

ARCH Wellbeing Report

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Introduction

This paper describes the contribution of the National Centre for Population Health and Wellbeing Research (NCPHWR) and Farr Institute, Swansea University to the ARCH Case for Change. NCPHWR was commissioned to help with the development of the Case for Change by utilising its expertise and assets to help

1. Define wellbeing and relevant associated metrics
2. Summarise existing knowledge on what works to improve wellbeing
3. Advise on wellbeing indicators to consider for use in ARCH
4. Advise on how to measure wellbeing using data from SAIL and on data gaps

The research involved discussion and engagement with subject specific experts, scoping reviews of relevant literature and analysis of linked and unlinked data, primarily through the Secure Anonymised Information Linkage (SAIL) databank. Given the amount of work involved the analysis of data from SAIL and the Welsh Health Survey is contained in the accompanying ARCH Data Analysis Report

Summary and Recommendations

Wellbeing is still a relatively new and somewhat subjective concept. Consensus has not yet been reached on its precise definition but the broad concept is accepted and enshrined in policy documents, such as the Wellbeing of Future Generations Act. The most used metrics are the four components of the ONS Annual Population Survey focussing on life satisfaction, feeling worthwhile, happy and not being anxious. As part of this investigation we created an unweighted overall index by summing these factors and carrying out a feasibility study to explore broad predictors using the Welsh Health Survey to inform the development of this report. These, and other analyses of data, are available in the accompanying ARCH Data Analysis Report, given the size of the document.

The report contains a review of the literature, most of it from the grey literature, on the components of wellbeing that are included or captured in a variety of tools. The contents vary considerably with some focussing to a greater or lesser extent on mental health, children and young people, other specific age groups, physical activity and fitness, and environmental, social and community influences. The report also includes a review of data on symptoms, diagnoses and service utilisation available through routine data that also shed light on wellbeing and health status. For overall measurement of Wellbeing we recommend the use of the ONS4 indicator and the Warwick Edinburgh Mental Wellbeing Scale. There is also a need to collect information on the many specific indicators listed in the Wellbeing of Future Generations Act, Welsh Government's Children and Young People Wellbeing Monitor for Wales, and the Royal College of Paediatrics and Child Health's list of 25 indicators.

The report includes an overview of what is known to work in improving wellbeing. There are a wide variety of influences but a number appear to be particularly influential: health status (both mental and physical health), learning, employment, social inclusion, community activities, parenting/early years interventions and the creation of slow speed salutogenic environments that support active travel and many community activities. As many of these factors are inter-related in complex causal pathways

with both positive and negative feedback loops, teasing out the specific impact of any one factor is extremely challenging, and may well be impossible. Measurement instrument precision and failure to account for the complexity of causal pathways means that important determining factors for components of the pathway may not be detected in some analyses, including in the preliminary analyses conducted for this report, which has also been limited by lack of availability of data on some important topics and for some age groups .

There are a number of data intensive activities and research projects being undertaken within the ARCH region that provide considerable insight into effectiveness of different approaches in particular groups, including the HAPPEN (Health and Attainment of Pupils in a Primary Education Network) study and the Swanlinx project, a health, fitness and lifestyle programme, with the aims of investigating and collecting data on the health, fitness, nutrition, and physical activity of 9-11 years old children. Essentially, these are ongoing combined intervention and evaluation studies. Given the evidence for their impact and the importance of early motor skill development to the enjoyment, uptake and persistence of sports activities and physical activity ARCH should consider extending such interventions across the entire region. In contrast to many other approaches participating schools appear to value and enjoy their involvement in these programmes. There is also scope for the implementation of interventions and programmes that have been shown elsewhere to improve mental health. There is growing evidence that involvement in social activities during childhood, such as scouting, creates resilience and reduces the incidence of mental health conditions in middle age. Community involvement at all ages has many positive consequences.

In order for ARCH to measure the population impact of its wellbeing focussed interventions a range of data will be required, including the use of National Survey for Wales (NSW) data linked to many other sources of data through the Secure Anonymised Information Linkage (SAIL) system, the commissioning of sample size enhancements of the NSW for the ARCH region, and the commissioning of ARCH population surveys to include important factors on wellbeing and its determinants that are not included in NSW. The latter will be needed to provide greater insight and required sample sizes to quantify effectiveness in sub-population e.g. children, residents of wellness villages, and those receiving targeted interventions. For many indicators we still have no data on the determinants and uptake of salutogenic activities and exposures and the effects these have on future health and the prudent use of public services.

Some of the analyses undertaken in the accompanying ARCH Data Analysis report reveal how the the Secure Anonymised information Linkage (SAIL) system can be used to fill gaps in our knowledge of effectiveness and impact of interventions. Analyses of the Welsh Health Survey data reveal, that, in adults, self reported health status, the presence of limiting long term illness, and not being able to work due to illness have large influences on wellbeing scores. Healthy diets, giving up smoking and not drinking alcohol influence wellbeing in the expected directions. Physical activity did not appear to influence wellbeing in these preliminary analyses but that may be due the the relatively poor measurement of activity captured in the survey or the impact of PA being largely mediated through other variables, e.g. improved health. Further, more complex causal pathway analyses are

recommended and could be conducted when the 2016/17 NSW data have been included in SAIL with the potential to adjust for more factors, including rurality and deprivation.

The Data Analysis report also includes feasibility work on a number of novel health service utilisation indicators derived using linked databases that provide insights into the overall functioning of the health system, resilience and people's behaviour. Attending emergency departments for illnesses that do not require hospital admission is proposed as an indicator of system failure, as in a perfect world these common events would be dealt with in the community and not happen. Analysis of the frequency of attending general practice with symptoms and diagnoses of non upper respiratory tract infections shows that these account for under 1% of the recorded activity, indicating that people are generally not consulting with trivial problems. Some three quarters of the population are prescribed at least one drug in a year. Multi-morbidity is both common and increasing and putting pressure on all components of health and social services, not just the traditional and easily collected metrics around hospital pressures, such as cancellations, waiting times and bed occupancy. The impact of service reconfigurations on the entire system need to be evaluated and tweaked if necessary if system efficiency is to improve. Continued failure to invest in prevention will only increase pressures on the NHS and social services, as predicted by the Wanless reports in 2003.

if ARCH is to embrace the potential for evidence based and data informed approaches to improve the wellbeing of the population it will need to train or commission a dedicated cadre of skilled data scientists to drive and support this activity.

1. Defining wellbeing and relevant associated metrics

Although research in wellbeing is growing, the nature of its definition is still unanswered. Research and policy makers have focused on defining wellbeing through a set of variable indicators, without defining the nature of this phenomenon. This has led to the concept of wellbeing still being insufficiently understood and therefore not always appropriately reflected and measured in the planning and delivery of public services.

As will become clear from the sections below, there are a considerable number of factors that are strongly associated with, and influence, wellbeing. Many of these factors are susceptible to change using targeted policies or interventions. Since the objective of the ARCH Wellbeing Programme is to implement change at the population level, this report also contains definitions and measurement tools for key factors that influence wellbeing.

Wellbeing of Future Generations (Wales) Act 2015

The Wellbeing of Future Generations Act voted by the Welsh Assembly in 2015, required public bodies in Wales to "do things in pursuit of the economic, social, environmental and cultural wellbeing of Wales". The Act includes seven wellbeing goals: A prosperous Wales, A resilient Wales, A healthier Wales, A more equal Wales, A Wales of cohesive communities and A Wales of vibrant culture and thriving Welsh language.

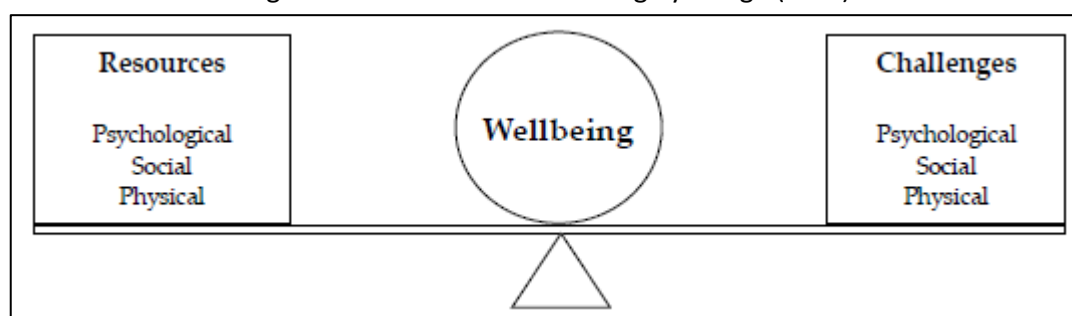
Under section 10 of the Act, the Welsh Minister is required to publish indicators for the purpose of measuring the progress towards achieving the Wellbeing goals set out as part of the Act.

The national indicators can be measured through data already collected by national surveys and datasets including the National Community Child Health Database, ONS, Public Health Wales, National Survey for Wales, Welsh Examinations Database, Annual Population Survey and data from Natural Resource Wales. There are 46 indicators that have been defined as part of this work (for the full list of indicators please see Appendix 1).

Hedonic and Eudaimonic approaches to wellbeing

Early research in this area has revolved around two approaches which initially were developed separately. The hedonic approach to wellbeing, which originated from the philosopher Aristippus, refers to the element of 'feeling good' or achieving happiness through pleasure and avoiding painful experience. On the other hand, Aristotle offered the theory of the eudaimonic approach which refers to 'functioning well' or realising your potential as a human being (Ethan A. McMahan, 2011). This theory has been further developed by many other philosophers including Maslow and his hierarchy of needs (Maslow, 2013). However, recent research has shown that a mixed approach including the two elements of feeling good and functioning well, as a more truthful representation of the concept of wellbeing. Dodge (2012) goes further by defining wellbeing as a state of equilibrium or a balance between someone's resources in terms of physiological, social and physical abilities and the challenges they are being faced with.

Figure 1. Definition of Wellbeing by Dodge (2012)



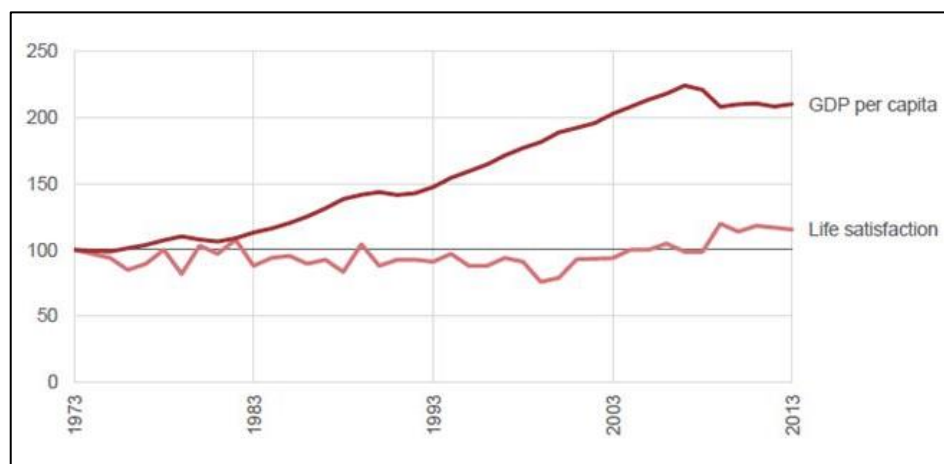
According to Dodge, individuals can achieve a sense of wellbeing when they have the psychological and physical resources they need to meet a particular psychological, social or physical challenge. If individuals do not have the appropriate resources or challenges needed, then they will reach a state of imbalance where they have more resources than challenges or vice versa. Dodge illustrates this theory with scales (see Figure 1 above) (Rachel Dodge, 2012). This definition contradicts previous definitions of wellbeing defined as a static state where individuals are not challenged, whereas Dodge stays in line with Hendry and Kloep's theory that a lack of challenge leads to stagnation (Cummins, 2010). This definition also emphasizes the dynamic nature of wellbeing as also described in Nic Marks's interpretation of wellbeing:

Wellbeing is not a beach you go and lie on. It's a sort of dynamic dance and there's movement in that all the time and actually it's the funtuality of that movement which actually is true levels of wellbeing (Nic Marks, Radio 4, 7 January 2012)

Objective and Subjective wellbeing

Traditionally, the measurement of a nation's progress was through objective measures such as the Gross Domestic Product which represents the monetary value of all finished goods and services produced in a country. Research and policy makers have recently acknowledged that objective indicators like GDP cannot help understand the nation's wellbeing on its own. Alartartseva & Barysheva (2015) defines two levels of wellbeing: internal (subjective) and external (objective). The internal wellbeing is the spiritual or mental wellbeing of the individual whereas the external wellbeing 'develops from the perception or one's evaluation of the society' (Elena Alartartseva, 2015). The chart below shows the disparity between GDP and life satisfaction in the UK. This results show how crucial it is to capture both objective and subjective measures to evaluate the nation's wellbeing (Cabinet Office, 2014).

Figure 2. GDP per capita and life satisfaction, 1973-2013, indexed 1973 = 100



The Public Health Outcomes Framework (PHOF) for Wales document 'Measuring the health and wellbeing of a nation' defines 42 outcomes including overarching outcomes and outcomes grouped under three domains (Public Health Wales, 2016):

- Living conditions that support and contribute to health now and for the future
- Ways of living that improve health
- Health throughout the life-course

You can find more information on the detailed outcomes in Appendix 2.

PHOF list a number of areas where it would be desirable to develop outcome measures:

- Natural and built environment in relation to health
- A health service that prevents ill health and promotes equity
- Employment that promotes health
- Health protection and sexual health
- Preventable cancer
- Adverse childhood experiences (ACEs)

- Information on protected characteristics and health, including learning disability
- Preventable sight loss
- Indicators of income inequality
- Citizens and services engaged together in creating good health and well-being

As the literature shows, there is no universal definition of wellbeing but there are similarities in the way wellbeing is seen as a dynamic phenomenon which includes a range of components instead of a single trait. For the purpose of this work and based on the literature discussed in the previous sections, we will define wellbeing:

“as a dynamic state which include the presence of positive emotions (happiness), the absence of negative emotions (depression, anxiety etc), life satisfaction, fulfilment and functioning well. (Elena Alartartseva, 2015) (Ethan A. McMahan, 2011) (Rachel Dodge, 2012)”

2. Measuring population wellbeing – aspects for consideration

Two fairly widely used indicators capture the subjective measures of wellbeing. They are well recognised and validated indicators which are used in a range of surveys:

- The ONS4 indicators (life satisfaction, happiness, anxiety, feeling worthwhile)
- The Warwick-Edinburgh Mental Wellbeing Scale (feeling optimistic, feeling useful, feeling relaxed, feeling interested in other people, energy to spare etc)

There is an increasing scientific literature around factors that are closely linked to wellbeing, and sometimes are described as wellbeing measures but actually capture slightly different concepts. These include mental health, mental wellbeing, resilience and aspects of physical health, health related quality of life, societal involvement and integration.

Mental Health

The UK’s Faculty of Public Health quotes two common definitions in the health literature about mental health and mental wellbeing:

"Mental health... is a state of wellbeing in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community." WHO. Strengthening mental health promotion. Geneva, World Health Organization, 2001: Fact sheet, No. 220.

‘Resilience – as in "being able to cope with the normal stress of life" – is an important component of most definitions of mental wellbeing, with great relevance for the prevention of mental illness. Working productively and fruitfully is an important component from the point of view of economists, and in some studies is regarded as the primary component’ (Aked J, 2008).

It also introduces the concept of social wellbeing and its relationship to mental wellbeing.

“Mental wellbeing includes the capacity to make health and happiness enhancing relationships with others. People with mental wellbeing know themselves and their needs, have clear boundaries, relate to others using the skills of emotional literacy and accept and manage conflict without manipulation or coercion. People with mental wellbeing are also generous, wise and compassionate. They make good decisions on behalf of others. It therefore follows that promoting the mental wellbeing of all, particularly of those who are in positions of power, is an important approach to preventing social inequality and unhealthy policy.”

Mental wellbeing and resilience are defined as protective factors for physical health as they reduce the prevalence of risky behaviours such as heavy drinking, illegal drug use, smoking and unhealthy food choices which are used as coping and management mechanisms when support is not provided (UK's Faculty of Public Health, 2010)

Child and Young People

Children are defined as aged from 0-17 years and young people from 18-25 years. In many studies they are grouped as children and young people (0-25).

Children and Young People Wellbeing Monitor for Wales 2015

The Children and Young People Wellbeing Monitor for Wales is a Welsh Government initiative which aims at providing a multi-dimensional picture of children and young people's wellbeing in Wales (Welsh Government, 2015). The Children and Young People Wellbeing Monitor for Wales was published for the first time in 2008, a second edition was published in 2011, and the latest edition in 2015. This report published data and indicators on concepts that have the greatest impact on children wellbeing, including:

- Early years: first 1000 days including pregnancy (maternal alcohol consumption during pregnancy, breastfeeding, infant mortality rates, diet, and engagement with public health initiatives)
- Education and learning opportunities (engagement in compulsory school (to age 16), absences, exclusions, educational attainment, post-compulsory school, and children's feelings towards school)
- Health (dental health, immunisation rates, teenage pregnancy, hospital admissions for self-harm, substance misuse, smoking & drinking alcohol)
- Access to sport, leisure and culture (children's level of physical activity, active travel to school, participation in arts and cultural events, attendance at National Eisteddfod activities)
- Participation in decision making
- A safe home and safe community (temporary accommodation, bullying, child homicide, sexual offences, road traffic casualties)
- Not being disadvantaged by poverty (living in relative poverty, living in a family with very low income, youth unemployment, and access to education and training)

Professor Sinead Brophy provided further information children's wellbeing and the key measures to consider. The full report can be found in Appendix 6.

The Royal College of Paediatrics and Child Health issued a report on the state of child health in the UK in 2017 (Royal College of Paediatrics and Child Health, 2016) describing the poor performance of the UK compared with most European countries and alarming and growing inequalities. The report recommended 25 indicators to monitor progress:

- Number of infant (under one year) deaths per 1,000 live births
- Annual deaths of children aged one to nine years per 100,000 population
- Annual deaths of young people aged 10 to 19 years per 100,000 population
- Proportion of mothers recorded as smokers at time of delivery or at first post-natal visit
- Proportion of mothers recorded as breastfeeding at six to eight weeks post birth
- Proportion of children who received the full course (three doses) of the 5-in-1 vaccination by 12 months
- Proportion of children at a healthy weight during their first year of primary school
- Proportion of children with no obvious tooth decay at age five
- Rate of hospital admissions for non-intentional injuries in children under five years
- Proportion of children at a healthy weight during their final year of primary school
- Proportion of girls who have received the completed Human Papilloma Virus (HPV) course of immunisation
- Proportion of regular smokers aged 15 years
- Proportions of regular alcohol users and drug users aged 15 years
- Proportion of young people aged 15 years who report high life satisfaction, by gender
- Suicide rate amongst young people aged 15 to 19 years per million
- Number of car drivers or passengers aged 17 to 19 years reported killed or seriously injured
- Number of conceptions per 1,000 females under 18 years of age
- Proportion of children living in households with income less than 60% of the median
- Number of children subject to child protection plans or on the child protection register
- Percentage of Childline counselling sessions by primary concern across UK
- Number of emergency hospital admissions for asthma for children and young people under 19 years of age
- Proportion of children (0–14 years) surviving five years following a diagnosis of cancer
- Proportion of children with diabetes meeting recommended targets for blood glucose control
- Percentage of pupils with Special Educational Needs and Disabilities (SEND) / Additional Support Needs (ASN)
- Number of emergency hospital admissions for epilepsy for children and young people under 19 years of age

Physical Activity, Fitness and Physical Literacy across the Life course

The Active Healthy Kids Wales (AHK-Wales) expert group uses data on physical activity to advocate children's rights to have access to physical activities and promote healthy active behaviour and physical literacy in children (Active Healthy Kids Wales, 2016). AHK-Wales produced a report in 2014 on physical activity, health behaviours and outcomes in children taking inspiration from the Canadian

Report Card published annually (Gareth Stratton, 2014). They used a set of indicators to evaluate the level of physical activity and health behaviours outcomes including (Gareth Stratton, 2014):

- Sedentary behaviour (watching television for two or more hours per week)
- Physical activity (hours of physical activity per day)
- Active and outdoor play (visit park to do sport and exercise)
- Active transportation
- Organised sports participation

They also used indicators for settings and influences on physical activity and health including:

- Family and Peers influences (parents and adult population taking part in sport)
- Community and the built environment (green and recreational spaces and safety)
- National Policy, Strategy and Investment (physical activity promotion in policies)

Further work is also underway to define a set of physical activity measures led by the National Indicators Working group. The indicators cover children, young people and the general population. For a detailed list of the draft indicators please see Appendix 4. Professor Gareth Stratton provided further information on physical activity and wellbeing. The full report can be found in Appendix 7.

Environmental Influences

A report by HM Government published in 2011 shows the increased evidence of social inclusion, community cohesion and interventions targeted at improving social networks to have a direct effect on mental wellbeing (HM Government, 2011). The UK Faculty of Public Health proposes seven environmental factors that can affect mental wellbeing in a positive way:

- Community: Community is used to describe the shared relationships, values, identities, and interests among people (Yerbury, 2011). Interventions that aim to improve wellbeing have to be implemented at multiple levels across communities (homes, neighbourhoods, workplaces, schools, NHS provision and community policing (Goldie I, 2016).
- Home: Living in a safe, warm and secure environment is key to mental wellbeing (Mental Health Foundation, 2016) and it enables children to become resilient (Mental Health Network NHS Confederation in partnership with National Housing Federation, 2011) and less likely to develop stress, anxiety or depression. Mental health problems are twice as high among homeless people compared with the general population (Mental Health Taskforce, 2016).
- Educational settings: Schools are a key setting where children can learn about wellbeing and how to support it (Ofsted, 2013).
- Work settings: There is strong evidence that employment has a direct effect on mental health and wellbeing. Reduced sickness and absenteeism, improved productivity and performance are factors associated with better mental health (163) (Office for National Statistics, 2011).
- Built environment and neighbourhood: Community centres, cafes, green spaces and safe play facilities for children are proven to be important for community wellbeing (Morris, 2003). Access to open space is linked to providing a sense of identity and belonging and happiness (M.P. White, 2012).

- Natural environment: There is strong evidence that access to green spaces has a direct effect on mental wellbeing (UK's Faculty of Public Health, 2010).
- Socio-economic environment: Poverty can refer to a lack of money or possessions but also a lack of social or educational resources. People living in poverty are more likely to develop a number of adverse outcomes, including mental health problems (UK's Faculty of Public Health, 2010).

Data on symptoms, diagnoses and service utilisation

In addition to the recording of wellbeing, closely related factors and determinants through the use of survey instruments routinely collected health service data can provide valuable insights into the prevalence of, and trends in, symptoms and diagnoses collected during consultations. Wales is fortunate in having developed the Secure Anonymised Information Linkage (SAIL) system, a world leading privacy protecting system designed to support health research but now also increasingly used to support the planning, provision and evaluation of services (Lyons RA, 2009) (Ford DV, 2009). SAIL is unique in the ability to link anonymised data at an individual and household level and has been used to evaluate large scale individual, household and community interventions that otherwise would never have been possible or affordable, and identifying some interventions that were poor value as well as others that very worthwhile (Moore GF, 2013) (Morgan KL, 2014) (Snooks HA, 2014) (Littlecott H, 2015) (Hutchings HA, 2016) (John A, 2016) (Fone D, 2016) (Lyons RA, 2016).

Backed and endorsed by the Welsh Government, SAIL receives core funding from Health and Care Research Wales and brings in millions of pounds of research grants into Wales, including for the Farr Institute and the Administrative Data Research Centre-Wales. The SAIL Databank is an invaluable resource for its richness and breadth of routinely collected data currently available for data linkage research. The vast array of datasets ranges from GP records, hospital data and emergency services, through to mental health, social services, education and national survey data (see section 3).

The security and protection of the data held within is ensured through its tightly controlled, robust, proportionate 'Privacy by Design' methodology that is regulated by a team of specialists and overseen by an independent Information Governance Review Panel that includes members of the public. SAIL Databank does not receive or handle identifiable data. The commonly-recognised identifying details are removed before datasets come to SAIL, and so SAIL cannot reconstruct the identifiable datasets. SAIL is committed to working with researchers, the NHS and other health-related stakeholders to conduct projects that lead to enhanced patient care, public benefit and improvements in health and well-being. SAIL makes person-based population data available for genuine research purposes only where there is a potential for public benefit. Because SAIL holds only anonymised data, researchers carry out their work without knowing the identities of the individuals represented in the datasets.

Benefits of Data Linkage

The ability to link multiple sources of data together that relate to e.g. a particular individual, a geographical location or an event, brings a new dimension to answering research questions. Data linkage allows researchers to use existing collections of extensive data that have been routinely collected and stored securely to identify patterns across entire populations to give a much broader picture. Previously unnoticed relationships can be identified giving greater depth of clarity and understanding that wouldn't otherwise be possible from analysis using a single source of data alone.

Using existing data is far more cost effective than having to collect the equivalent data through other methods such as surveys, and is overall far less intrusive. This makes many research projects more feasible and an increase in research activities leads to greater health and wellbeing for populations, improvements in the provision of services and care, and helps to form policy at the highest level. In addition, the quality of research data is improved to produce greater accuracy as the quality assurance process of linking data can identify and eliminate anomalies such as duplicate records that can otherwise affect the results of a study.

Linking together existing data gives endless opportunities to research areas of interest that may not have been previously possible. It allows more sophisticated research questions to be tackled to give a greater depth of understanding.

As part of the development of the Case for Change research analysts from the NCPHWR, Prudent Healthcare Intelligence Unit and Farr Institute undertook a series of studies to highlight the potential benefit of SAIL in informing ARCH about the creation of novel indicators and insights, and how these might be used over the longer term to evaluate the overall impact of the programme and its components, particularly the service redesigns and community wellbeing interventions.

The analyses include tables, graphs and maps showing the distribution of different patterns of service utilisation and care across the ARCH region, exploration of potentially useful novel indicators, such as the frequency of attendance with less or more serious conditions, as well as analyses of Welsh Health Survey Data to explore the distribution of wellbeing and its determinants. Given the scale of this work the analyses are featured in a separate document.

2. What works to improve wellbeing

A considerable portion of the literature on wellbeing and its determinants is to be found in the grey literature. We conducted an internet search to identify relevant publications and reports, supplemented by reports from the National Institute for Health and Clinical Effectiveness (NICE), from Royal College of Paediatrics and Child Health and the input of many context specific experts from the National Centre for Population Health and Wellbeing Research. This report summarises the main findings of this review.

In 2014, the Department for Health published a report called 'What works to improve wellbeing' (Department of Health, 2014). The report categorises interventions under six themes including:

- Health

The dual relationship between health and wellbeing is widely acknowledged in the literature with people with high level of happiness more likely to have healthier lives. Specific interventions such as Stop Smoking services, diet control services, birth control and improving access to psychological therapies have shown to be effective in reducing anxiety and improve people's mental health. Physical activity has been specifically shown to reduce depression and raises levels of cognitive functioning. The most effective programmes target the least active

populations and are community based. It is also shown that access to green spaces may encourage physical activity.

- **Learning**
Learning interventions are equally beneficial to children and young people as well as older people. Interventions including early education programme and early family interventions can help increase cognitive skills and school preparedness. It is important to develop interventions that will support children with learning disabilities as it has strong implications for wellbeing and self-esteem.
- **Work**
There is strong evidence that good quality employment positively influences people's mental health. Effective interventions include improving employment chances, supporting those recovering from mental health problems. Reducing mental health problems in the workplace through workshops, seminars and information, reducing stigma and discrimination.
- **Environment**
Interventions targeting housing has shown to improve health outcomes and changing people's perceptions of crime and safety. Another research has shown that reducing the amount of traffic and its speed can increase the levels of play and social activity.
- **Social inclusion, activity and relationships**
Social networks can contribute to building resilience in older and young people. Interventions targeting a reduction in inequality and promoting social inclusion have been shown to be beneficial in providing equal access to opportunities. Social prescribing including exercise on prescription and prescription for learning and arts. Timebanking is also an effective approach. Finally, community based projects have been found to improve people's confidence, empower communities, give a sense of self determination, as well as enhancing people perceptions of their local area and creating social cohesion.
- **Parenting and early years' interventions**
Early years and parenting interventions can raise the levels of wellbeing of children and parents. Examples of low cost interventions which improve the communication between parents and infants include training on infant development and infant massages, nurse led parental support, skin to skin contact and kangaroo care.

An unpublished study into the effectiveness of a community development programme for women in new housing estates in Dublin in the 1980s reported significantly improved measures of self-esteem (Rosenberg's) and volunteering post intervention (Personal communication, Lyons). This followed on from the successful trial of the Community Mothers programme, which involved empowerment of parents by parents in less affluent communities (Zachary Johnson, 1995).

A recently published analysis of the 1958 Birth Cohort showed that participating in Scouts and Guides activities as a child was associated with an 18% reduction in the chances of suffering from an anxiety disorder at age 50 (Chris Dikken, 2016). The authors concluded that "Participation in Guides or Scouts was associated with better mental health and narrower mental health inequalities, at age 50. This suggests that youth programmes that support resilience and social mobility through developing the potential for continued progressive self-education, 'soft' non-cognitive skills, self-reliance, collaboration and activities in natural environments may be protective of mental health in adulthood."

The Royal College of Paediatrics and Child Health recommended a considerable number of interventions covering general health and wellbeing, support for prevention, modification of lifestyles, injury prevention and treatment of chronic disorders. They included a number of key actions for the UK:

- Each UK Government to develop a child health and wellbeing strategy, coordinated, implemented and evaluated across the nation
- Each UK Government to adopt a 'child health in all policies' approach
- UK Government to introduce a ban on the advertising of foods high in saturated fat, sugar and salt in all broadcast media before 9pm
- Each UK Government to develop cross-departmental support for breastfeeding; this should include a national public health campaign and a sector wide approach that includes employers, to support women to breastfeed
- An expansion of national programmes to measure the height and weight of infants and children after birth, before school and during adolescence
- A reversal of public health cuts in England, which are disproportionately affecting children's services
- The introduction of minimum unit alcohol pricing in England, Wales, and Northern Ireland, in keeping with actions by the Scottish Government
- UK Government to extend the ban on smoking in public places to schools, playgrounds and hospitals
- UK Government to prohibit the marketing of electronic cigarettes to children and young people
- National public health campaigns that promote good nutrition and exercise before, during and after pregnancy

RCPCH specific recommendations for Wales:

- The Healthy Child Wales Programme should ensure local authorities and health boards prioritise children's safety, and through utilising resources such as health visitors and home safety equipment schemes, educate and equip parents and carers to keep their children safe, with a focus on water safety, blind cord safety and safe sleeping.
- The Welsh Government should ensure data systems across all age groups in health, social care, youth justice and education are connected.
- The Welsh Government should fund a longitudinal study to track outcomes of infants, children and young people growing up in Wales to create data that will directly inform policy and services.
- The Welsh Government should encourage increased investment in research relating to child health across the pharmaceutical, medical, social sciences, youth justice and education domains.
- Health Education Wales and Health Boards should ensure protected time for clinicians to contribute to and support child health research.
- Higher educational institutions should ensure that faculty structures and career opportunities support careers and capacity development in child health research.

- The Welsh Government should extend the Healthwise population survey to take responses directly from under 16s.
- The Welsh Government should continue to extend the Flying Start project so all children living in poverty have access to the enhanced services and support it provides.
- NHS Wales and Public Health Wales should provide good quality, safe and effective prevention and care throughout the public health and healthcare services for children of all ages, with a particular focus on primary care in order to mediate the adverse health effects of poverty
- The Welsh Government should develop a national strategy on infant feeding.
- The Welsh Government should mandate that all maternity services achieve and maintain UNICEF UK Baby Friendly Initiative Accreditation by January 2019.
- The Welsh Government should set and monitor targets for increasing breastfeeding and reducing smoking in pregnancy and early childhood.
- Public Health Wales and Health Boards should provide local breastfeeding support that is planned and delivered to mothers in the form of evaluated, structured programmes.
- Public Health Wales should undertake a targeted awareness campaign promoting smoking cessation, breastfeeding, healthy weight in women of childbearing age and safe sleeping practices for babies.
- The Welsh Government should take immediate steps to embed statutory and comprehensive personal, social and health education programmes (including sex and relationships education) across all primary and secondary schools. The new curriculum for Wales should use the Health and Wellbeing Area of Learning Experience to continue that approach.
- Estyn should inspect the provision of personal, social and health education programme within a robust framework.
- The Welsh Government should ensure that compulsory evidence based health and wellbeing programmes are embedded in all primary and secondary schools which foster social and emotional health and wellbeing, through building resilience, and specifically tackling issues around social inclusion, bullying, drug and alcohol use and mental health.
- The Welsh Government should pursue responsibility to implement minimum unit pricing on alcohol.
- The Welsh Government should pass the Public Health (Wales) Bill and extend bans on smoking in public places to school grounds, playgrounds and NHS grounds.
- Public Health Wales should undertake sustained public health campaigns about the dangers of second hand smoke.
- Public Health Wales should protect services that help pregnant women stop smoking and ensure they are accessible to all.
- The Welsh Government should develop and implement an evidenced-based childhood obesity strategy for tackling the current crisis and preventing further escalation.
- The Welsh Government should audit local authority licensing and catering arrangements with the intention of developing formal recommendations on reducing the proximity of fast food outlets to schools, colleges, leisure centres and other places where children gather.

- Local authorities should carry out a public health impact assessment in all planning decisions and introduce 20mph speed limits in built up areas, to create safe places for children to walk, cycle and play.
- Public Health Wales should expand the Child Measurement Plan for Wales to measure children after birth, before school and in adolescence.
- NHS Wales should ensure that all health care professionals can make every contact count by having difficult conversations with their patients (whatever their age) who are overweight or obese.
- Professional bodies representing all those working with infants, children and young people in health, social care, education, criminal justice, and community settings should equip their members with the necessary tools to identify mental health issues through the promotion of resources such as the MindEd portal.
- The Department for Education and Skills should ensure that all schools make mental health support available to their pupils.
- The Welsh Government should introduce a children and young people patient survey that covers general practice, inpatient, outpatient and community settings.
- NHS Wales should involve children and young people in the development of services designed for them.
- NHS Wales should ensure better transitions from child to adult services, involving children and young people in planning the change.
- NHS Wales should provide every child and young person with a long term condition with a named doctor or health professional.
- NHS Wales should support all Health Boards to ensure that clinical teams looking after children with known medical conditions make maximum use of tools to support improved communication and clarity around ongoing management, for example the use of epilepsy passports or asthma management plans where appropriate.
- Health Education Wales should fund mandatory child health training for all GP trainees.
- NHS Wales and Public Health Wales should work together to support Health Boards to provide quality health and care services and support them to implement guidelines and standards.

Specific interventions currently taking place in the ARCH region

It is difficult to find out about the range of community activities and interventions underway as many voluntary and statutory bodies are involved in providing or supporting services that improve wellbeing but there is no single source of information on these. Many will not be categorised wellbeing interventions. Our research team is aware of a number of interventions and studies that are specifically aimed at improving health and wellbeing and which include robust evaluations of effectiveness and we have chosen to highlight these.

Several interventions are focused around schools.

The Swansea Outdoor Schools project is an outdoor learning whole schools approach currently being taken up by three primary schools (Gowerton, Sketty and Crwys). The project utilises an active learning approach, using the school and surrounding grounds to enhance curriculum experiences. This project is currently being evaluated using the HAPPEN (Health and Attainment of Pupils in a Primary Education

Network) collaboration (Swansea University, 2015). The evaluation will explore the impact of outdoor learning on the wellbeing, educational attainment and physical health of 8-11-year-old children in these schools, compared to others in the network.

Nine schools have taken part in a Mindfulness Based Stress Reduction course for teachers which, when evaluated was found to reduce anxiety, stress and depression in teachers. Longer term follow-up is currently underway but many of the teachers involved in the course, have taken elements of this practice forward to implement with children in their schools or have either gone on or are interested in attending future courses to teach children, as they have noted an increase in the number of mental health related problems among children. It is intended that this will also be evaluated using the HAPPEN network.

Work is ongoing on the ACTIVE (Active Children Through Incentive Vouchers Evaluation) project. This is a randomised trial exploring the impact of providing teenagers (aged 12-13) with vouchers to spend on physical activities of their choice and includes a number of outcomes physical activity and health related outcomes. This project promotes socialisation among teenagers and will link to routine data to examine the health and wellbeing outcomes of those children engaging with the scheme compared to those pupils in schools who did not receive the scheme.

Many schools across the ARCH region participate in the Welsh Network of Healthy Schools. This has yet to be evaluated.

Early years and school based interventions

With regard to specific interventions for different groups, the next section is broken up into in age categories including early years, primary and secondary schools, and young people and incorporates information from the areas outlined below:

- National Institute for Health and Clinical Evidence (NICE) guidance
- Other sources of evidence-based information
- Other examples of interventions being carried out or currently evaluated in Wales

Early years

Existing projects in Wales: MIND, a mental health charity, deliver a project entitled “Two in Mind” which focuses on optimising the social and emotional environment of infants through 1) provision of early intervention resources for family practitioners and 2) training to build the capacity in primary care by training family practitioners in the newly accredited Level 3 qualification and Level 2 certificate in maternal and infant mental health. This is now part of the Healthy Child Wales programme.

Bangor University’s Centre for Health Economics & Medicines Evaluation (**CHEME**) published a report bringing together international evidence relevant to Wales on the likely return on investment and cost effectiveness of programmes and practice to support the Early Years development of children living in Wales (Bangor University, 2016). Key recommended interventions and their summarised impacts include:

- Investing in the Child
Interventions during pregnancy through maternal nutrition and provision of vitamin supplements is a proven way of promoting good maternal health and child outcomes. Investment in contraceptive services is also key in controlling the rates of unplanned teenage pregnancies which can have a significant impact on the likelihood of positive outcomes for

parent and child. Increasing breastfeeding rates are also linked to improved outcomes for children.

- Investing in the whole family

Troubled families cost 10 times more to local councils than other families in England and Wales. Troubled families are characterised by there being no adult in the family working, children not being in school and family members being involved in crime and anti-social behaviour. They cause problems to the community around them, putting high costs on the public sector (Department for Communities and Local Government, 2015).

- Investing in education and skills

Pre-school experience can lead to better job prospects and higher income levels in later life (Barros, 1999). Children from low socio-economic backgrounds are more likely to succeed if they receive high quality pre-school education (Melhuish, 2003).

- Investing in the child's environment and wider community

Poor housing conditions increase the likelihood of disability and ill health by up to 25% during childhood and early adulthood (Shelter, 2006). We estimate that the NHS in Wales could save £120 million a year in treatment costs for children and adults were we to improve all homes up to current building regulation standards (Nicolet al., 2015). Poor housing is also estimated to cost a further £100 million a year through poorer educational attainment and life chances (Davidson et al., 2011).

Evidence from the Royal Society for the Prevention of Accidents (RoSPA) and the US Centres for Disease Control (CDC) show that many childhood injury prevention initiatives are cash saving and show good returns on investment.

Primary school Interventions

Evidence-based interventions: The Public Policy Institute for Wales recently conducted a report synthesising evidence regarding Promoting Emotional Health, Well-being and Resilience in Primary Schools. With regards to which interventions may be most effective at promoting wellbeing in children, they point to a variety of evidence-based programmes which provide guidance and resources for supporting school-based activities in this area. These are collated and rated in several existing databases provided by organisations such as Collaborative for Academic, Social, and Emotional Learning (CASEL), Early Intervention Foundation (EIF), KidsMatter Primary, and Blueprints for Healthy Youth Development. However, an important point made by this report highlights that even where the evidence base for a programme is very strong, implementation factors play a crucial role and there is no guarantee that introducing the programme will generate positive and sustained impacts on children. They advocate for embedding approaches to social and emotional learning within wider school systems and the broader curriculum (Wales, 2016). They emphasised the importance of mapping out, planning, delivering and evaluating any school systems approach to social and emotional wellbeing.

Schools should be healthy places that support the emotional and mental wellbeing of both young people and staff. Shared decision making has been shown to be a key aspect of implementing a whole school approach. An effective school council is a good way to involve young people in the running of the school and implementing a whole school approach to supporting emotional and mental wellbeing (Children and Young People's Mental Health Coalition, 2015).

YoungMinds project

This project aims at improving outcomes for children and young people with behavioural and emotional difficulties by providing a comprehensive suite of online learning resources for educational professionals, along with a range of training courses related to mental health and wellbeing in schools. Introducing mindfulness in schools is key to improving emotional and mental wellbeing. A report from the Mental Health Foundation (2010) found that a growing evidence base indicates that Mindfulness-based approaches are effective in helping people manage stress, anxiety and depression, and other mental health problems.

There are key things to consider when designing interventions in schools. It is important to understand the needs of pupils in the area, ensure that the services are easily accessible to increase take up, keeping in mind the potential stigma with attending mental health services, putting in place appropriate evaluation based approach to demonstrate the value of the intervention (Children and Young People's Mental Health Coalition, 2015).

TaMHS: a large scale government policy initiative that aimed to promote mental health support in schools

The Targeted Mental Health in Schools (TaMHS) programme was part of the Government's wider programme of work developed to improve the psychological well being and mental health of children, young people and their families. The programme ran between 2008 and 2011. Selected schools in every local authority (LA) were involved in the programme to develop innovative, locally determined interventions to provide early intervention and targeted support for at risk of developing mental health problems and their families.

The randomised trial found that the implementation of TaMHS led to a significant reduction in problems for pupils in primary school with behavioural problems, but not for pupils with emotional problems or for secondary school pupils with either emotional or behavioural problems. Reduction in problems for pupils in primary school with behavioural problems was greater when pupils were also given evidence based self-help leaflets. The Longitudinal Study revealed that overall the self-reported mental health of children taking part in the study improved (except for behaviour problems in secondary school pupils).

In secondary school greater inter-agency working (measured by use of Common Assessment Framework) and more positive links with specialist CAMHS and provision of information to pupils were all independently associated with reduction in behaviour problems. There was some evidence that giving information to pupils in primary school with emotional problems may be associated with less reduction in emotional problems.

Interventions to improve adolescent mental health

A recent systematic review regarding mental health interventions in adolescence included 38 systematic reviews in the areas of school-based interventions, community based interventions, digital platforms and individual/family based interventions (Jai K. Das, 2016).

Targeted group-based interventions and cognitive behaviour therapy (CBT) were effective in reducing depressive symptoms. School-based suicide prevention programs involving classroom-based didactic

and experiential programs increased knowledge of suicide and suicide prevention in the short term, but there was no evidence of an effect on attitudes or behaviours around suicide.

Evidence from digital platforms was generally supportive of web-based prevention and treatment programs for anxiety and depression; however, more extensive research was advocated to further establish the conditions needed.

Exercise was found to be effective in improving self-esteem and reducing depression score, but no impact was found on anxiety scores. CBT compared to waitlist was found to be effective in reducing remission. Psychological therapy when compared to antidepressants had comparable effect on remission, dropouts, and depression symptoms (Jai K. Das, 2016).

Older children: aged 16-25 Guidance-Mental Health Foundation

The Right Here project has been running from 2009 to 2014 and aimed at developing new approaches to supporting young people in UK with their mental health and wellbeing through free therapeutic activities, group work programmes and multimedia campaigns to raise awareness of mental health (Right Here, 2016). The approach consists in intervening early to help young people at risk of developing mental health problems. The project has been independently evaluated and has showed positive outcomes on participants who have:

- Felt able to be themselves in groups, and forge relationships with others, sometimes for the first time.
- Come to realise that 'everyone has mental health' and grasped its relevance to themselves, as well as understanding that there is less difference between those who are 'well' and 'unwell'.
- Developed the confidence to consider and/or take up new opportunities.
- Acquired new skills and techniques for spotting and then handling changes in their emotions, especially the onset of feelings of anger and violence.
- Improved or made changes in their relationships with family members and their peers, including leaving violent or damaging relationships.

Mental health interventions to improve population health and wellbeing

The Public Health Mental Health and Wellbeing Team in Warwickshire led the development of the Five Ways to Wellbeing (FWtW) project which aims at promoting mental wellbeing and preventing issues associated with poor mental health (Mind, 2013). This new intervention followed a three tier approach:

1. They firstly worked towards raising awareness of wellbeing and encourage discussions in the community. They designed engaging resources to encourage people to think about their wellbeing and how they can improve it. Other services include one to one support, walk-ins, peer led drop ins, workshops and community talks.
2. The second level included targeted interventions for people at risk of mental health problems including suicide prevention training for GPs.
3. The team commissioned a Physical Activity on Referral service as part of the early intervention and physical health improvement support for people living with mental health problems.

The programme was evaluated and within the first 18 months the programme led to an increase in appointments through the wellbeing hubs to help support individuals' wellbeing. Further work needs to be carried out to understand the long term impact of the intervention of people's health and wellbeing.

NHS Lanarkshire introduced a new programme called 'Well Connected' to encourage greater mental wellbeing through social prescribing. The programme focuses on three levels: individual, community and structural. The programme achieved a reduction in inequalities through the creation of a single information telephone point delivered through the third sector. This service provides information and practical support to people who require support to access. Local self-referral Occupational Therapy Community Clinics were also available which provided a hub for people to explore their needs and receive support to engage in community based programmes. Various interventions undertaken as part of the programme have been evaluated. Results from the Scottish Health Survey has shown improved self-reported mental health and wellbeing for those who received the intervention.

Creating supportive environments: The impact of cars on people's health and wellbeing

There is a clear and well established medical evidence base from the National Institute for Health and Care Excellence (NICE) for the effective measures needed on streets to improve health. These measures include:

1. reallocating road space to support active travel, eg. by reducing on-street parking, widening pavements and introducing cycle lanes
2. restricting motor vehicle access, eg. by closing or narrowing the carriageway
3. introducing road user charging schemes
4. introducing traffic calming schemes to reduce vehicle speeds, eg. 20mph limits and zones, enforcement and narrowing the carriageway
5. providing a comprehensive network of routes for walking and cycling to offer everyone (including people whose mobility is impaired) convenient, safe and attractive access to workplaces, homes, schools, shops, play and green space and social destinations.

The UK Faculty of Public Health produced a report recommending a 'major shift away from cars in favour of active travel including walking, cycling and public transport. The report recommends a range of interventions for local authorities to mitigate the health impacts of cars on their residents (Faculty of Public Health, Chartered Institute of Environmental Health, Royal Society for Public Health, Transport & Health Study Group, Professional Alliance for Transport and Health, 2015). The categories of measures include:

- Street design
Reallocating road space to support active travel can help reduce the health impacts of cars. Examples of interventions include converting on street parking spaces to public seating areas or cycle parking, widening and improving pavements and introducing cycle lanes. Restricting the flow of motor traffic and designing slower speed sections also lead to creating a healthy environment and encourage physical activity.
- Traffic management

Successful traffic management methods include traffic calming schemes with 20mph zones, developing a 'play streets' policy which temporarily closes a street to allow children to play safely and car free days.

- Reducing vehicle emissions
Encouraging the procurement of low emissions vehicles for public organisations and suppliers can help demonstrate the capabilities of low emission vehicles to a wider audience. Introducing car sharing schemes is also a successful way to reduce emissions.
- Planning
Promoting car free residential developments, developments with mixed uses including shops, leisure to avoid car travels, developments closer to public transport and protecting local high streets through planning policies that enable active travel through walking or cycle and discourage the use of cars.
- Active travel
Interventions in school can help encourage pupils in using a more active mode of transport. Providing free cycling training in schools and supporting nurseries, schools and colleges to adopt better ways of travelling are effective measures. In the workplace, providing bike loan schemes, promoting the use of active travel and supporting the opportunities to combine cycling and public transport are good methods to encourage active travel with adults.
- Public transport
- Increasing the provision of public transport instead of major road development and making public transport more attractive to use are two recommendations in this report. There are several benefits to investing in local public transport as it promotes economic growth, increases productivity (reduced congestion), promotes the regeneration of areas and is more suitable in terms of carbon emissions.

The Royal College of Paediatrics and Child Health (2017) also supports the development of slow speed environments to improve children's health and wellbeing.

[Investments and interventions to improve physical activity](#)

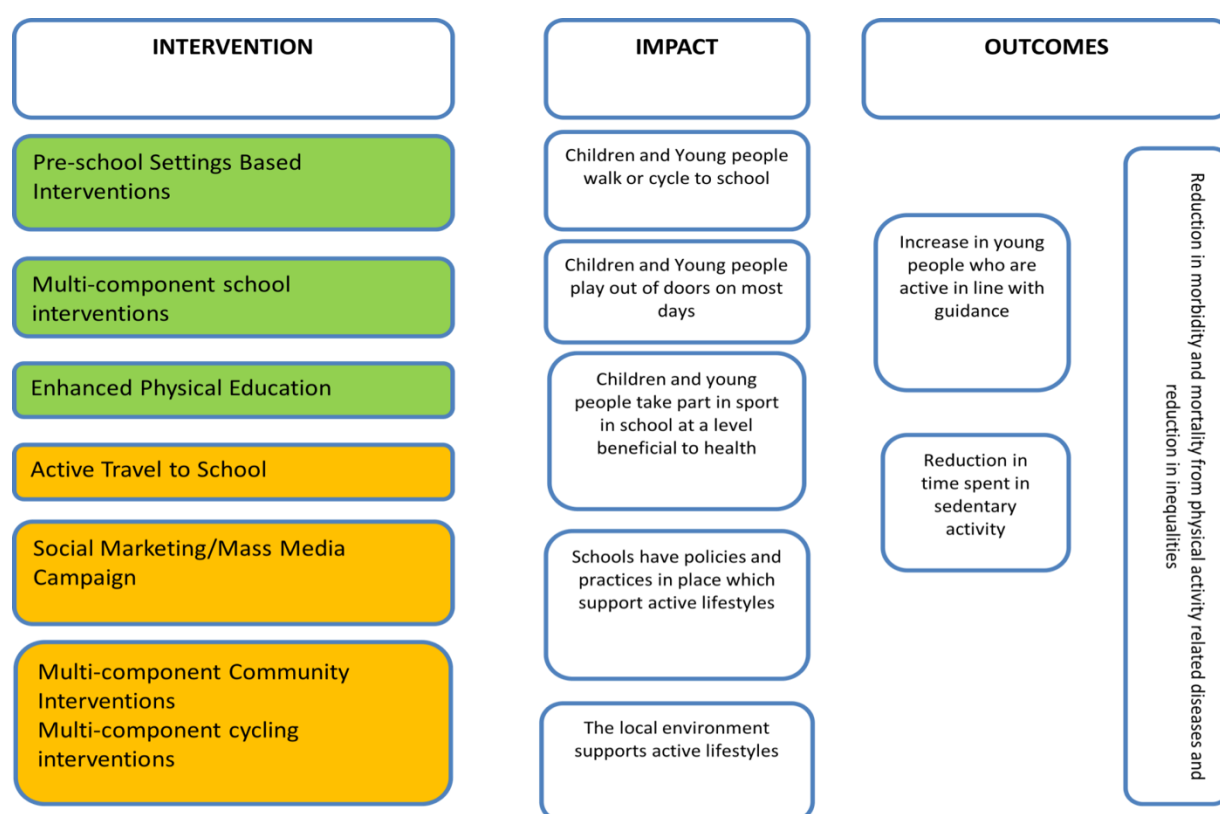
Sufficient levels of physical activity can significantly reduce the risk of cancer, heart disease, diabetes and stroke and lower the risk of early death by 30 per cent. Physical activity also increases energy levels, reduces stress, and improves mental health, mood, sleep quality and self-esteem. In Wales, 18 percent of all deaths are deemed to be caused by physical inactivity (Lee I, 2012), but the problem remains that only a third of adults and children are sufficiently active and, in fact, the population of Wales is the least active in the UK (Davies S, 2011). Promoting the benefits of physical activity on the quality and quantity of life of people in ABMU and HDU requires a concerted effort.

Children and Young People

The Physical Activity Expert Advisory Group (PHW) identified seven potential areas for action in relation to increase in intensity and duration of physical activity among children aged 8 – 18 years of age, three of which were considered to have a sufficiently robust evidence base for implementation and a further four which would require varying degrees of research and evaluation. These are summarised in Figure 1.

The group ranked work associated with the school setting as the highest priority in this group including multi-component school intervention, enhanced physical education and active travel to school as a development action. Intervention in pre-school settings was ranked lower than in school settings. The group felt that the multi-component action in communities and specifically for cycling had potential. However, the evidence base is not strong for this area currently and in relation to the scope of the project Public Health Wales would have a supportive rather than leadership role – deliverability therefore was felt to be a potential weakness for these actions but that they offered among the greatest potential for change. The implementation of the Active Travel Act in Wales provides a potential platform for further co-ordinated work in this area. The third area identified related to social marketing programmes utilising the best available evidence and including new forms of media i.e. social media, in addition to traditional mass media approaches. The group acknowledged the challenge in finding funding for these interventions on a sustained basis and the limited evidence base in relation to physical activity compared to some other lifestyle areas.

Figure 1 – Increase in intensity and duration of physical activity among children aged 8 – 18 years of age.



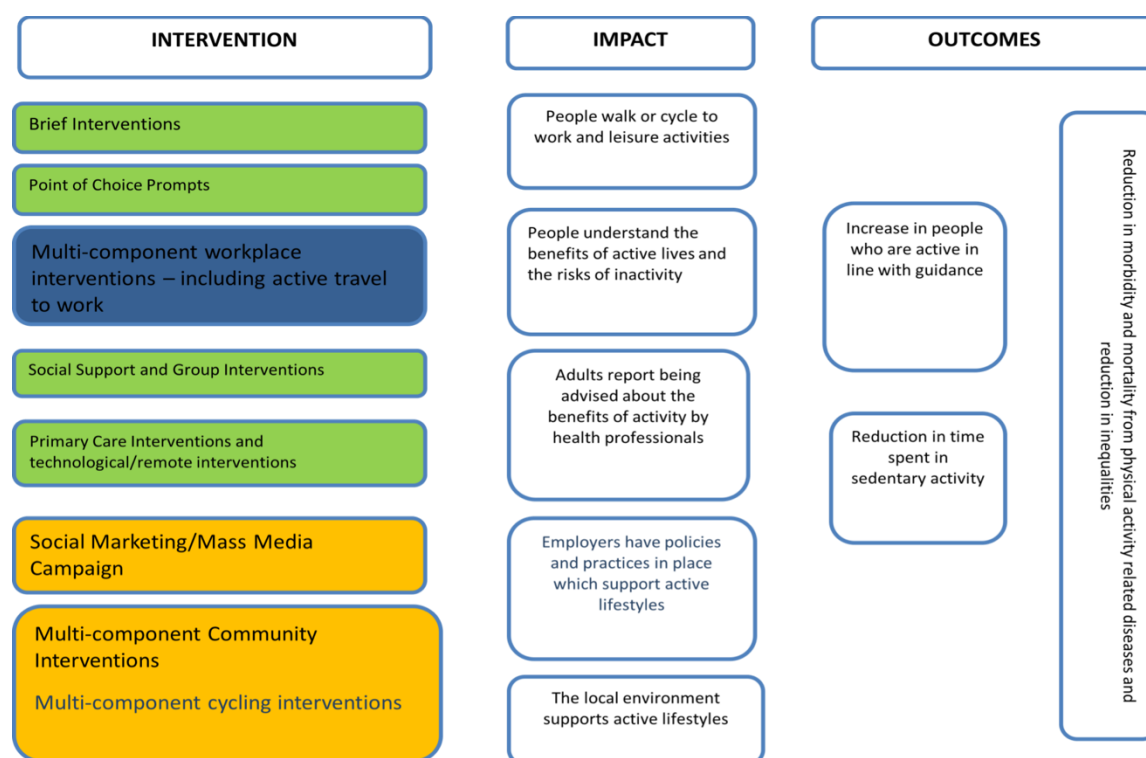
Note: Interventions in yellow lacks sufficient evidence for widespread implementation at the current time and are proposed for research and development

Working Age Adults and Older People

In relation to increasing in duration and intensity of physical activity among adults of working age, the group made seven recommendations (Figure 2). The greatest priority for action was given to relatively low impact but deliverable actions relating to brief interventions and point of choice prompts. They

also noted the difficulties in health professionals prioritising this work alongside routine care and that data collection and monitoring systems linked to routine patient systems would be essential to support action. The need to integrate this work within wider programmes, such as Making Every Contact Count is essential. Although lacking robust evidence currently and presenting challenges in relation to the funding and joint working required for delivery the development areas of multi-component community interventions and cycling interventions along with social media/mass media marketing were prioritised next. Finally, interventions in the workplace (including active travel to work), social support and primary care interventions (including use of technology and other remote support) were given the lowest priority. It should be noted however, that the differences between the ranking of the interventions was very small. The final area for action related to the provision of brief interventions through routine health and social care service delivery and the necessary training and support to deliver this. The group noted that relatively short sessions of training (45 minutes) showed evidence of effect.

Figure 2 – Increase in duration and intensity of physical activity among adults of working age



Note: Interventions in yellow lack sufficient evidence for widespread implementation at the current time and are proposed for research and development; interventions in blue were not considered for older people although clearly many older people would access these interventions in communities.

In relation to increasing intensity and duration of physical activity in older adults, similar interventions were considered except for interventions in the workplace and multi-component cycling interventions. The prioritisation was slightly different with greater emphasis placed on social support and group interventions among older people, reflecting the strong evidence base for benefits to other aspects of health and wellbeing such as mental health. The existing National Exercise Referral Programme works largely with this target age group with chronic conditions and includes a social support element through group delivery.

Wellbeing indicators for consideration in ARCH

Based on the research and evidence outlined above, we have drawn the list of indicators below to consider when measuring the wellbeing of the population.

Subjective wellbeing

These indicators below capture the subjective measures of wellbeing. They are well recognised and validated indicators which are used in a range of surveys:

- ONS4 (life satisfaction, happiness, anxiety, worthwhile)
- Warwick-Edinburgh Mental Wellbeing Scale (feeling optimistic, feeling useful, feeling relaxed, feeling interested in other people, energy to spare etc)

Children and young adults' specific indicators

The list of indicators recommended by the Royal College of Paediatrics and Child Health. In addition, there are a number of others that would supplement these national indicators, including

- children's levels of physical activity, active travel to school, participation in arts and cultural events, attendance at National Eisteddfod activities
- Subjective wellbeing (Happiness with appearance, quarrelling with parents, talking to parents about things that are important, bullied at school, time spent on social websites, feeling safe walking in the neighbourhood after dark, liking one's neighbourhood, happiness with school, desire to go on full time education.
- Engagement in compulsory school, school absences, exclusions

Indicators that measure uptake of interventions by geography, deprivation status and rural/urban designation, including

- Breastfeeding
- Engagement with initiatives to improve diet and stop smoking and alcohol consumption during pregnancy
- Home visits during pregnancy and post-partum period (0-1 years)
- Home and environmental safety

Health related indicators

As discussed previously there is strong evidence for the links between wellbeing, physical and mental health. The indicators listed below contribute to an overall picture of the health of the population as well as the uptake of health services.

- Mental Health (Depression, Anxiety, Treatment, emotional distress)
- Common morbidities
- Long term conditions
- Emergency admissions for injuries and selected conditions
- Patterns of GP and hospital visits
- Uptake of vaccination, screening and preventive services

- Access to services
- Access to psychological therapies
- For older people it would be helpful to have measures of frailty (weakness, fatigue, weight loss, low physical activity, poor balance, visual impairment, cognitive impairment)

Lifestyle behaviours

Following the global recommendation from the Lancet series on physical activity, surveillance on overall physical activity levels as well as its subcomponents and determinants is needed. Furthermore, a thorough and critical evaluation is needed for all sectors and settings that have a known impact on physical activity participation, including school, community, home, and policy.

- Smoking status and alcohol consumption
- Weight control
- Sedentary behaviour (watching television for two or more hours per week)
- Physical activity (hours of physical activity per day, organised sport participation, active and outdoor play and active leisure time)
- Physical literacy
- Participation in active and outdoor play (visit park to do sport and exercise)
- Active transport
- Participation in organised sports
- Family and Peers influence (parents and adult population taking part in sport)
- Access to healthy built environment (green and recreational spaces and safety)
- National Policy, Strategy and Investment (physical activity promotion in policies)

Learning and education

- Educational attainment
- Engagement in post-compulsory school and higher education
- Children's attitudes towards school
- Enrolment in education or training
- Volunteering
- Regular internet access (older people)
- Outdoor learning

Environment (Built environment, neighbourhood and natural environment)

- Housing (temporary accommodation, affordable, safe homes and neighbourhoods, damp free, modifications to accommodate mobility and safety for older people)
- Community safety (bullying, assaults, sexual offences, road traffic casualties)
- Traffic calming schemes
- Active travel, motor vehicle access
- Cycling and walking routes
- Car emissions (pollution)
- Access to transport/public transport and affordability

- Work (absences, sickness, mental health and wellbeing policies and support)
- Access to green and blue spaces
- Green play facilities
- Community centres
- Access to health and social care services

Social inclusion, activity and relationships

- Frequency of visits from family and friends,
- % with nearest child living less than one hour's drive away,
- % spend celebratory occasions not alone
- Perception of local area
- Opportunity for social inclusion

Poverty / Social economic environment

- living in relative poverty,
- living in family with very low income,
- youth unemployment,
- access to education and training
- living in fuel poverty
- affordability of holidays
- % of income used for housing (mortgage/rent)

3. How to measure wellbeing using routinely collected data held in the SAIL databank

This section provides an overview of the current data sources available through the SAIL Databank.

Primary Care data gathered by GP practices across Wales

There are currently a total of 462 GP practices actively treating patients in Wales. Of those practices 350 (76%) have agreed to include their data within the GP dataset held in SAIL. The available data covers the period from January 2000 to the present, but this varies by practice. Individual patient level clinical information is securely extracted (using Audit+) from the practices' clinical systems. This system captures the signs, symptoms, test results, diagnoses, prescribed treatment, referrals for specialist treatment and social aspects relating to the patients' home environment. There are no standard rules for recording data within primary care clinical information systems. Therefore, each individual clinician can record information in their own way. GP data is coded in a hierarchical system called Read Coding. To improve the consistency of coding, standards have been agreed for certain conditions monitored by the Quality and Outcomes Framework (QOF).

The GP dataset has previously been linked to other datasets to examine a number of important research questions. These have ranged from looking at differences in blood pressure level readings in Primary and Secondary care, to the rate of acute myocardial infarction or stroke among patients with

ankylosing spondylitis. The GP dataset also allows for examination within individual health boards and at GP cluster level. For example, research has used GP data from the Abertawe Bro Morgannwg University Health Board to examine chronic pulmonary disease in relation to flu vaccine uptake and emergency admissions resulting from respiratory disease during the flu period.

Patient Episode Database Wales

This is the national repository for all episodes of inpatient and day-case activity in all NHS Wales hospitals. All hospitals are required to collect and code standardised data. The PEDW contains attendance and clinical information for all hospital admissions, which includes all finished consultant episodes of inpatient and day-case care. The PEDW utilises the International Classification of Diseases (ICD) diagnostic codes, and the OPCS-4 classification of surgical operations. The data held in the PEDW can provide information regarding both health service utilisation and the incidence and prevalence of disease.

Emergency Department Data Set

NWIS provides this dataset which contains administrative and clinical information for all activity/attendances at all A&E departments and Minor Injury Units (MIU) in Wales. Whilst all attendances irrespective of residence are recorded, Welsh residents attending emergency departments in hospitals in England are not included. The EDDS also includes the All Wales Injury Surveillance Systems (AWISS) dataset which collects data on all injuries from A&E departments. The data are collected and coded at each hospital where they are electronically transferred to the NWIS to be validated and merged in to the main database. Diagnoses, investigations, and treatments are coded using broad categories. The EDDS contains information on attendances from 2009 to the present and includes records on approximately 750,000 attendances per year. The data held in the EDDS can provide information regarding both health service utilisation and the incidence and prevalence of certain events. Whilst validity checks are undertaken by the Health Boards and the NWIS, researchers need to be mindful of local variations in coding practice. Despite these challenges, the EDDS has been used in previous research studies covering a range of areas relating to emergency data in Wales. For example, one study has used EDDS to examine whether a change in the amount of alcohol outlets within local authorities had any impact on alcohol consumption levels and alcohol-related harm to health (Fone, 2012).

Outpatient dataset

NWIS provide this dataset which contains attendance information for all NHS Wales hospital outpatients' appointments. The data are collected and coded at each hospital. Administrative information such as speciality of care, appointment date, and attendance status is collected from the central Patient Administration System (PAS). There are approximately 4,500,000 appointments per year. The dataset contains individual person level data and is available from 2004 to the present. The dataset also contains all scheduled outpatient appointments including those where the patient failed to attend. Previous research studies relating to hospital outpatient activity in Wales have already been conducted using the OPD. For example, one study has linked outpatient data with a number of other health datasets, questionnaire data, and clinical studies in order to produce a single data resource for

use in health economic analyses and longitudinal tracking of patient journeys through the healthcare system (Husain, 2012).

National Survey for Wales

The National Survey for Wales (NSfW) is a major study conducted by the Welsh Government. It is one of the main ways in which the Welsh Government seeks to gain detailed information on people's views and wellbeing. The survey is conducted during a 45-minute face to face interview with a randomly selected sample of people aged 16 and over across Wales (around 12,000). The survey is conducted every year by selecting random sample of addresses, ensuring homogeneous representation of the population of Wales. The survey ran between 2012 and 2015. An expanded version of the NSW, beginning in 2016, covers similar topics as well as a selection of topics from four other surveys. These are the Welsh Health Survey, the Active Adults Survey, the Arts in Wales Survey, and the Welsh Outdoor Recreation Survey, all of which come to an end in 2014 or 2015. The first results from the new survey will be published in June 2017.

Table 2: Number of cases within National Survey for Wales 2012 - 2015

Year	Total
2012 (Jan - March)	3,558
2012-13	14,552
2013-14	14,771
2014-15	14,285

Table 3: National Survey for Wales 2014-15 sample, split by age and gender (Unweighted)

	Male	Female
16-29	761	1,033
30-39	750	1,149
40-49	943	1,214
50-59	1,034	1,321
60-69	1,300	1,492
70 and over	1,473	1,815
Total	6,261	8,024

The 2014-15 survey includes a number of questions on wellbeing. The survey includes ONS four subjective wellbeing questions (ONS4) that were developed as part of their Measuring National Wellbeing programme. The questions focus on four main areas:

- Satisfaction (with life overall and with particular domains)
- Happiness

- Anxiety
- Feeling that the things one does are worthwhile

The survey covers other relevant topics including:

- Satisfaction with health services
- General Practitioners (GPs) and hospitals
- Social care
- Local Authority Services
- Democracy and understanding
- Active travel
- Literacy and numeracy
- Internet access, use and e-safety
- Well-being
- Demographic questions
- Personal finance
- Material deprivation
- Childcare and play

Consent to link the National Survey to other data sources was obtained from 2012-13 onwards. Consent to data linkage was also asked as part of the January to March pilot in 2012/4. Consent does not have a time limit set, and linkage can therefore be conducted for the foreseeable future. The consent to link rate for the National Survey was roughly 64 percent (9,303 cases) of the achieved survey sample in 2012-13, 66 percent (9,795 cases) in 2013-14, and 65 percent (9,289 cases) in 2014-15. Data can therefore be pooled for several years in order to obtain a linkable sample of over 28,387 cases – as at 2015.

Table 4: Distribution of age groups and gender for National Survey for Wales 2014-15 data comparing total achieved sample with those where consent to link was given (on SAIL); Unweighted

	Achieved Sample (%)	Consent to link in SAIL (%)
16-29	13	13
30-39	13	14
40-49	15	16
50-59	16	17
60-69	20	20
70 and over	23	21
Male	44	45
Female	56	55
Total (n)	14,285	9,289

The 2016-17 survey sees the introduction of the Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) which is widely used and validated to measure subjective wellbeing. The scale was developed to enable the monitoring of mental wellbeing in the population. The indicators both cover hedonic (feeling good) and eudaimonic (getting on with others and functioning well) perspectives of wellbeing. It includes fourteen items with five responses each (none of the time, rarely, some of the time, often, all of the time) to provide a single score ranging from 14-70 (Warwick University, 2015).

The fourteen items include:

- I've been feeling optimistic about the future
- I've been feeling useful
- I've been feeling relaxed
- I've been feeling interested in other people
- I've had energy to spare
- I've been dealing with problems well
- I've been thinking clearly
- I've been feeling good about myself
- I've been feeling close to other people
- I've been feeling confident
- I've been able to make up my own mind about things
- I've been feeling loved
- I've been interested in new things
- I've been feeling cheerful

The survey also collects information on:

- Demographics
- Full time education
- Economic status
- Qualifications
- Tenure
- Car use
- Community and safety
- Volunteering
- Active travel
- Internet
- General Health
- Access to health services
- Lifestyle behaviours (diet, smoking, alcohol and exercise)
- Environment (outdoor space, climate change, leisure activities including sports)

Welsh Health Survey

The Welsh Health Survey (WHS) is a key source of information about the health and wellbeing of the general population in Wales. The current annual WHS began in 2003 and replaces two previous study series: the previous WHS, conducted in 1995 and 1998, and the Health in Wales Survey which was

conducted every two to three years between 1985 and 1996. Welsh Government have now decided to replace existing surveys, including the WHS, with a new survey of adults that will start during 2016-17 which will include health-related questions.

The annual **Welsh Health Survey** (most recent 2015) (Welsh Government, 2015), provides information about the health and health-related lifestyles of people living in Wales. It covers a range of health-related topics, including health status, lifestyle and health behaviours (including physical activity), and health service use. The most recent survey (2015) collected data on 13,656 adults and 2,608 children. The survey data is collected through a combination of methods. Namely, household data is collected in face-to-face interviews, whereas individual data is collected using paper questionnaires. The Welsh Health Survey also include the four ONS questions as measures of wellbeing and has a slight larger sample size than the National Survey for Wales.

Table 5: Overview of topic areas covered by the Welsh Health Survey, split by adult/children's surveys'

Adult Survey Topic Areas:	Children & Young People's Survey Topic Areas:
Demographic data (age, gender, ethnicity, employment status, highest academic qualification)	Demographic data (age, gender, ethnicity)
General health and wellbeing	Health status
Health service use	Health service use
Medicines and illnesses	Accidents
Untreated problems or symptoms	Illnesses and other health problems
Alcohol and smoking	Eating habits
Fruit and vegetable consumption	Physical activity
Exercise	Strengths and difficulties
Carers	
Height and weight	
Infant feeding	

Consent to link the WHS to other datasets has only been obtained from April 2013 onwards (plus a small pilot study during 2011), and was only asked in the adult questionnaires. The total number of cases available for linkage from 2013 is 4,362 cases, 29 percent of the 2013 WHS sample. However as consent was only asked part way through the year in 2013, scaling down the total WHS sample to reflect the shorter data collection period, the percentage of WHS cases with consent increases to roughly 39 percent. In 2014 the percentage of WHS cases in SAIL with consent to link was roughly 52 percent.

Active Adult Survey

The Active Adult Survey is implemented once every four years by Sport Wales (Sport Wales, 2014). The most recent survey conducted in 2014 on adults (aged 15+ years), is in the form of a biennial household survey, which measures levels of sports participation, club membership and volunteering, in addition to lifestyle, health and other sport related behaviours. Sport Wales's data allows analysis

at a local authority level for 5 key indicators. In total, 8,156 adults in Wales were interviewed during the most recent survey. For questions on physical activity within this survey please see Appendix 5.

National Community Child Health Database

The child health system in Wales includes the registration of births and the monitoring of child health examinations and immunisations. The NCCHD brings together data from local Child Health System databases held by NHS Health Boards which are used to administer child immunisation and health surveillance programmes. There are approximately 35,000 births per year and some 500,000 vaccinations each year in Wales. The dataset contains individual level data on all children born, resident or treated in Wales and is available from 1987 to the present. It contains information on where and when babies were born, their birth weight and whether they were pre-term. It also includes information about their mothers such as their age and whether they breastfed the baby.

The National Pupil Database (Wales)

The NPDW combines information on pupil and school characteristics data from the PLASC dataset with information on pupil attainment, as well as incorporating reference data on schools and Local Education Authorities (LEAs). It is generally accepted that the quality of the NPD data in Wales improved from 2004/5 onwards (for all cohorts) and therefore data prior to this period is not generally made available for research use. A unique pupil reference number allows information held on the same pupils to be linked longitudinally. At the individual level, the NPD provides information related to three broad areas; demographic information, absenteeism and attainment.

4. The feasibility of developing a regional understanding of wellbeing

This section investigates the feasibility of developing a regional understanding of wellbeing through identifying opportunities for data acquisition and raising the limitations and gaps of current and potential data sources. The outcomes of the feasibility are modelled in the matrix below.

Opportunities: further datasets to consider

The **Life Long Learning Wales (LLWR)** contains individualised data for learners enrolled at Further Education Institutions (FEIs), Work-Based Learning (WBL) and Community Learning (CL) providers in Wales from 2003/04 onwards. Data collected under the LLWR system forms part of the Welsh Government's procedures for funding, planning, performance monitoring and strategic development within the post-compulsory education sector. The LLWR is also used by Welsh Government to produce official statistics on post-compulsory (non-higher education) learners in Wales.

The **HAPPEN** (Health and Attainment of Pupils in a Primary Education Network) project collects data on children physical activity, health and wellbeing in a number of schools in Swansea for children from year 5 and 6. The section on wellbeing focuses on children's degree of happiness with their health, their fitness, their school, their family and their friends. All of these are well known markers that influence children's wellbeing.

The **Health Behaviour in School Aged Children (HBSC) survey** is a school based questionnaire run every four years since 1980. It includes a life satisfaction scale (0-10), questions on bullying at school,

how easy it is for them to talk to their parents about things that bother them and other proxy measures including self-reported health, physical activity, nutrition, alcohol and smoking.

The **Millennium Cohort** study follows 1,980 children in Wales starting at the age of 9 months with assessments at ages 3, 5, 7, 11, and 14 with further interviews at age 17. This study asked parents to complete a number of questionnaires as the child grew up, and one of these questionnaires was the Strengths and Difficulties Questionnaire (SDQ). The SDQ estimates emotional and behavioural difficulties and identifies children with conduct disorder, hyperactivity and emotional and peer relationship problems.

Growing up in Wales is a study following mothers through pregnancy and looking at outcomes for the infant. The study collects data on birth (delivery, gestation, and feeding methods), diet diary for the infant, routine growth measures and health assessments, sleep and activity, injuries, feeding.

The **School Sport Survey** conducted by Sport Wales (Sport Wales, 2015), has the greatest reach of all surveys completed in Wales. In the 2015 survey, 115,039 Year 3-11 pupils in 1,000 schools took part in the survey, and 1,094 teachers completed a School Sport Survey provision questionnaire. The survey monitors and tracks trends in sports participation – covering both community and school participation and tracks the provision of PE and school sport, as well as teachers' and pupils' attitudes to PE and sport. For questions on physical activity within this survey please see Appendix 5.

The **Further Education Survey** is also conducted by Sport Wales (Sport Wales, 2015). This survey was the first survey of students in further education colleges in Wales. In 2015, 4,568 students (aged 16 to 20+ years) completed the online questionnaire, obtaining data on core measures of well-being and frequency of sport participation. This survey is like the School Sport Survey, collecting data on participation in sport and physical activity, volunteering, and attitudes to sport. This allows the School Sport Survey and Further Education Survey to be combined and data to cover children and young people from 7 through to 20+ years. For questions on physical activity within this survey please see Appendix 5.

Welsh Outdoor Recreation Survey (2014) (Natural Resource Wales, 2014), was commissioned by Natural Resources Wales. A total of 5,995 telephone interviews were conducted between January 2014 and January 2015 with adults aged 16+ living in Wales, with the results weighted to be representative of the adult population in Wales. The survey focuses on public engagement with the natural environment, including participation in outdoor recreation, health and economic benefits, attitudes to biodiversity and pro-environmental behaviours. For questions on physical activity within this survey please see Appendix 5.

Current limitations

There is a range of data available in Wales to measure wellbeing below for more details however in order to accurately capture the level of wellbeing in the population of the ARCH region and to evaluate the impact of service reconfigurations and targeted or population wide initiatives, further data need to be captured. The sample size of some of the current datasets would not provide enough data to draw out significant conclusions. Furthermore, specifically with the national datasets, the consent to linkage further reduce the sample size. Further work is required to determine the proportion of the ARCH population included in the consented sample in the most up to date national surveys.

Although the SAIL Databank contains key datasets that should be used to measure the wellbeing of the population, there are still missing information that could bring crucial insights. Employment and

living standards are key constructs of wellbeing. The Department of Work and Pensions collect a range of data at national level that could bring further strengths to measuring wellbeing. Work is going to determine the requirements of housing such data but there are currently no data extracts available for this project. The acquisition of this data must be considered as one of the key activities of the future project.

In order to capture detailed and accurate information on the wellbeing of the ARCH population, further mechanisms need to be implemented. Designing a range of ARCH surveys should be considered to fill in the gaps of the currently available datasets. These surveys could help undertaking the evaluation of the ARCH interventions and could also be used to undertake longitudinal studies of the impact of the project. In measuring wellbeing, it is key to capture subjective and self-reported measures which can be successfully achieved through surveys. Evidence from previous projects show the strength of survey data to get further insights into the health and wellbeing of the Welsh Population (see section on the HAPPEN project).

The accompanying data analysis report also demonstrates the utility of novel indicators derived from routine datasets within the SAIL databank. We recommend that further consideration is given to the development of indicators from this source.

Table 6. Wellbeing Feasibility Matrix

Theme	Indicator	SAIL Dataset (Y/N)	Source(s)	Frequency	Sample size	Level of disaggregation	Collected (Wales, UK, International)	Captured within the baseline (Y/N)	Limitations
Subjective wellbeing	ONS 4	Y	NSW (2015)	Annual	14,285 (consented for linkage 9,289)	National LA LSOA Indiv	Wales	Y	Questionnaire change Self-reported Small sample
	Warwick-Edinburgh Mental Wellbeing Scale	N	NSW (2016)	Annual	12,000	National LA LSOA Indiv	Wales	N	Questionnaire change Self-reported Small sample
Children and young people wellbeing	Early years	Y	Primary Care GP dataset	Monthly and Annual	83% of Welsh population	National Health Board LA GP cluster LSOA Indiv	Wales	N	Data quality issues and inconsistencies
		Y	National Community Child Health Database	Annual	All children born in Wales	National Health Board LSOA Indiv	Wales	N	Limited information captured on early years
	Health	Y	Primary Care GP dataset	Monthly and Annual	83% of Welsh population	National Health Board LA GP cluster LSOA Indiv	Wales	N	Data quality issues and inconsistencies
	Physical activity and leisure	Y	WHS (2015)	Annual	2,608 children	National LA LSOA Indiv	Wales	Y	Small cohort for linkage Prone to respondent error

		N	School Sport Survey(2015)	Every two years	115,039 children	National LA LSOA Indiv	Wales	N	Require consent for linkage
		N	Further education Sport Survey	2015	4,568 students	National LSOA Indiv	Wales	N	Require consent for linkage
		N	Welsh Outdoor Recreation Survey	Every three years	6,000 people	National LA LSOA Indiv	Wales	N	Only includes adults and potentially a small cohort for the ARCH region
	Subjective wellbeing	Y	HAPPEN	Project specific	1,020 pupils	LA School Indiv	Swansea	N	No consent for linkage
			Millennium Cohort	Every year from age 3 to 14	2,000 children	National LA LSOA Indiv	Wales	N	Small cohort
			Health Behaviour in School Aged Children Survey	Every three years	9,000 secondary school children	National Health Board Indiv	Wales	N	Small cohort and doesn't include primary school children
	Education	Y	National Pupil Database Wales	Annual	435,000 pupils	National LA LSOA Indiv	Wales	N	No clear picture of post compulsory education
Health	Disease prevalence	Y	Primary Care GP dataset	Annual	83% of Welsh population	National Health Board LA GP cluster LSOA Indiv	Wales	Y	Data quality issues and inconsistencies
	Access to services	Y	NSW	Annual	14,285 (consented for linkage 9,289)	National LA LSOA	Wales	N	Questionnaire change Self-reported Small sample

						Indiv			
	Service usage	Y	PEDW EDDS Outpatient	Annual	Full coverage	National Health Board LA LSOA Indiv	Wales	Y	Data quality issues and inconsistencies
	Lifestyle behaviours	Y	WHS	Annual	13,656 adults	National LA LSOA Indiv	Wales	Y	Small cohort Prone to respondent error
			NSW	Annual	14,285	National LA LSOA Indiv	Wales	Y	Small cohort Prone to respondent error
			Primary Care GP dataset	Annual	83% of Welsh population	National Health Board LA GP cluster LSOA Indiv	Wales	N	Data quality issues and inconsistencies
		N	Welsh Outdoor Recreation Survey	Every three years	6,000 people	National LA LSOA Indiv	Wales	N	Only includes adults and potentially a small cohort for the ARCH region
		Y	Active Adults Survey	Every four years	8,156 adults	National LA LSOA Indiv	Wales	N	Potentially a small cohort for the ARCH region
Learning and education	Attainment & absenteeism	Y	National Pupil Database Wales	Annual	Full coverage	National LA LSOA Indiv	Wales	N	Doesn't include data post GCSE level.
	Further education	N	Life Long Learning Wales	Annual	Full coverage	National LA	Wales	N	Current limited use for research

Environment	Housing	Y	NSW (2015)	Annual	14,285 (consented for linkage9,289)	National LA LSOA Indiv	Wales	N	Questionnaire change Self-reported Small sample
	Safety & Community	Y	NSW (2016)	Annual	12,000 people	National LA LSOA Indiv	Wales	N	Questionnaire change Self-reported Small sample
	Active Travel	Y	NSW (2015)	Annual	14,285 (consented for linkage9,289)	National LA LSOA Indiv	Wales	N	Questionnaire change Small cohort Prone to respondent error
			WHS	Annual	13,656 adults	National LA LSOA Indiv	Wales	N	Small cohort Prone to respondent error
			Active Adults Survey	Every four years	8,156 adults	National LA LSOA Indiv	Wales	N	Potentially a small cohort for the ARCH region
	Car usage and emissions	Y	NSW (2015)	Annual	14,285 (consented for linkage9,289)	National LA LSOA Indiv	Wales	N	No information on emissions Prone to respondent error
	Cycling and Walking facilities	N	Welsh Outdoor Recreation Survey	Every three years	6,000 people	National LA LSOA Indiv	Wales	N	Only includes adults and potentially a small cohort for the ARCH region
	Access to transport	N	NSW (2015)	Annual	14,285 (consented for linkage9,289)	National LA LSOA Indiv	Wales	N	Small cohort for linkage Prone to respondent error Only limited information
	Outdoor space	N	Welsh Outdoor Recreation Survey	Every three years	6,000 people	National LA LSOA	Wales	N	Only includes adults and potentially a small

						Indiv			cohort for the ARCH region
	Pollution	N	Welsh Air Quality Data and Statistics Database	Annual	N/A	National LA LSOA	Wales	N	No individual level data and only aggregated variables available
Social inclusion and relationships	Community cohesion	N	NSW (2016)	Annual	12,000 people	National LA LSOA Indiv	Wales	N	Questionnaire change Self-reported Small sample
Poverty	Living standards	N	Department of Work and Pensions	Annual	National	National LA LSOA Indiv	Wales and UK	N	Not recorded for research purposes
	Income	N	Department of Work and Pensions	Annual	National	National LA LSOA Indiv	Wales and UK	N	Not recorded for research purposes
	Fuel poverty	N	Department of Work and Pensions	Annual	National	National LA LSOA Indiv	Wales and UK	N	Not recorded for research purposes
Employment	Unemployment	N	NSW (2016)	Annual	12,000 people	National LA LSOA Indiv	Wales	N	Questionnaire change Self-reported Small sample
	Sickness and Absenteeism	N	Department of Work and Pensions	Annual	National	National LA LSOA Indiv	Wales and UK	N	Not recorded for research purposes

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Appendix 1 – National Indicators for Wales

- Percentage of live single births with a birth weight of under 2,500g.
- Healthy life expectancy at birth including the gap between the least and most deprived.
- Percentage of adults who have fewer than two healthy lifestyle behaviours (not smoking, healthy weight, eat five fruit or vegetables a day, not drinking above guidelines and meet the physical activity guidelines).
- Levels of nitrogen dioxide (NO₂) pollution in the air.
- Percentage of children who have fewer than two healthy lifestyle behaviours (not smoking, eat fruit/vegetables daily, never/rarely drink and meet the physical activity guidelines).
- Measurement of development of young children.
- Percentage of pupils who have achieved the “Level 2 threshold” including English or Welsh first language and Mathematics, including the gap between those who are eligible or are not eligible for free school meals. (To be replaced from 2017 by the average capped points score of pupils).
- Percentage of adults with qualifications at the different levels of the National Qualifications Framework.
- Gross Value Added (GVA) per hour worked (relative to UK average).
- Gross Disposable Household Income per head.
- Percentage of businesses which are innovation-active.
- Capacity (in MW) of renewable energy equipment installed.
- Concentration of carbon and organic matter in soil.
- The Ecological Footprint of Wales.
- Amount of waste generated that is not recycled, per person.
- Percentage of people in employment, who are on permanent contracts (or on temporary contracts, and not seeking permanent employment) and who earn more than 2/3 of the UK median wage.
- Gender pay difference.
- Percentage of people living in households in income poverty relative to the UK median: measured for children, working age and those of pension age.
- Percentage of people living in households in material deprivation.
- Percentage of people moderately or very satisfied with their jobs.
- Percentage of people in employment.
- Percentage of people in education, employment or training, measured for different age groups.
- Percentage who feel able to influence decisions affecting their local area.
- Percentage of people satisfied with their ability to get to/ access the facilities and services they need.
- Percentage of people feeling safe at home, walking in the local area, and when travelling.
- Percentage of people satisfied with local area as a place to live.
- Percentage of people agreeing that they belong to the area; that people from different backgrounds get on well together; and that people treat each other with respect.
- Percentage of people who volunteer.
- Mean mental well-being score for people.
- Percentage of people who are lonely.
- Percentage of dwellings which are free from hazards.
- Number of properties (homes and businesses) at medium or high risk of flooding from rivers and the sea.
- Percentage of dwellings with adequate energy performance.

- Number of households successfully prevented from becoming homeless per 10,000 households.
- Percentage of people attending or participating in arts, culture or heritage activities at least three times a year.
- Percentage of people who speak Welsh daily and can speak more than just a few words of Welsh.
- Percentage of people who can speak Welsh.
- Percentage of people participating in sporting activities three or more times a week.
- Percentage of museums and archives holding archival/heritage collections meeting UK accreditation standards.
- Percentage of designated historic environment assets that are in stable or improved conditions.
- Emissions of greenhouse gases within Wales.
- Emissions of greenhouse gases attributed to the consumption of global goods and services in Wales.
- Areas of healthy ecosystems in Wales.
- Status of Biological diversity in Wales.
- Percentage of surface water bodies, and groundwater bodies, achieving good or high overall status.
- The social return on investment of Welsh partnerships within Wales and outside of the UK that are working towards the United Nations Sustainable Development Goals.

Appendix 2 – Wellbeing outcomes for the Public Health Outcomes Framework

Outcome		Indicator
Overarching outcomes		
Years of life and years of health	1	Life expectancy at birth
	2	Healthy life expectancy at birth
Mental well-being	3a	<i>Mental well-being among children and young people (NI)</i>
	3b	<i>Mental well-being among adults (NI)</i>
A fair chance for health	4	The gap in life expectancy at birth between the most and least deprived
	5	<i>The gap in healthy life expectancy at birth between the most and least deprived (NI)</i>
	6a	The gap in mental well-being between the most and least deprived among children and young people
	6b	The gap in mental well-being between the most and least deprived among adults
A. Living conditions that support and contribute to health now and for the future		
Children have the best opportunity for a healthy start	7	<i>Children living in poverty (NI)</i>
	8	<i>Young children developing the right skills (NI)</i>
Families and individuals have the resources to live fulfilled, healthy lives	9	<i>School leavers with skills and qualifications (level 2) (NI)</i>
	10	School leavers with essential literacy and numeracy skills
	11	<i>People able to afford everyday goods and activities (NI)</i>
	12	<i>People not in education, employment or training (NI)</i>
Resilient, empowered communities	13	Gap in employment rate for those with a long term health condition
	14	<i>A sense of community (NI)</i>
	15	<i>People who volunteer (NI)</i>
	16	<i>People feeling lonely (NI)</i>
Natural and built environment that supports health and well-being	17	<i>Quality of housing (NI)</i>
	18	Quality of the air we breathe
B. Ways of living that improve health		
Healthy actions	19	Physical activity in adolescents
	20	Adolescents who smoke
	21	Adolescents using alcohol
	22	Adolescents drinking sugary drinks once a day or more
	23	Adults eating five fruit or vegetables portions a day
	24	Adults meeting physical activity guidelines
	25	Adults who smoke
	26	Adults drinking above guidelines
Healthy starts	27	Teenage pregnancies
	28	Smoking in pregnancy
	29	Breastfeeding at 10 days
	30	Vaccination rates at age 4
C. Health throughout the life-course		
Health in the early years and childhood	31	<i>Low birth weight (NI)</i>
	32	Children age 5 of a healthy weight
	33	Adolescents of healthy weight
	34	Tooth decay among 5 year olds
Good health in working age	35a	Working age adults in good health
	36a	Working age adults free from limiting long term illness
	37a	Life satisfaction among working age adults
Healthy ageing	38a	Working age adults of healthy weight
	35b	Older people in good health
	36b	Older people free from limiting long term illness
	37b	Life satisfaction among older people
	38b	Older people of healthy weight
Minimising avoidable ill health	39	Hip fractures among older people
	40	Premature deaths from key non communicable diseases
	41	Deaths from injuries
	42	Deaths from road traffic injuries
	43	Suicides

Appendix 3 – ONS National Wellbeing Indicators

Domain	Measure	Source
Personal well-being	Very high rating of satisfaction with their lives overall	Annual Population Survey, ONS
	Very high rating of how worthwhile the things they do are	Annual Population Survey, ONS
	Rated their happiness yesterday as very high	Annual Population Survey, ONS
	Rated their anxiety yesterday as very low	Annual Population Survey, ONS
	Population mental well-being	Understanding Society: UK Household Longitudinal Study
Our relationships	Percentage of those in fairly or extremely unhappy relationships	Understanding Society: UK Household Longitudinal Study
	Feelings of loneliness often/always	Community Life Survey, Cabinet Office
	Has a spouse or partner, family member or friend to rely on if they have a serious problem	Understanding Society: UK Household Longitudinal Study
Health	Healthy life expectancy at birth (male/female)	Health analysis and reporting, ONS
	Percentage who reported a disability	Labour Force Survey, ONS
	Mostly or completely satisfied with their health	Understanding Society: UK Household Longitudinal Study
	Some evidence indicating depression or anxiety	Understanding Society: UK Household Longitudinal Study
What we do	Unemployment rate	Labour Force Survey, ONS
	Mostly or completely satisfied with their job	Understanding Society: UK Household Longitudinal Study
	Mostly or completely satisfied with their amount of leisure time	Understanding Society: UK Household Longitudinal Study
	Volunteered more than once in the last 12 months	Understanding Society: UK Household Longitudinal Study
	Engaged with/participated in arts or cultural activity at least 3 times in last year	Department for Culture, Media and Sport

	Adult participation in 30 mins of moderate intensity sport, once per week.	Sport England
Where we live		
	Crimes against the person (per 1,000 adults)	Crime Survey for England and Wales, ONS
	Felt fairly/very safe walking alone after dark (men/women)	Crime Survey for England and Wales, ONS
	Accessed natural environment at least once a week in the last 12 months	Natural England
	Agreed/agreed strongly they felt they belonged to their neighbourhood	Understanding Society: UK Household Longitudinal Study
	Average minimum travel time to reach the nearest key services	Department for Transport
	Fairly/very satisfied with their accommodation	Department for Communities and Local Government
Personal finance		
	Individuals in households with less than 60% of median income before housing costs	Family Resources Survey, Department for Work and Pensions
	Median wealth per household, including pension wealth	Wealth and Assets Survey, ONS
	Real median household income	National Accounts, ONS
	Mostly or completely satisfied with the income of their household	Understanding Society: UK Household Longitudinal Study
	Report finding it quite or very difficult to get by financially	Understanding Society: UK Household Longitudinal Study
The economy		
	Real net national disposable income per head	National Accounts, ONS
	UK public sector net debt as a percentage of Gross Domestic Product	National Accounts, ONS
	Inflation rate (as measured by the Consumer Prices Index)	Consumer Prices, ONS
Education and skills		
	Human capital - the value of individuals' skills, knowledge and competences in labour market	Human Capital estimates, ONS
	Those Not in Education, Employment or Training (NEET)	Labour Market, ONS
	UK residents aged 16 to 64 with no qualifications	Labour Force Survey, ONS

Governance

Voter turnout in UK General Elections	Electoral Commission
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Those who have trust in national Government	Eurobarometer
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The natural environment

Total green house gas emissions (millions of tonnes)	Department for Business, Energy and Industrial Strategy (BEIS)
Protected areas in the UK (Millions hectares)	Department for Environment, Food and Rural Affairs
Energy consumed within the UK from renewable sources	Department for Business, Energy and Industrial Strategy (BEIS)
Waste from households that is recycled	Department for Environment, Food and Rural Affairs

Appendix 4 – National Physical Activity Indicators

- 1. The proportion of the population in Wales meeting the Chief Medical Officer recommended levels of physical activity.**
 - 1.1. An indicator of the degree of variation in activity levels within the population –gender, ethnicity, disability and WIMD.
- 2. The proportion of children in the Early Years (under 5) reported as being active for 3 or more hours per day**
 - 2.1. A measure of the access and availability of Play (play sufficiency)
- 3. The proportion of children and young people aged 5 to 18 reported as being active for 60 minutes every day in the past week**
 - 3.1. Active Healthy Kids report card gradings
 - 3.2. Multicomponent Physical literacy measure
 - 3.3. Physical activity in adolescents: The percentage of children aged 11/12 to 15/16 who were physically active every day (for at least 60 minutes each day) in the past week.
- 4. The age-standardised percentage of persons aged 16+ who met physical activity guidelines in the previous week (at least 150 minutes of moderate/vigorous physical activity).**
 - 4.1. The proportion of adults (ages?) who report being active for less than 30 minutes per week (inactive)
 - 4.2. Measure of % of older adults aged 65 and over meeting the strength and balance components of CMO guidance
- 5. The proportion of the population regularly being active through sport and recreation**
 - 5.1. The proportion of Children ‘Hooked on sport’ - taking part three or more times per week in organised extracurricular or community-based activity
 - 5.2. The proportion of Adults ‘Hooked on sport’ – taking part three or more times per week on average
 - 5.3. A measure of the accessibility and proximity of sports facilities/spaces
 - 5.4. The proportion of adults engaged in active outdoor recreation
 - 5.5. The extent / proximity of green space and Public Rights of Way
 - 5.6. The proportion of the population engaged in active volunteering (in sport/recreation?) –link to PHOF15 ‘People who volunteer’
- 6. The proportion of the population regularly using active travel for purposeful journeys**
 - 6.1. The proportion of children actively travelling (define active travel –walking, cycling, scooting or skating?) to school
 - 6.2. The proportion of working adults walking / cycling to work
 - 6.3. A measure of the extent, proximity and quality of walking and cycling networks –designated ‘Active Travel’ routes

- 7. The proportion of the population accumulating daily incidental [in the workplace or household] physical activity**
 - 7.1. Measure of proportion of working adults in 'active' occupations (active could be defined as 'being in an occupation in which a person accumulates the CMO recommended amounts of MVPA and Strength activity during their average working week')
 - 7.2. The average time (minutes per week) adults spend being physically active undertaking household (home-based – to include gardening?) tasks
- 8. The proportion of the population accumulating harmful amounts of sedentary time**
 - 8.1. A measure of the amount of screen time (outside of school hours?) for children and young people

Appendix 5 – Physical activity survey questions

The Active Adults Survey – Sport Wales 2014

1. Past 4 weeks
What outdoor activities have you taken part in over the last 4 weeks? – How many times over last 4 weeks?
What indoor activities have you taken part in over the last 4 weeks? – How many times over last 4 weeks?
What outdoor pursuits have you taken part in over the last 4 weeks? – How many times over last 4 weeks?
If walked over 2 miles, how many times for reasons other than active transport? What are the reasons for walking? (walking dog, transport, health etc.).
If cycled, how many times for reasons other than active transport?
2. Reasons for taking part in sport/physical activity
What is the main reason for taking part in sport? (Health, competition, fitness, wellbeing, stress)
What are the other reasons for taking part in sport? (Same as above, friends, skills)
What reason describes best why you do not take part in sports or physical activity? (age, ability, etc.)
3. Past 12 months
What outdoor activities have you taken part in over the last 12 months?
What indoor activities have you taken part in over the last 12 months?
What outdoor pursuits have you taken part in over the last 12 months?
Over the last 12 months, have you taken part in any organised competition for sports or recreational activities? If so, which sports/activities?
4. Past 12 months – Coaching and Instruction
Have you received sports coaching/instruction in any of these in the past 12 months? If yes, which ones? Would you like to receive more instruction/coaching?
If have not, would you like to receive any instruction/coaching?
5. Sport club/organisation membership (including leisure centres)
Are you a member of a sports club? How many clubs do you belong to? Which sports does your club cover? Do you personally participate in a sport or sports with your club?
Which sports do you participate in?
Is your club membership a family or personal one?
Coaching/instruction over past 12 months in sports club/organisation?
How frequently have you received instruction in [your club] over past 12 months?
Did you receive any coaching/instruction in Welsh?
How did you get involved in the club?
6. Pure sports club membership
Are you a member? Have you ever been a member? How many years (previous or current)
If not a current member – how many years since you were a member?
Why did you leave?
How many clubs/organisations do you belong to that are NOT related to sport/physical activity?

7. Activities to try
 - What new activities would you like to try?
 - What activities would you like to do more of?
 - What would encourage you to do more of these activities?
 - Did/do you enjoy PE at school?
 - To what extent do you agree/disagree - 'While at secondary school, I regularly took/take part in organised sport outside of school lessons'.

8. Voluntary service/time
 - Which groups have you given your time to?
 - Over past 12 months, have you given time for sporting activities?
 - Which activities did you help with? (admin, coaching etc.)
 - What age group did you volunteer with?
 - How often during the last year have you helped groups, club etc. with sport? How many hours?
 - How many hours during past 4 weeks?
 - How many years have you been helping clubs etc. with sport?
 - Have you coached other people/groups over the past 12 months?
 - What is your highest coaching qualification?
 - How often do you coach in the Welsh language?

9. Leisure & Culture
 - Which activities have you taken part in over the last 4 weeks?

10. Importance and perceived sporting ability
 - How true are following statements?
 - It's important to me to take part in sport or exercise regularly
 - I encourage my friends to take part in sport or exercise
 - I encourage my family to take part in sport or exercise
 - My family believe it is important to take part in sport or exercise regularly
 - My family expect me to take part in sport or exercise
 - My friends believe it is important to take part in sport or exercise regularly
 - My friends expect me to take part in sport or exercise
 - I get restless if I don't take part in sport or exercise regularly
 - I feel good about myself when I take part in sport or exercise
 - Rank your ability considering others of your age and gender –
 - General sporting ability and skills
 - Mobility and flexibility
 - Strength
 - Stamina
 - Running speed
 - Agility and balance
 - Hand-eye co-ordination

11. Health
 - Do your health problems/disabilities stop you partaking in sport or physical activities?

12. Children
 - Does the eldest child in your household take part in sport at any of the following, at least once a week?
 - School sports club (not including PE)
 - Swimming lessons outside of school time

Sports club outside of school time
 Other organised sport sessions
 Informally, with friends
 Informally, with parent(s)/carer(s)
 Do you pay for any of the activities/sports?

13. Travel

How do you travel to work?

The Welsh Health Survey 2015

One question asks how health condition(s) affects individual carrying out functional physical activities and ADL

1. Walking (over past 7 days)
 Across how many days did you walk for 10 mins at a time?
 How much time did you spend walking on one of these days?
 Describe walking pace?
 Was the effort used for 10 minutes walking enough to make you sweat, increase HR etc.?
2. Moderate physical activity (over past 7 days)
 How many days last week did you engage in moderate physical activity lasting at least 10 mins?
 How much time on average did you spend doing moderate activity on one of those days?
3. Vigorous physical activity (over past 7 days)
 How many days last week did you engage in vigorous physical activity lasting at least 10 mins?
 How much time on average did you spend doing vigorous physical activity on one of those days?
4. Sitting time (over past 7 days)
 How much time over the last 7 days did you spend sitting on an average week day?
 How much time over the last 7 days did you spend sitting on an average weekend day?

National Survey of Wales 2014 – 2015

1. Active travel (children) – how do they get to primary/secondary school, how long is the journey?
2. Active travel – only focuses on walking or cycling to and from work, shops or to visit friends

Natural Resources Wales - Wales Outdoor Recreation Survey 2014

1. Which of the following activities have you taken part in at least once in last 12 months?
2. Which of the following activities have you done in the last 4 weeks?

Which activity did you do outdoors?

What was the main activity that you did?

How long did you spend in the outdoors? (Hrs/mins)

Was the effort you put in enough to-

Raise breathing rate?

Make you out of breath or sweat?

What best describes the type of place you visited when you were doing this activity?
 (woodland, beach, park etc.)

What was the main mode of transport? (active transport)

3. What activities would you like to do more of when visiting the outdoors?

Health Behaviour in School-aged Children in Wales 2013-2014

1. Over the past 7 days, on how many of the days were you physically active for 60 minutes or more?
2. What is the main transport mode to and from school? (active transport).
3. Out of school, how many hours do you spend doing physical activity that makes you out of breath or sweat?

Appendix 6 – Child wellbeing: Evidence from ongoing studies

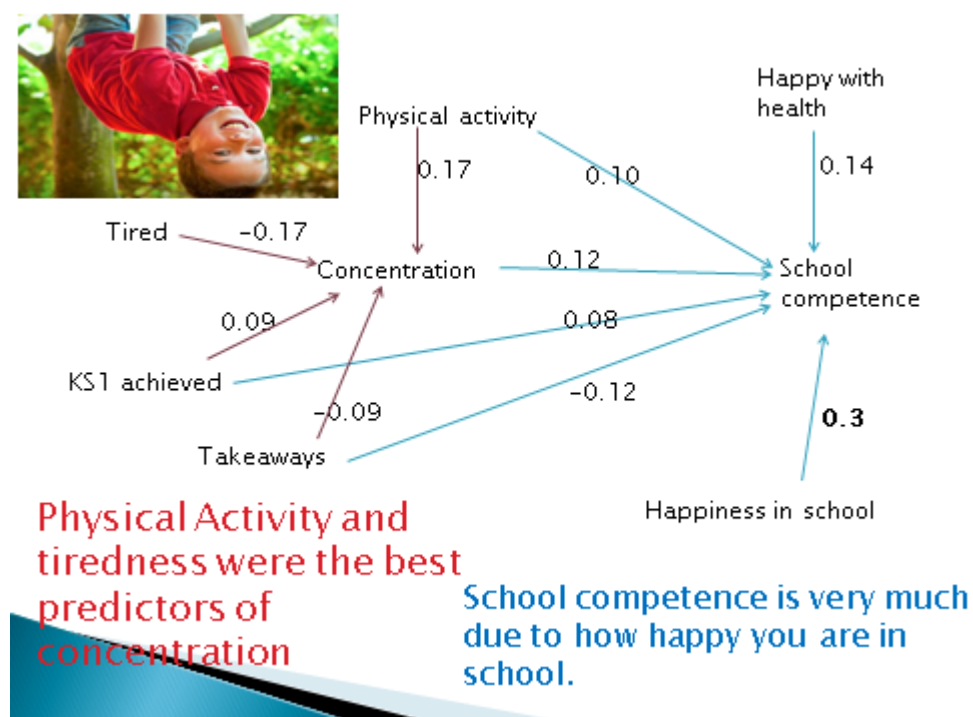
Evidence from HAPPEN

HAPPEN (Health and Attainment of Pupils Primary Education Network) <http://www.happenswansea.co.uk/>,) in collaboration with the Swan-linx project, collects health and wellbeing information from 9-11 year old children in primary schools. The wellbeing questions asked are adapted from the Good Childhood Index developed by the Children's society. The responses from 1916 children aged 9-11 in Swansea show; children are happiest with their family and friends and are less likely to be happy with their fitness and with school (see Table 1 below). Approximately 20% of children do not have the recommended amount of sleep and 60% felt they could not concentrate every day in class. Linkage of the questionnaire with education data showed that children who achieved their key stage 2 were those who reported to feel competent in school. The best predictor of those who report they were competent in school were those who were happy in school (see figure 1). Thus, happiness in school affects educational attainment and how competent a child feels. The children who were happy in school were more likely to be younger, girls and those that felt they had autonomy. Feeling competent in school was also associated with not feeling tired, feeling able to concentrate, doing physical activity and not eating takeaways (see figure 1).

Table 1: Childhood Index in Children in primary school in Swansea over 2 years.

Percentage of children who reported:	2015 (n=833)	2016 (n=1083)
They were happy or very happy with their health	85.5%	84.7 %
They were happy or very happy with their fitness	83.3%	80.3 %
They were happy or very happy with their school	81.6%	81.8 %
They were happy or very happy with their family	93.8%	93.9 %
They were happy or very happy with their friends	93.4%	92.6 %
Percentage of children who reported:	2015 (n=833)	2016 (n=1083)
They had at least 9 hours of sleep	83.0%	78.8 %
That they felt tired every day of the week	10.8%	12.9 %
That they felt like they could concentrate/focus well in class every day of the week	43.5%	41 %

Figure 1: Factors predicting School Competence



Evidence from Growing Up in Wales, Environments for Healthy living (EHL)

The EHL study includes a birth cohort study which recruited women in pregnancy and assessed them in pregnancy and when the infant was 12 months. It then follows-up the children using linkage to routine data (education and health records).

A recent study, as part of EHL, involved 148 children wearing an accelerometer on their ankle when they were 12 months old, to assess physical activity during the day and at night. The factors associated with a physically active infant were; boys were more active than girls (60% of the active group were boys and 70% of the low active group were girls), full term infants were more active than babies born earlier (9.7 days difference in gestational age between active and low active infants), active children had more milk per week and low active children had more juice per week, active children during the day had fewer night wakes, and active children were breast fed for longer than the low active babies (on average, 7 weeks longer). Using activity as a proxy for infant wellbeing, measures to improve gestational length, increase breastfeeding duration and reduce juice intake will improve child wellbeing. It is not clear if boys are naturally more active than girls, even at this young age, or if opportunities and types of play are gender stereotyped by parents, with parents playing more active games with boys and more sedentary activities with girls.

Other research through EHL has found that maternal BMI is significantly associated with infant BMI at age 1 (Morgan et al 2015), showing the potential importance that interventions in pregnancy can have on future child wellbeing.

Evidence from routine data

Work linking educational attainment with mental health diagnosis in the teenager years (see Figure 2-5 below) found that depression was the most common mental health condition among the population

examined, with 5% of children diagnosed with depression in their childhood. Our results suggest that in these cases the children were already declining in school, in terms of educational attainment, for a number of years before a diagnosis of depression. Depression before or during an exam was also associated with lower achievement. In addition to these factors, declining in school, female gender, deprivation and conduct disorder were all associated with higher risk of depression in the teenage years.

When exploring results in relation to self-harm, children who go on to self-harm were not declining in primary school; instead something appears to happen in secondary school that causes a decline. This suggests that self-harming is due more to an acute problem occurring in the teenage years, but depression is more a long term chronic problem. However, both are associated with deprivation and are more common in girls.

Conduct disorder in primary school was the main determinant of being prescribed medication such as antipsychotics, antidepressant, hypnotics or stimulants and an important determinant of self-harm and depression in adolescence. In this study, 3.55% of boys were diagnosed with a conduct disorder; 76.5% of these were in primary school. Thus, conduct disorder is an important and common problem in primary school boys which predicts mental health difficulties in adolescent boys. In addition, it is a very strong predictor of poor academic achievement at all stages for the children affected.

The study results suggest that adolescent mental health can often be predicted from the primary school years, with girls who are declining in primary school more likely to develop depression and boys with conduct disorder at very high risk of medication for mental health conditions in adolescence. Identifying those who are declining in academic achievement which is routinely measured in school may be a useful avenue to recognise early at risk children and provide early appropriate intervention which may be more effective than later treatment and may prevent more serious problems from developing. Social and emotional competencies have been found to be more significant determinants of academic attainment than IQ (1) and potentially declining in school may be an indicator that interventions aimed at emotional and social development could improve attainment and reduce development of future mental health problems.

Figure 2: Primary school achievement as a predictor of poor mental health in adolescence.

Background: Educational achievement and mental health are very strongly linked and impact on each other. We examined the association of attainment in primary school education and subsequent mental health in particular on the development of mental health conditions in the teenage years.

Methods: This cohort study took all children in Wales between 1999 and 2014 and used routine data from general practice and hospital data linked with education records held in the Secure Anonymised Information Linkage (SAIL) databank. Cox regression was used, controlling for sex, deprivation, conduct disorder, attention deficit hyperactivity disorder, and learning difficulty.

Findings: Health records of 652,903 children (319,839 boys, 307,584 girls) were linked with educational records: between the ages of 12 and 21 years, 33,498 children (5.1%) developed depression and 15,946 (2.4%) self-harmed. Children who developed depression were more likely to have achieved key stage 1 (age 7 years) milestones (adjusted hazard ratio 1.19, 95% CI 1.08–1.30) but not key stage 2 (age 11) (HR 0.76, 0.69–0.83), indicating that they were declining in primary school education. Conversely those who self-harmed (4736 boys [1.5%], 11 210 girls [3.6%]) were achieving well as those who did not self-harm (HR 1.02, 0.92–1.12) in primary school but had a severe decline in

secondary school (before their diagnosis of self-harm). The children who were prescribed medications in adolescence (antipsychotics, hypnotics) were those with conduct disorder in primary school and were more likely to be male.

Interpretation: Declining achievement in primary school was associated with developing depression in the teenage years. Girls and those from deprived backgrounds were more likely to develop depression. Self-harm was associated with decline in secondary school but not primary school. Boys with conduct disorder in primary school were at higher risk of being prescribed medication such as antipsychotics in adolescence. Thus, interventions in primary school focused on children declining in school could potentially prevent mental health problems in adolescence.

Figure 3: Odds of achieving the key stage in those who go on to develop depression vs those who do not develop depression in the teenage years.

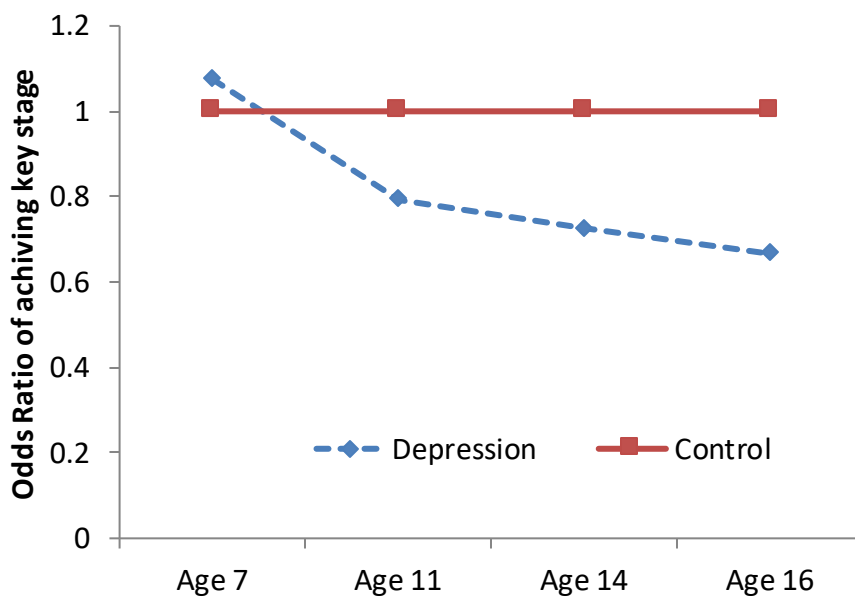


Figure 4: Odds of achieving the key stage in those who go on to self-harm vs those who do not develop self-harm in the teenage years.

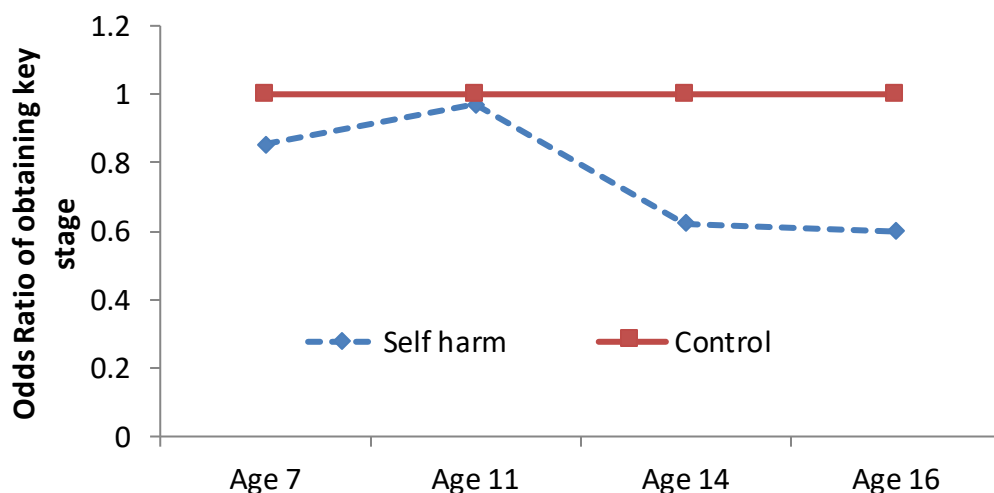
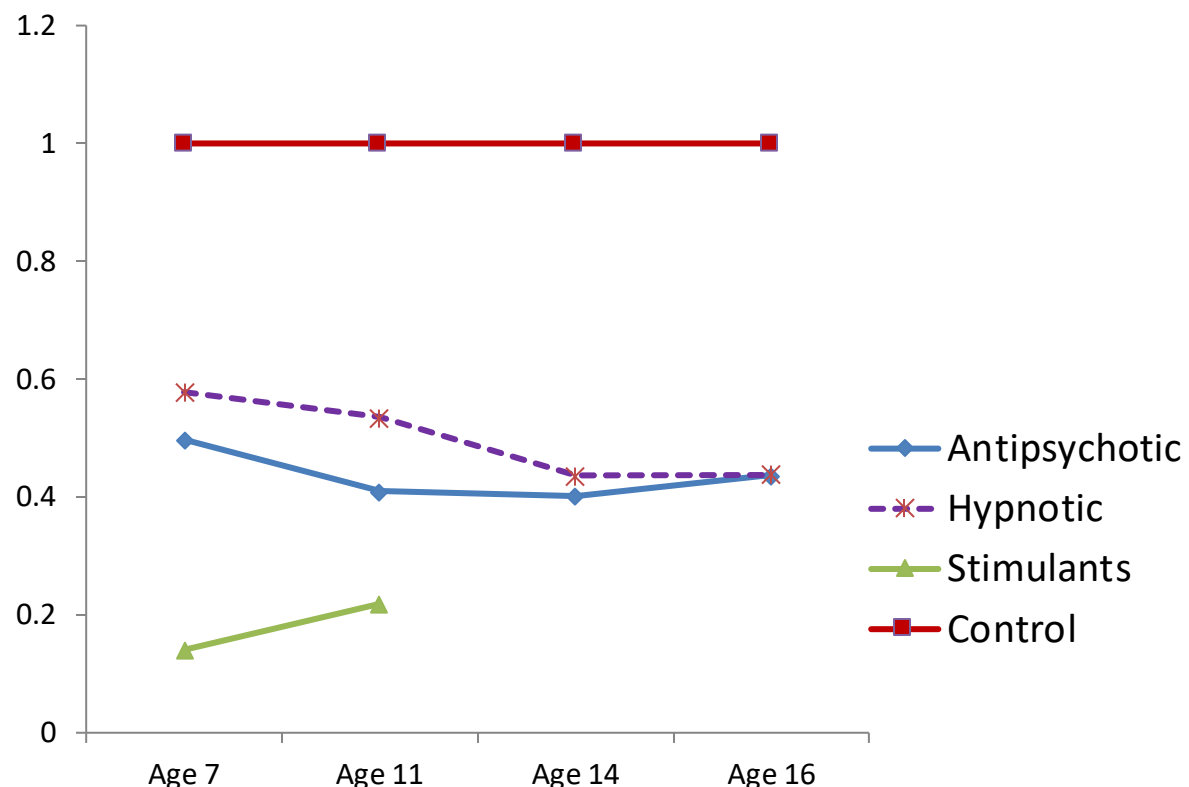


Figure 5: Odds of achieving key stage in those who are prescribed medications after the age of the key stage (e.g. prescribed in the teenage years)



Evidence from The Millennium Cohort study

The Millennium Cohort study recruited 1683 children in Wales. This study asked parents to complete a number of questionnaires as the child grew up, and one of these questionnaires was the Strengths and Difficulties Questionnaire (SDQ). The SDQ estimates emotional and behavioural difficulties and identifies children with conduct disorder, hyperactivity and emotional and peer relationship problems. We examined the parent reported responses to this questionnaire when the child was aged 3 and aged 5 and linked this with hospital admission for the child for injury between the ages of 11-14 years. We found that children who were classed as having hyperactivity or conduct disorder at age 3-5, were more likely to be admitted to hospital with an injury at age 11-14. Adjusting for family factors, socio-economic level and gender, it was found that children with hyperactivity (at age 5) were 1.65 (Confidence interval : 1.12-2.02) times more likely to be admitted for injury as teenagers and children with conduct disorder (at age 5) were 1.47 (Confidence interval: 1.04-2.09) times more likely to be admitted for injury. These findings further support evidence from routine data in the teenage years that interventions that can help children (predominately boys) with hyperactivity or conduct disorder in the primary school years, could have an important effect in improving adolescent health, as injury is the leading cause of death in adolescence.

Appendix 7 – Physical activity, Fitness and Physical Literacy across the Life Course

Physical activity and sport participation in ABMUHB and HDUHB:

The age-standardised combined results of the 2015 Welsh Health Surveys, show that only 28% of adults in the Abertawe Bro Morgannwg University Health Board area, and 34% of adults in the Hywel Dda University Health Board area reported sufficient levels of activity on 5 or more days in the previous week. Further, 38% and 30% of adults in ABMUHB and HBUHB reported no activity in the previous week. Results from the Sport Wales Active Adult Survey (2014), reported that 42.1% and 37.8% of adults in ABMUHB and HDUHB, respectively, took part in “no frequent activity”. Data for those taking part in sport three times per week showed that 39.9% and 42.6% of adults met this criterion in ABMUHB and HDUHB, respectively. In older adults, only 14% of the ABMUHB and 20% of HDUHB population aged 65 and over were sufficiently active. In children and young people, the results of the 2012-15 Welsh Health Survey, show that 32% of children in ABMUHB and 36% of children in HDUHB were active on every day of the week, although boys were more active than girls. Sport Wales’ School Sport Survey (2015), revealed that 49.7% and 47.2% of children take part in sport three times per week in ABMUHB and HDUHB, respectively. In the Swanlinx study (2016) of 1184 9-11 years old children in ABMU, 42% of boys and girls were sufficiently fit to avoid the risk of metabolic ill health. Only 23% were active for 60 minutes every day, 38.6% actively travelled to or from school, 79.7% could swim 25 metres and 30.4% were sedentary during screen watching for >2 hours per day.

Monitoring and Surveillance of Physical activity data:

Physical activity is multi-dimensional, complex behaviour, characterised by its frequency, intensity, and duration. There are different types of activity that contribute to overall physical activity and these occur in a multitude of settings. For example; occupational (e.g. work-related, school-related/PE), household (e.g. domestic cleaning, caregiving, chores), transport (e.g. cycling/walking to school or work), leisure-time activities (e.g. dancing, active play), and organised sport participation. Physical activity (and its alternate sedentary behaviour) is therefore notoriously difficult to assess [24]. Most research has attempted to quantify physical activity, although there is no single method that captures the complete range of physical activity characteristics. Few studies have succeeded in capturing temporal data on both the quantity and quality of physical activity.

The gold standard measures of physical activity are those that acquire objective data. Objective data can be obtained by use of accelerometers, pedometers, heart-rate telemeters, electronic motion sensors (doubly labelled water, actiheart), or by observation (SOFIT, SOPLAY). There are also significant developments in physical activity measurement that aims to link sensor data with telecommunications to better populate public health databases. Although objective measures are the desired measures of physical activity, achieving a population sample with any of these measures can be extremely costly and very time consuming for both participants and staff. Also, most objective measures, e.g. accelerometers, do not distinguish between different domains of physical activity, such as transport-related physical activities, organised sports, household physical activity or occupational physical activity. It is therefore advised that the use of an objective measure (e.g. accelerometers) should be used on a subset of participating children and adults to analyse agreement between the objective measure of physical activity and self-report (subjective) methods.

The 2012 and 2016 *Lancet* series on Physical Activity, suggested that optimal physical activity monitoring and surveillance should focus on physical activity levels and behaviours, their determinants and outcomes, and indicators of proven and promising solutions to address low physical activity in various segments of the population. *Therefore, it is posited that the attention should not be the traditional epidemiological disease-case finding approach to surveillance, but instead the monitoring of trends in people's physical activity behaviour and assessment of progress in changing the underlying determinants that affect physical activity.* Health-related measures should focus on meeting physical activity recommendations and domain-specific measures, e.g. walking and cycling for transportation, occupational physical activity, physical education lessons at school, and participation in physically active sport and recreation. To inform many levels and sectors needed for interventions, covering determinants and correlates at the individual, social, environmental, and societal levels is needed to organise the vast array of factors affecting physical activity. Assessing only overall physical activity is not enough to inform policy and planning. Therefore, physical activity surveillance should provide information for policies and interventions across many sectors (health, recreation, transportation, education, land-use planning).

Tools to Quantify Physical Activity and Sedentary Behaviour :

Most public health surveillance tools have used self-report methods to gather physical activity data in different domains. This is subjective data on physical activity acquired through diaries, logs and recall surveys. It relies on a person recalling or remembering which activities they participated in, and/or recalling their perception of the intensity of the activity. Subjective measures are predominately used for measuring activity levels of large groups and are low cost. Surveillance data for children and adults are collected through many surveys across Wales.

- The annual Welsh Health Survey (most recent 2015), provides information about the health and health-related lifestyles of people living in Wales. It covers a range of health-related topics, including health status, lifestyle and health behaviours (including physical activity), and health service use. The most recent survey (2015) collected data on 13,656 adults and 2,608 children. The survey data is collected through a combination of methods. Namely, household data is collected in face-to-face interviews, whereas individual data is collected using paper questionnaires. Each adult (16+ years) in the household was given a questionnaire to complete. Two questionnaires were designed for parents to complete on behalf of children aged 0 to 3, and children aged 4 to 12; a third questionnaire was given to children aged 13 to 15 to complete on their own behalf.
- The Health Behaviour in School Children (HBSC) survey (every 4 years – most recent 2013/14), collected data on 9,055 secondary school children (aged 11-16 in school years 7 to 11) in Wales. The survey was carried out through interviewer administered paper self-completion sessions in class. The survey focuses on and provides data on key indicators of health or health behaviour in young people in Wales under the headings: social context of health; health outcomes; health behaviours; and risk behaviours.
- The Active Adult Survey is implemented once every four years by Sport Wales. The most recent survey conducted in 2014 on adults (aged 15+ years), is in the form of a biennial

household survey, which measures levels of sports participation, club membership and volunteering, in addition to lifestyle, health and other sport related behaviours. Sport Wales's data allows analysis at a local authority level for 5 key indicators. In total, 8,156 adults in Wales were interviewed during the most recent survey.

- The School Sport Survey conducted by Sport Wales, has the greatest reach of all surveys completed in Wales. In the 2015 survey, 115,039 Year 3-11 pupils in 1,000 schools took part in the survey, and 1,094 teachers completed a School Sport Survey provision questionnaire. The survey monitors and tracks trends in sports participation – covering both community and school participation and tracks the provision of PE and school sport, as well as teachers' and pupils' attitudes to PE and sport.
- The Further Education Survey is also conducted by Sport Wales. This survey was the first survey of students in further education colleges in Wales. In 2015, 4,568 students (aged 16 to 20+ years) completed the online questionnaire, obtaining data on core measures of well-being and frequency of sport participation. This survey is like the School Sport Survey, collecting data on participation in sport and physical activity, volunteering, and attitudes to sport. This allows the School Sport Survey and Further Education Survey to be combined and data to cover children and young people from 7 through to 20+ years.
- The National Survey for Wales, is a face-to-face survey of people across Wales. Each year over 14,000 people aged 16 and over were asked for their opinions on a wide range of issues affecting them and their local area. Interviewers randomly selected one adult (aged 16+) in each household, and carried out a 25-minute face-to-face interview. In the most recent 2014/15 survey, a total of 14,285 interviews were achieved. Proxy data on health and related areas are available which includes data on the environment, active travel and health.
- Welsh Outdoor Recreation Survey (2014), was commissioned by Natural Resources Wales. A total of 5,995 telephone interviews were conducted between January 2014 and January 2015 with adults aged 16+ living in Wales, with the results weighted to be representative of the adult population in Wales. The survey focuses on public engagement with the natural environment, including participation in outdoor recreation, health and economic benefits, attitudes to biodiversity and pro-environmental behaviours.

National physical activity and sedentary behaviour indicators group:

There is a group working on national indicators on physical activity and sedentary behaviour for Wales. This group are developing indicators that will be integrated into each of the surveillance tools outlined above. Routine collection of physical activity data has the potential for future data linkage studies if data are robust and representative, and survey questions and approaches are consistent. If this is achieved it will allow further analysis of data by market segment.

Additional validated Physical Activity Questionnaires:

Further, there are many physical activity questionnaires (PAQ) that cover several components of physical activity, such as intensity, duration, and frequency, and assesses domains in which physical activity is performed (e.g. occupational physical activity, transport-related physical activity, and physical activity during discretionary or leisure time). These questionnaires have been used by many countries around the world for surveillance of physical activity.

- The International Physical Activity Questionnaires (IPAQ), consists of a set of 4 questionnaires. The long form contains 5 physical activity domains asked independently and the short form contains 4 generic items. Both versions are administered by either telephone or self-administered methods. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity. Research across 12 countries, has shown that these measures have acceptable reliability and validity for use in many settings and different languages, and are suitable for national population-based studies on physical activity prevalence.
- The Global Physical Activity Questionnaire (GPAQ), was developed by WHO for physical activity surveillance in countries around the world. It contains 16 questions, that gathers data on physical activity participation in three domains (Activity at work, Travel to and from places, and Recreational activities), as well as sedentary behaviour. The GPAQ is administered through face-to-face interviews by trained interviewers. It has been used in large scale population-based surveys with the general adult population. Research shows that the GPAQ is valid and reliable but also is adaptable to incorporate cultural and other differences for each country. It has been used by more than 100 countries globally, mainly through the WHO STEPwise approach to NCD risk factor surveillance (STEPS).
- The *Occupational Sitting and Physical Activity Questionnaire* (OSPAQ), asks participants to indicate the proportion of their working time on a typical workday in the last 7 days that they spent sitting, standing, walking, and doing heavy labour or physically demanding tasks.
- The Physical Activity Questionnaire for Children (PAQ-C) and Physical Activity Questionnaire for Adolescents (PAQ-A), are self-administered, 7-day recall instruments. They were developed to assess general levels of physical activity throughout the school year for students in grades 4 to 8 and approximately 8 to 14 years of age (PAQ-C) and for grades 9-12 approximately 14-20 years old (PAQ-A). Both questionnaires can be administered in a classroom setting and provides a summary of physical activity score derived from nine items, each scored on a 5-point scale. The PAQ-C and the PAQ-A have been supported as valid and reliable measures of general physical activity levels from childhood to adolescence.
- The Preschool-age Children's Physical Activity Questionnaire (Pre-PAQ), measures population estimates of activity in young children (aged 3-5 years old) in their *home environment*. Pre-PAQ is a 3-day activity questionnaire that measures habitual physical activity and sedentary behaviour. Items are related to potential influences including parent physical activity and parenting habits and attitudes, family demographics, home and neighbourhood environment, and the child's inherent activity nature. Pre-PAQ has acceptable validity and reliability and appears promising as a population measure of activity behaviour.

Measuring physical literacy (physical competence) and fitness across the life course:

Physical literacy is defined as “*the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life*”. Much research has looked at physical competence being the key aspect of physical literacy that is the driving force behind the other aspects of physical literacy and for increasing physical activity participation.

Physical competence can be defined as the ability to use your body and physical skills. Therefore, physical competence includes the acquisition of health and skills related components of fitness (e.g. cardiorespiratory fitness, strength, flexibility, agility, balance, coordination, power, reactions and speed), as well as fundamental movement skills like catching, throwing and running. Research identifies fundamental movement skills as being a key underlying factor that can influence participation in physical activity and, consequently, health status. These are the foundation skills that, if mastered, form the platform for physical competence. Further, in children, high physical competency levels will cause a positive trajectory toward perceived competence, health-related fitness and, sequentially, physical activity levels. In adults and older adults, there is a need to have a minimum level of physical literacy to gain the health and other benefits associated with participating in physical activities. Having good physical literacy can help people maintain their independence and make physical adaptations when facing the challenges that come with aging.

Objective measures of fitness/physical competence/physical literacy:

There are many fitness test batteries that measure both health-related (body composition, cardiorespiratory fitness, strength, flexibility) and skill-related (agility, balance, coordination, power, reactions and speed) components of fitness.

- The eurofit test battery is a series of physical fitness measures, there are both a children and adult version of the fitness tests, which obtains data on the health and skill related fitness of participants.
- Swanlinx, is a health, fitness and lifestyle programme, with the aims of investigating and collecting data on the health, fitness, nutrition, and physical activity of school children in years 5 and 6 (9-11 years old) in ABMU. Children take part in a Fitness Fun Day where they complete a series health and skill related exercise tests. These exercise tests are a selection of tasks from the Eurofit test battery and Sport hall series. Secondly, the children complete an online questionnaire named CHAT (Child's Health and Activity Tool), which is a web based health survey which asks the children questions about different health behaviours including diet, physical activity, sleep and wellbeing.
- The Dragon Challenge V1.0, assesses many fundamental movement skills in the areas of 'stability' (balancing the body in one place or while in motion), 'locomotion' (moving the body in any direction from one point to another) and 'manipulative skills' (handling or controlling objects with the hand, foot or an implement e.g. a bat or a racquet) of children. Children perform 9 discrete tasks in a circuit that require single or combinations of motor skills such as agility, balance, coordination, strength, power, speed and reactions to accomplish a goal. The Dragon Challenge has produced initial pilot data on 1674 children across Wales. Initial results suggest that continued investment in developing skilled movements in children is required.
- The Senior Fitness Test, is a comprehensive and reliable test battery for assessing physical fitness in adults ages 60 and older. The tests assess the physical attributes that older adults need to perform daily activities. It consists of seven tests, covering lower- and upper-body strength, aerobic endurance, lower- and upper-body flexibility, agility, and balance, to assist health practitioners and fitness and rehabilitation specialists in identifying weaknesses that cause mobility problems, developing exercise programs that improve functional fitness, preventing future mobility issues, and evaluating progress.

Subjective measures of fitness/physical competence/physical literacy:

It is possible to collect data on physical literacy using proxy data obtained from the prevalence of sport participation. This follows the notion that sport participation can act as a surrogate measure of physical literacy.

2.5 Proposed methodology towards monitoring and reporting physical activity:

Following the global recommendation from the *Lancet* series on physical activity, surveillance on overall physical activity levels as well as its subcomponents and determinants (e.g., active play/active leisure, organized sport, active transportation, sedentary time, physical literacy) is needed. Furthermore, a thorough and critical evaluation is needed for all sectors and settings that have a known impact on physical activity participation, including school, community, home, and policy. The recently published Active Healthy Kids Wales report card on physical activity, uses national surveillance data under 10 key indicators to analyse physical activity behaviours, settings, and influences in children. With use of similar key indicators, this can be applied for comprehensive surveillance and monitoring of physical activity data across the life course.

Specifically, across Abertawe Bro Morgannwg (ABMUHB) and Hywel Dda (HDUHB) there are self-report data from numerous national surveys available across the life course. This data and the use of the surveillance synthesis mechanism, will give insight into the physical activity levels and behaviours of the population within both local health boards under the 10 key indicators.

Indicator 1: Overall Physical Activity

This indicator should focus on overall levels of physical activity across ABMU and HDU, and the percentage of the population (both children and adults) who meet the recommended age-related physical activity guidelines.

Current survey data available for Overall Physical Activity indicator:

- Welsh Health Survey
- Health Behaviour in School-Aged Children Survey
- Swanlinx – Children Health and Activity Tool (current data only on ABMU children).

* It should be noted that self-report data on overall physical activity should be viewed with caution as findings from the Health Survey for England (2008), found that respondents significantly overestimated their physical activity when compared to objective measures. Therefore, objective measures of collecting overall physical activity data should be used on a subset of participants.

Indicator 2: Organised Sport Participation

This indicator refers to the frequency of organised sport participation by children and adults. In line with Sport Wales' definition of 'hooked on sport', this indicator should focus on the percentage of children and adults taking part in sports 3 or more times a week.

Current survey data available for Organised Sport Participation:

- *School Sport Survey*
- *Further Education Survey*
- *Active Adults Survey*
- Swanlinx – Children Health and Activity Tool (current data only on ABMU children).

Indicator 3: Active and Outdoor Play (children) / Active Leisure Time (adults)

This indicator focuses on the activities that are taken part in an outdoor setting. The percentage of children and adults using of a variety of places for play and active leisure should be used to analyse data for this indicator. For example, the Active Healthy Kids Wales report card used a variety of places used (parks, playing fields not at school, playing fields at schools, streets near home or school, beach and sea, playground not at school) to give an indication of active and outdoor activities.

Current survey data available for Active and Outdoor Play (children) / Active Leisure Time (adults):

- School Sport Survey
- Active Adults Survey
- National Resources Wales - Welsh Outdoor Recreation Survey
- Swanlinx – Children Health and Activity Tool (current data only on ABMU children).

Indicator 4: Active Transportation

Wales is the first country in the world to legislate for Active Transport (2013). Active transportation is any form of travel using active means, such as walking, cycling, skateboarding and scooting. Research has shown that active transportation, especially travel to and from school, contributes a substantial portion to children and adults' overall physical activity level and is linked with higher levels of energy expenditure. This indicator should focus on the proportion of children and adults who use active transportation to get to and from places.

Current survey data available for Active Transportation:

- School Sport Survey
- Active Adult Survey
- Welsh Health Survey
- National Survey for Wales
- Health Behaviour in School-aged Children Survey
- Swanlinx – Children Health and Activity Tool (current data only on ABMU children).

Indicator 5: Sedentary Behaviours / Sedentary Time

Sedentary behaviours are negatively related to 'all-cause mortality'. Children and adults accumulate large amounts of sedentary time throughout the day. Common sedentary behaviours include; sitting down whilst at school (e.g. during lessons, during break times with friends), sitting during leisure-time (e.g. watching TV, using a computer, playing video games, reading, sitting with friends/family, etc.), and sitting whilst using non-active transport (e.g. car). This indicator should focus on the proportion of children and adults who spend prolonged time in sedentary behaviours.

Current survey data available for Sedentary Behaviours/Sedentary Time:

- Health Behaviour in School-aged Children Survey

- Swanlinx – Children Health and Activity Tool (current data only on ABMUHB children).

Indicator 6: Physical Literacy (including Fitness)

This indicator focuses on a person having the technical skills along with the confidence and motivation to take part in a variety of sports and physical activities throughout their stages of life.

Current measures of Physical Literacy and Fitness:

- Swanlinx – objective measure of fitness (children aged 9-11 years)
- Dragon Challenge – physical competence (children aged 9-13 years)

Additional measures Physical Literacy and Fitness:

- Eurofit test battery for adults – objective measure of fitness (16+ years)
- Senior Fitness Test (+60 years)
- Surveys on Sport Participation can act as a proxy measure for physical activity.

Indicator 7: Family and Peer Influence (social environment)

This indicator focuses on the influences towards physical activity from family, peers and the social environment. This includes adults who facilitate physical activity and sport opportunities for their children and other adults (eg, volunteering, coaching, driving, paying for membership fees and equipment); adults who meet the physical activity guidelines for adults; adults who are physically active with their children and other adults; children and adults with friends and peers who encourage and support them to be physically active; children and adults who encourage and support their friends and peers to be physically active

Current survey data available for Family and Peer Influence (social environment):

- School Sport Survey
- Active Adult Survey
- Welsh Health Survey
- Swanlinx – Children Health and Activity Tool (current data only on ABMU children).

Indicator 8: School (children) / Workplace (adults) / Care home (seniors)

Influences towards physical activity in schools, workplaces and care homes should be of focus of this indicator.

Considerations for analysing schools: Schools with active school policies (eg, Daily Physical Activity, recess, “everyone plays” approach, bike racks at school, traffic calming on school property, outdoor time); schools where students are offered at least 120 minutes of PE per week; schools that offer physical activity opportunities (excluding PE); children who have access to physical activity opportunities at school in addition to PE; schools with students who have regular access to facilities and equipment that support physical activity.

Consideration for analysing Workplaces/Care Homes: Workplaces/care homes with active policies (eg, Daily Physical Activity, bike racks, traffic calming on property, outdoor time, standing desks, free gym passes, organised physical activity sessions); workplaces/care homes with regular access to facilities and equipment that support physical activity.

Indicator 9: Community and the Built Environment / Community Influences / Physical Environment

The Community and the Built Environment/Community Influences/Physical Environment indicator refers to perceived safety, access, and availability of facilities and spaces that provide opportunities for physical activity in children and adults.

Current survey data available for Family and Peer Influence (social environment):

- National Survey for Wales
- National Resource Wales survey

Indicator 10: Policies, Strategies and Investments

This indicator should investigate the current policies, strategies and investments towards physical activity in children and adults. Focus should be applied to evidence of leadership and commitment in providing physical activity opportunities for all children and adults; allocated funds and resources for the implementation of physical activity promotion strategies and initiatives for all children and adults; demonstrated progress through the key stages of public policy making (i.e., policy agenda, policy formation, policy implementation, policy evaluation, and decisions about the future).

Optional addition - Indicator 11: Weight Status (Overweight & Obese)

Since physical activity is a key determinant of energy expenditure, and thus fundamental to energy balance and weight control, it may be useful to report the proportion of children and adults in each weight category (healthy, overweight, and obese).

Current sources of Weight Status:

- National child measurement programme (children 4-5 years old)
- Swanlinx: Anthropometric measures during fitness fun days (children 9-11 years old)
- Welsh Health Survey (children and adults)
- Health Behaviour in School-aged Children Survey (children and young people)