exercise sessions can reduce state anxiety. Single sessions of moderate exercise can reduce short-term physiological reactivity to brief psychosocial stressors and enhance recovery (Taylor, 2000). The strongest anxiety-reduction effects are shown in randomized controlled trials.

Dementia

Physical activity is inversely associated with cognitive decline. Case-control studies tend to show a slight beneficial influence of physical activity against Alzheimer's disease. Prospective analyses tend to show a more convincing protective effect of physical activity against Alzheimer's as well as against all forms of dementia combined.

A recent study which was published in *The Lancet neurology* explored seven risk factors of Alzheimer's (diabetes, midlife hypertension, midlife obesity, physical inactivity, depression, smoking, and low

educational attainment). Of these risk factors physical inactivity was found to be the leading cause of the disease in the UK, with 21.8% of Alzheimer's cases attributable to this cause (Norton *et al.*, 2014).

Evidence from randomised control trials of healthy older adults and people with Alzheimer's disease or other dementias showed that regular participation in physical activity can also improve aspects of cognitive function or reduce symptoms of dementia.

The committee also found that physical activity and exercise may have the potential to reduce the onset or progression of central nervous system disorders other than dementia that contribute to disability and mortality risk, such as multiple sclerosis and Parkinson's disease. They also may reduce the adverse impact of these disorders on quality of life. However, too few prospective cohort studies and RCTs have been conducted to allow conclusions about the protective effects of physical activity for central nervous system diseases other than Alzheimer's disease and other dementias.

Conclusions from the committee report

The committee concluded that the reported evidence from prospective cohort studies and RCTs showed that being physically active can protect against several aspects of mental health disorders, with the evidence being strongest for protection against symptoms of depression and cognitive decline associated with aging, including the onset of dementia.

There was also evidence to suggest that physical activity reduces symptoms of anxiety and poor sleep, as well as feelings of distress and fatigue, and that being active enhances well-being. The benefits are the same for adults regardless of age, sex, race/ethnicity, or health status, but few studies have directly compared benefits or hazards of physical activity among those population segments.

How much exercise or physical activity is needed to treat or prevent mental health issues?

While the minimal or optimal type or amount of exercise for reducing depression symptoms was not known, evidence from prospective cohort studies and RCTs published since 1995 suggested that moderate and high levels of physical activity similarly reduced the odds of developing depression symptoms compared to low levels of physical activity exposure. In the 2011 report 'Start Active, Stay Active', the four home countries' Chief Medical Officers reported a 20%-30% lower risk of depression and dementia in adults participating in daily physical activity.

In the *Minding our Bodies* literature review, the author stated that most of the studies surveyed reported that their treatment groups generally participated at least three times a week in around 30 minutes of moderate-intensity exercise. The DOSE study (Dunn *et al.*, 2002, 2005) suggests that an accumulation of 30 minutes on five or more days a week is the minimum dose needed to reduce depression. This is congruent with what Blair and Connely (1996) found in their review of studies examining the amount of exercise needed for a clinically significant reduction in coronary mortality. The author reports that these convergent findings are encouraging, as they illustrate how marked improvements in both mental and physical health are "attainable by ordinary people who may not have time for the challenges of an athletic lifestyle" and that both aerobic and anaerobic exercises have been shown to reap beneficial health effects (Stathopoulou *et al.*, 2006).

In their inaugural editorial, the co-editors of the *Journal of Mental Health and Physical Activity* (MENPA), Adrian H. Taylor and Guy Faulkner, state that in addition to the research evidence pointing to

the effectiveness of physical activity in the prevention and treatment of mental illness, there are four additional reasons why physical activity should be considered a potential mental-health promotion strategy:

- 1) Physical activity is “relatively inexpensive to deliver as an intervention” and “may be a cost-effective alternative for those who prefer not to use medication or who cannot access therapy.”
- 2) “In contrast to pharmacological interventions, physical activity is associated with minimal adverse side-effects.”
- 3) “Physical activity can be indefinitely sustained by the individual, unlike pharmacological and psychotherapeutic treatments, which often have a specified endpoint.”
- 4) “Physical activity stands apart from more traditional treatments and therapies for mental health problems because it has the potential to simultaneously improve health and well-being *and* tackle mental illness.”

This last point is especially important when one considers issues like the cardiovascular and diabetes comorbidity problems experienced by people with mental illness. For example, persons with schizophrenia tend to die not from schizophrenia, *per se*, but rather from comorbid cardiovascular problems — which may be directly improved through regular physical activity (Faulkner, 2006).

Moving Beyond Physical Activity

The evidence which has thus far been expounded relates to the health benefits which may be derived from physical activity or ‘bodily movement produced by muscles that requires energy expenditure’ (WHO, 2014). Whilst not all forms of sport involve moderate or vigorous levels of physical activity, there are a vast array of ever-evolving sports formats do entail this health enhancing behaviour. Sport thus presents a diverse palette of opportunity for activity – a smorgasbord from which all individuals can find an appropriate, attractive and enjoyable offer, regardless of social characteristics or existing levels of fitness. As such sport is endowed with a tremendous capacity to galvanize large proportions of the population into action. This potential was acknowledged in the European Commission’s White Paper on Sport which stated that ‘as a tool for health enhancing physical activity, the sport movement has a greater influence than any other social movement’ (European Commission, 2007).

Yet sport’s capacity to enhance health is not solely confined to those benefits generated via physical activity. By creating a space of common activity in which social values such as team work and collaboration are celebrated sport can facilitate the growth and strengthening of social ties which transcend traditional demographic boundaries such as age and ethnicity. In this way sport, as an integrative force, can help to dissolve the stigmatisation surrounding marginalised groups and cultivate a sense of belonging and inclusion amongst individuals who were formerly ostracised. The social support conferred by newly forged bonds coupled with the development of innate strengths and aptitudes can enhance self-perception and boost self-esteem. This psychological shift is especially important for emotional health and may explain the findings of a recent literature review which examined the psychosocial benefits of sport participation amongst youth. Amongst the thirty publications which met the studies selection criteria there was ‘a general consensus that participation in sport for children and adolescents is associated with improved psychological and social health, above and beyond other forms of leisure-time PA’ (Eime *et al.*, 2013).

Participation in organised sport and the self-confidence that this may foster has also been associated with a reduced likelihood of children and adolescents engaging in unhealthy behaviours. In particular, there is evidence that youth who participate in organised sports are less likely to smoke cigarettes and use illicit drugs including marijuana, cocaine, heroin and methamphetamines (Baumert *et al.*, 1998; Jones-Palm and Palm 2005; Diehl *et al.* 2012). Additionally, the results from these studies indicate that sports participants are more likely to engage in healthy nutritional practices such as the consumption of fruit and vegetables. In the specific case of adolescent females, those who participate in sport have been found to engage in sexual intercourse less frequently and have lower rates of pregnancy (Sabo *et al.* 1999; Pate *et al.* 2000).

To ascertain whether these benefits were unique to participation in team sports a study was conducted that explored differences in health behaviours amongst adolescents participating in team sport compared to those who were physically active in general. The results from the study revealed a lower prevalence of damaging health behaviours amongst the active sports team members, with the trend especially pronounced in the case of females. The findings suggest that physical activity in general is unlikely to be sufficient in promoting positive health behaviour amongst youth, but that vigorous physical activity within a team setting potentially holds significant benefit for female students (Kulig *et al.*, 2003).

Sport's potential for health enhancement not only stems from the direct benefits of participation at the individual level but also from its capacity as a conduit for disseminating health information more broadly. The combination of sport's ubiquitous appeal along with the intense media coverage that it receives, affords it an unparalleled ability to reach the masses. This is particularly important when it comes to communication with marginalised members of society who are often the hardest to reach and the most in need of health support (Waldburger, 2005).

The three most viewed television programmes in Wales this century have all been sports events:

1. 2012 Olympics Opening Ceremony – 1.4 million viewers
2. 2012 Olympics Closing Ceremony – 1.3 million viewers
3. Wales v England, 2013 Six Nations – 1.1 million viewers

Source: BBC Media Centre (2013) 'BBC Cymru Wales announce record viewing figures for Wales v England'

Sport however presents more than just an opportunity to inform. By engaging people on a visceral level sporting events are an extremely powerful means of motivating and inspiring behavioural change. Indeed, the protagonists of these sporting spectacles are widely viewed as role models with many youngsters striving to replicate the values they embody. Sport, in this way, boasts huge potential as an agent for engendering cultural change around vital health issues.

'Sport's unique and universal power to attract, motivate and inspire makes it a highly effective tool for engaging and empowering individuals, communities and even countries to take action to improve their health.' (United Nations, 2008).

The Health Risks and Limitations of Sport

The evidence presented so far in this section has demonstrated the efficacy of sport in promoting health. It would be naïve however to assume that participation in sport is entirely free of all risk. Levels will inevitably vary according to the type of sport in question with musculoskeletal and soft tissue injuries more likely in those sports involving high-velocities, repetitive movements or physical contact. These can be minimised however by ensuring that playing conditions are safe, that participants are sufficiently trained, and that where necessary appropriate supervision and equipment is in place (US Department of Health and Human Services, 1996).

Other physical hazards arise not from the environment but from overexertion of the individual. Excessive training can increase the risk of hematologic, metabolic and body organ abnormalities, whilst in the short term the risk of upper respiratory tract infections and adverse cardiac events may be elevated. By ensuring that participants do not train far beyond accustomed levels and that programmes account for the specific circumstances of individuals (such as existing medical conditions) these risks are greatly diminished (US Department of Health and Human Services, 1996; President's Council on Physical Fitness and Sport, 2001).

As we have seen, sport possesses tremendous potential to enhance psychological and social health by connecting and empowering individuals. It is important however to remember that sports environments, like all social domains, are susceptible to broader social tensions and conflicts. Well-designed sports programmes which promote communal values such as inclusivity and tolerance can help to ameliorate these anxieties, and make full use of sports integrative capacity. Such programmes should also place significant emphasis on personal development and progression, ensuring that where competition is involved that it is organised at a suitable level (United Nations, 2008). Doing so will minimise the risk of social exclusion or feelings of inadequacy which can engender unhealthy behaviours, such as the use of performance enhancing drugs.

The overall health risks associated with participation in sport are therefore low, and are far outweighed by potential health gains. Where risks do exist, these are largely amenable to mitigation.

Utilising Sport for Health

Sport and Population Health

The health benefits of sport presented in section 2 are wide-ranging and underpinned by compelling evidence. Sport and physical activity can considerably reduce the risk of a number of society's most prevalent non-communicable diseases and can help ensure individuals maintain quality of life and functional capacity at all ages. These health benefits are not solely confined to the realm of the physical but also span the full spectrum of psychological and social benefits which are integral to health as emphasised by the WHO. Sport also supports strategies to promote other healthy behaviours such as good nutritional habits and smoking cessation. Whilst there are risks associated with participation in sport, these can largely be mitigated by avoiding overexertion and excessively strenuous activity. For the majority of people the benefits of sport far outweigh these risks.

Sport is thus an incredibly powerful social movement and should be viewed as a holistic and effective means of helping individuals to move toward an optimal state of being. The latest figures from our Active Adults Survey and School Sports Survey indicate that 39% of adults participate in sport on three or more occasions per week; whilst 40% of pupils do so (N.B. adults and pupil figures are not directly comparable due to differences in survey design) (Sport Wales, 2013; Sport Wales, 2014). Although these figures represent a significant upturn in levels of participation in recent years, findings from these surveys also reveal the persistence of participation inequalities with, for example, significantly lower levels of participation amongst females and those from lower income households. In view of these inequalities and the 40% of adults who do no frequent sporting activity it is clear that there is still substantial latitude for sport to improve population health and help address health inequalities (Sport Wales, 2014).

In terms of the burden on the National Health Service, it is thought that physically inactive individuals spend an average of 38% more days in hospital, make 5.5% more GP visits, access 13% more specialist services and 12% more nurse visits than an active individual (Jones *et al.*, 2012). In 2012-13 spending on disease categories related to physical *inactivity* (cancers & tumours, circulation problems, mental health problems, and diabetes) cost the NHS in Wales £1,510.5 million, or £491.37 per head of population (Welsh Government, 2014). Whilst not all of the disease cases attributed to this spending will have been the direct or sole result of physical *inactivity*, estimates using population attributable fractions (PAF's) suggest that 6.5% of the UK's NHS spending in 2006-07 was attributable to this risk factor (Scarborough *et al.*, 2011). Assuming the spending proportions of health programme budgets were similar between Wales and England (which was used as the basis for calculations in the study), this would account for £325million of NHS Wales' total expenditure for 2006-07 (£105.63 per head of population). Given that this estimate does not include the substantial costs of mental health problems, which constitute the largest programme budget category, the figure is likely to be conservative.

The economic costs of physical *inactivity* related non-communicable disease are not just felt by the NHS but also by families and businesses. Physical *inactivity* contributes to absenteeism, "presenteeism" (performing below par at work because of mental health problems) and associated losses in productivity and output. Countering this issue, workplace physical activity interventions have demonstrated notable success in the US with reductions in short-term sick-leave of 6-32% and increases

in productivity of 2-52% (Hardman and Stensel, 2003). Similarly in Canada initiatives of this nature have been shown to save companies US\$513 per worker annually (United Nations, 2008).

Of course interventions that promote physical activity and sport require investment in the first instance, but evidence of the return which they yield is illustrative of the value for money that most offer. In the case of workplace interventions available evidence indicates a saving of US\$2.5-4.9 from reduced absenteeism for every dollar that is spent on the programme (WHO, 2003). Most other physical activity interventions (including brief advice in primary care, exercise referral schemes, community-based exercise groups, mass media campaigns and pedometers) have been found to be cost effective at less than £30,000 per QALY gained (Anokye *et al.*, 2013). The cost-utility estimates for these interventions compare favourably with other well-accepted preventive strategies such as smoking cessation services and pharmaceutical interventions such as statins (The National Institute for Health and Care Excellence, 2006; Roux *et al.*, 2008; Garrett *et al.*, 2011). By increasing participants' quality of life physical activity interventions ultimately confer substantial benefits to population health and do so with net cost reductions to the health service (NICE, 2006; Cobiac *et al.*, 2009).

The extent to which physical activity interventions are cost effective and sustainable will largely be contingent on the enjoyment which participants derive from their participation. Findings from our Active Adult Survey, for example, have revealed that those adults who enjoyed sport whilst in secondary school are more likely to be frequently active as an adult (Sport Wales, 2014). Furthermore, recent research has shown that individuals who enjoy physical activity tend to gravitate towards healthier options in their post-session food consumption (Werle *et al.*, 2014). In light of the psycho-social benefits which are generated from well-designed sports programmes, such initiatives are likely to be particularly cost-effective and sustainable when it comes to the attainment of beneficial health outcomes.

Sport, Health and Strategy

The NHS in Wales, as elsewhere in the UK, has become a highly evolved system for treating acute episodes of ill health via emergency intervention. The ever growing expectancies, dependencies and demands on the NHS in a time of severe financial constraint are however now seriously compromising the quality and sustainability of this model of care. Under such circumstances there have been calls to improve the efficiency of the health service through for instance the active avoidance of waste and harm and the abandonment of care that brings little or no benefit (Bevan Commission, 2013). Whilst there can be no doubting the importance of these particular 'prudent health' principles, given the human-intensive nature of health services their potential alone to improve health outcomes and efficiencies is likely to be somewhat limited (Baumol and Bowen, 1966). For this reason Sport Wales believes that although the elimination of unnecessary waste, unnecessary harm and unnecessary procedures is important, the ultimate elimination should be that of unnecessary non-communicable diseases which afflict patients and bring them to the NHS in the first place. Accordingly Sport Wales believes that stemming the demand on the NHS is a priority area of a 'prudent health' approach and that as part of this greater emphasis needs to be placed on currently undervalued and underutilised preventive health measures that move care upstream and maintain the health, wellbeing, fitness and functional capacity of individuals from within the community. This care and support of individuals is not solely the responsibility of the health sector but will require integrated and coordinated action to address the risk factors of non-communicable disease from a variety of actors working across a

multitude of sectors. Furthermore, care in this context does not just mean counselling or traditional health prescriptions but the fostering of community environments that empower and enable Welsh citizens to lead healthy lifestyles. As the wide-ranging evidence in this paper has demonstrated, sport can be an incredibly effective instrument in this respect if utilised correctly.

To optimise the value of sport for health Sport Wales recognises the importance of cultivating supportive community environments that provide attractive and accessible participation opportunities for all. These opportunities are contingent upon the provision of suitable sports facilities and spaces, in combination with a work force (including teachers and health professionals) that is knowledgeable, skilled and passionate about sport and its potential for health. To this end Sport Wales advocates a 'Sport for Health' approach that is underpinned by the following principles:

1. Multi-Sectoral and Integrated

The optimal utilisation of sport for health requires the coordinated and committed efforts of those working across a range of key sectors, including sport, health, education, media, planning and government (both locally and nationally). Through the formation and strengthening of sustainable partnerships and coalitions these sectors and others can work together to develop and implement innovative strategies, policies, and programmes for the enhancement of population health and the reduction of health inequalities.

2. Equitable

'The practice of sport is a human right' (International Olympic Committee, 2013).

Whether we work in research, communication, strategy, policy or delivery we all have a role to play in addressing sports inequalities and promoting equal participation in sport for health. Ensuring equitable access to a range of sport for health opportunities is crucial in this respect.

3. Evidence-Based

Strategies, policies and initiatives should be based on robust evidence regarding the levels and trends of sport participation, the determinants of sport participation and the nature of the relationship between sport/s and health. This intelligence is crucial for resource allocation decisions including who to target and how to increase their sport participation for optimal health outcomes.

- Since the greatest health benefits of physical activity are to be derived amongst those who are highly sedentary, an approach which focuses on the activation of these individuals will be crucial in addressing the growing burden of non-communicable disease (Chief Medical Officers Report, 2011). Multi-sectoral interventions and initiatives implemented within the health care setting are likely to be particularly important in mobilising this stratum of the population, and there is evidence to suggest that motivation and encouragement from health workers can be an effective means of engendering and sustaining the participation of these individuals.
- Findings from the 2012 Active Adults Survey indicate that those adults who regularly participated in sport whilst at secondary school were significantly more likely to be active on three or more occasions per week as an adult (Sport Wales, 2014). Since physical activity in adulthood lowers the risk of chronic illness this evidence highlights the importance promoting sport and physical literacy development amongst children and young people. Getting young people into the habit of being physically active will also be integral to the long term reduction of obesity levels.

Monitoring and evaluation processes should be incorporated into all initiatives at the strategic planning stage in order to identify best practice and improve the effectiveness of future initiatives. In addition, analyses of cost-effectiveness will help public leaders make the most prudent use of scarce resources for health.

4. Relevant

Strategies, policies and initiatives that harness sport for health need to be tailored to the specific and ever-changing needs of local populations and individuals. This requires a high-degree of social, cultural and economic sensitivity, recognising for instance, variations in education levels, nutritional behaviours and the existence of health conditions. Achieving this level of sensitivity is contingent upon the generation of local intelligence and the involvement of the local population in the decision-making process.

5. Optimal use of existing resources

Sport for health initiatives should maximise the use of existing resources including partnerships, networks and events.

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