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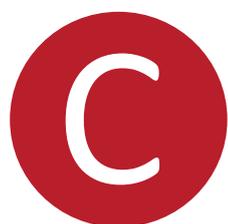
# Transforming Young Lives across Wales:

## The Economic Argument for Investing in Early Years

### Summary Report



Professor Rhiannon Tudor Edwards  
Lucy Bryning  
Huw Lloyd-Williams



Canolfan Economeg Iechyd a Gwerthuso Meddyginiaethau

**CHEME**

Centre for Health Economics and Medicines Evaluation

## About CHEME at Bangor University

The Centre for Health Economics & Medicines Evaluation (CHEME) was founded in 2001, and is now one of the leading health economics centres in the UK. At CHEME, we aim to promote and sustain high-quality health economics research, maximise opportunities for research grant capture and publications in high impact journals. The Centre is active across a range of health economic and medicines evaluation research activities spanning public health economics and the health economics of psychosocial interventions and other non-pharmacological health technologies, led by Professor Rhiannon Tudor Edwards, and Pharmacoeconomics, pharmaceutical policy and medicines use, led by Professor Dyfrig Hughes. For more information about CHEME visit <http://cheme.bangor.ac.uk/>

## About this report

This summary report highlights key findings from our report which brings together robust international and UK evidence on the relative return on investment of devoting public sector resources to programmes and practices supporting babies, young children and their families, and translates the findings to Wales where possible. Our intended audience includes Public Health bodies and functions in Wales, England, Scotland and Northern Ireland; the seven Health Boards across Wales; Welsh local government and the third sector, who potentially have an impact on families and young children living across Wales.

Public Health Wales is an NHS organisation providing professionally independent public health advice and services to protect and improve the health and wellbeing of the population of Wales. Production of this report was funded by Public Health Wales. **However, the views in this report are entirely those of the authors and should not be assumed to be the same as those of Public Health Wales.**

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Graphic design by Excellent Design [www.excellentcreative.co.uk](http://www.excellentcreative.co.uk)

**The full report is available at <http://cheme.bangor.ac.uk/reportspublications.php.en>**

## Background

Wales already has a significant policy direction and investment in programmes and practice relating to Early Years. This report is intended to provide an evidence base for decisions about investment in Early Years.

The Welsh Government has recognised the intergenerational relationship between poverty, health and lifetime opportunities in the Well-being of Future Generations (Wales) Act (Welsh Government, 2015a).

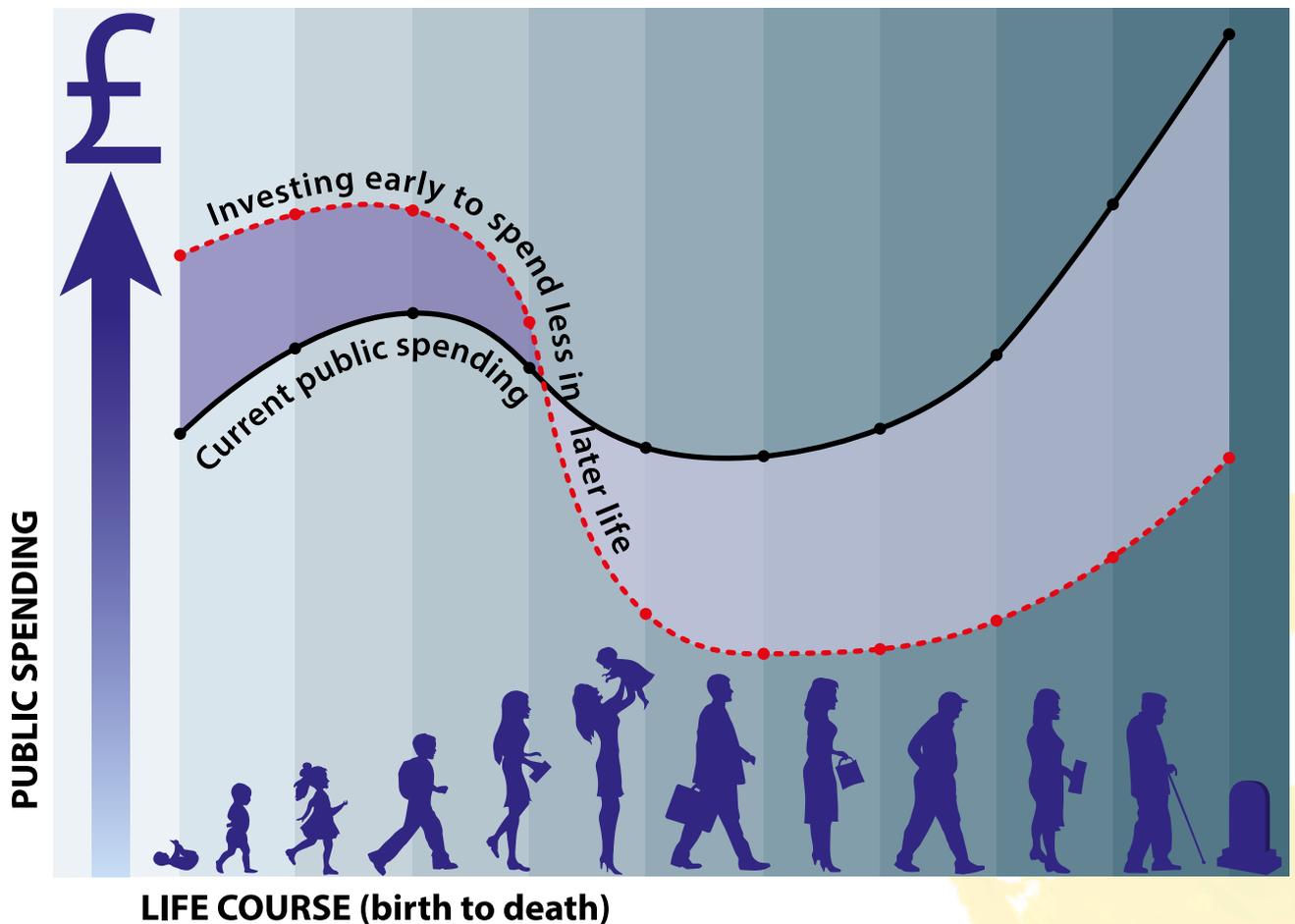
Today, one in three children are living in poverty in Wales (Welsh Government, 2015b). At birth, there is an 18.9 year difference in healthy life expectancy between the least and most deprived area of Wales (Public Health Wales Observatory, 2011; Buck & Maguire, 2015).

We explore the economic case for allocating scarce public resources, starting with the first 1000 days from conception through pregnancy to a child's second birthday, through to children being school ready (1,000 Day Partnership, 2013; Field, 2010).

“In Wales over the next 20 years, the population aged over 65 will increase by 50%, whilst the population of children entering the workforce will continue to decline. Not only will an ageing population produce ever more challenge to health and social care, but a reducing working age population will make it much more difficult to square the circle of caring, not least in an era of reductions in public sector finance.”

Professor John Ashton, Faculty of Public Health, Foreword

## Shifting the curve towards prevention and Early Years investment



Source: Current spending based on figures by the Office for Budget Responsibility (2015)

## Approach

This report fills a gap bringing together international evidence relevant to Wales on the likely return on investment (ROI) and cost-effectiveness of programmes and practice to support the Early Years of children living in Wales. Within the timescale for the preparation of this report, the topic was too broad to adhere to systematic reviewing methodology. We therefore adopted a pragmatic search strategy across diffuse subject areas relevant to Early Years (Papaioannou et al., 2010). We contacted experts and centres of excellence in the US and in the UK to bring evidence together that is relevant to Wales.

ROI tells us what benefits we get back in pounds for every £1 we invest now. Capturing the full range of costs and benefits of investing in Early Years is a challenging but critical factor for the efficient development of public services. The public sector is an important part of the Welsh economy, but the sustainability of public services requires a stronger focus on the benefit of prevention rather than just reactions to health and social care crises. We found much of the ROI literature relevant to Early Years to have originated from the US. At the outset of our report, we emphasise that there is a need for an awareness of issues in transferring findings from one international context to another (Karoly & Bigelow, 2005). In a UK context, there is current guidance aiming to standardise methods in ROI and social return on investment (SROI) (Cabinet Office, 2013; New Economics Foundation, 2011; Edwards et al., 2013). Just as health economists are conscious that cost per quality adjusted life year (QALY) league tables, defined as giving the relative costs of producing an additional healthy year of life to society, involve a range of research methods (Drummond et al., 2015), internationally, ROI methods differ. For this reason, comparison across programmes is difficult (National Institute for Health and Care Excellence: NICE, 2011). This is no different from the use of ROI in other areas of the economy and ROI may provide Welsh Government, local authorities and Public Health Wales amongst other stakeholders with ballpark estimates of returns on investment (Phillips & Phillips, 2004).

Economic evaluations of public health interventions need to take account of a full range of costs and outcomes that span a range of public and private sectors (Weatherly et al., 2009). This report wishes to emphasise that in comparison to many high cost drugs approved by NICE, many public health prevention initiatives for children and adults are either cost saving, or have a cost per QALY far below the threshold of £20,000 - £30,000 used by NICE (Owen et al., 2011). While NICE promotes the use of cost-benefit analysis in the evaluation of public health interventions (NICE, 2012), there is growing interest in financial returns on investment in public health and prevention (Buck & Gregory, 2013). In an effort to meet the information needs of government and local authorities, with an increased responsibility for Public Health, health economists, as well as measuring QALYs, are exploring social benefit in terms of net social benefits and costs, in practice often operationalised through ROI analysis (Buck & Gregory, 2013).

In this report, we refer to leading international examples of evidence repositories which have collated the returns from investment in evidence based programmes. In particular, we draw upon the Washington Institute for Social Policy<sup>1</sup> (WSIPP) in the US and the Social Research Unit at Dartington<sup>2</sup> in the UK, the latter has adapted this database to a UK setting. These resources use benefit-cost ratios to show the returns on investment in a variety of programmes.

<sup>1</sup><http://www.wsipp.wa.gov/BenefitCost>

<sup>2</sup><http://investinginchildren.eu/search/interventions>

## Findings

Here we summarise the key findings of the report on investing in the child, family and the wider community to support health and wellbeing.

**The full report is available at <http://cheme.bangor.ac.uk/reportspublications.php.en>**

## Investing in the Child

### Pregnancy

With respect to maternal nutrition, universal provision of vitamin supplements is a cost-effective way of promoting good maternal health, healthy pregnancies and child outcomes (NICE, 2015; Filby et al., 2015).

The UK has one of the highest rates of unplanned teenage pregnancy in Western Europe (Office for National Statistics, 2016), with research in Wales highlighting the long-term and intergenerational effects, and psychological reasons behind repeat teenage pregnancies (Whitaker et al., 2016). Planned pregnancy significantly affects the life course with a higher likelihood of positive outcomes for parent and child (Lyons & Ashton, 2004).

Every £1 invested in contraceptive services in the UK would return between £11 and £14 in savings to the NHS in Wales (Lyons & Ashton, 2004; McGuire & Hughes, 1995; North Wales local public health team, 2015).

### Low birth weight

Delivery of Low birth weight (LBW) babies (those born weighing less than 2500g) entails high direct neonatal treatment costs (Godfrey et al., 2010). We estimate that the annual additional cost of caring for low birth weight babies in hospital in Wales was over £4.5 million in 2014 (Godfrey et al., 2010). LBW babies have poorer short and long-term outcomes (Jefferis et al., 2002; Currie, 2009). They are at higher risk of infant death (McCormick, 1985) and there is evidence of negative health consequences, lower educational attainment and lower lifetime earning outcomes (Currie & Moretti, 2007).

The additional cost to Welsh NHS maternity services of delivering low birth weight babies attributed to smoking and other modifiable risk factors is estimated to be £2.15 million annually (Johnson, Jones & Paranjothy, 2016).

### Breastfeeding

Low breastfeeding rates are associated with higher incidence of childhood illness, which subsequently places a significant cost on the NHS (Ball & Wright, 1999).

We estimate that increasing rates of exclusive breastfeeding at 4 months (currently at 9% in Wales) to the rates observed at birth (currently 57% in Wales) would lead to cost savings of £1.51 million per annum in reduced spending on various childhood conditions in Wales (Renfrew et al., 2012).

Children who are not breastfed are significantly less likely to breastfeed their own babies in later life (Renfrew et al., 2012). Changing social norms in Wales through evidence based interventions that increase rates of breastfeeding may help break this intergenerational cycle.

### Vaccinations

Vaccinations for children reduce disease, death, disability and inequity worldwide (Andre et al., 2008).

Compared with other common public health interventions, vaccinations are considered to be a good investment and generally highly cost-effective (Chabot et al., 2004). Evidence from the US showed that for every \$1 invested in the MMR vaccine, there are \$26 in benefits to society (Zhou et al., 2004).

In the UK, the childhood flu vaccine is highly cost-effective with a cost per QALY gained of £251, dramatically below the NICE threshold of £20,000 used for decisions about new medicines and services (Pitman et al., 2013).

### **Looked after children**

In Wales, the proportion of looked after children (in local authority care) are highest in the most deprived areas and have been increasing (Giant, 2014). Looked after children are more likely to experience health problems and have poorer educational outcomes compared to the general population (StatsWales, 2015). If more children could remain safely with their families after leaving care, the cost savings would offset the cost of providing the support services (All Wales Heads of Children's Services, 2013).

## **Investing in the whole family**

### **Parenting**

Conduct disorder is a psychological disorder diagnosed in childhood or adolescence presenting as persistent antisocial behaviour. Parenting programmes when delivered well can be effective and cost-effective in preventing and reducing the long-term effect of conduct disorder in children, with potential savings across multiple sectors (Edwards et al., 2007; Edwards et al., 2016; Hutchings et al., 2007; Knapp et al., 2011).

Conduct disorders are the most common mental and behavioural problems affecting children and young people (NICE, 2013). It is estimated that 5% of children and young people aged between 5 and 16 years have conduct disorders (Green et al., 2005). Children with conduct disorder cost the public sector ten times more than children with no conduct disorder (Knapp et al., 2011). It is estimated that preventing conduct disorder in the most serious of cases could provide lifetime savings of around £150,000 per case (Friedli & Parsonage, 2007). The cost of crime attributable to those that had conduct disorders as children is in the region of £60 billion a year in England and Wales (Sainsbury Centre for Mental Health, 2009).

### **Troubled families**

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).

Dealing with troubled families requires joined up services that consider the whole family unit. Early intervention strategies targeting disadvantaged high-risk communities, such as the Sure Start and Flying Start programmes, have become part of government strategy across the UK (Rutter, 2006). Evaluation of these programmes has been disappointing, primarily because central Government had failed to specify effective interventions meaning that service providers delivered widely differing services, with some delivering evidence-based programmes and others developing their own (Belsky et al., 2006).

### **Adverse Childhood Experiences (ACEs)**

ACEs lead to an elevated risk of experiencing negative health outcomes across the life course and represent a great cost to society including public sector services (Bellis et al., 2014 & 2015).

These are stressful events in childhood including: living in a household with someone who is depressed, mentally ill, a substance abuser or someone who has been incarcerated; exposure to child maltreatment or domestic violence, and losing a parent through divorce, separation or death (Felitti et al., 1998).

ACEs are clustered around, but not exclusive to, families from lower socio-economic backgrounds (Björkenstam et al., 2013). We estimate that in Wales, the costs of outcomes associated with ACEs may range from £2.59m per year for cannabis use (Bryan et al., 2013) to £6.2bn per year for violent crime (Institute for Economics and Peace, 2013).

The costs to some sectors of some of the individual outcomes associated with ACEs are known, these include:

- Early sex and unplanned teenage pregnancy: We estimate that the cost of unplanned teenage pregnancy in Wales is £4.5 million per year (Department for Education and Skills, 2006).
- Child sexual abuse: It is estimated that child sexual abuse costs £160 million per year in Wales (NSPCC, 2014).
- Smoking: In 2013, the total economic cost of smoking to Wales was £791 million, with the cost to the NHS in Wales specifically being £437 million per year (ASH, 2013).
- Binge drinking: The cost of excessive alcohol consumption in Wales is estimated at between £69.9m and £73.3m (Phillips et al., 2011a). Inflated to 2015/16 this stands at £78.2m to £82m per year.
- Cannabis and heroin/crack cocaine use: We estimate that the cost of treating cannabis users in Wales is £2.59m per year (Bryan et al., 2013), and the total economic cost of treating Class A drug use in Wales is £253.1m per year, of which 88% can be attributed to crime and policing costs (Godfrey et al., 2012).
- Violent crime and incarceration: We estimate the cost of violent crime in Wales is £6.2 billion per year (Institute for Economics and Peace, 2013), and the cost of incarceration in Wales in 2013-14 was £113.1 million per year (Ministry of Justice, 2014).
- Poor diet: We estimate that poor diet related ill health costs the NHS in Wales £349 million per year (Scarborough et al., 2011).

## Youth crime

There are links between aggression, hyperactivity, concentration problems, impulsivity in early childhood and later risk taking and subsequent violent behaviour in adolescence (Hawkins et al., 1998). Family characteristics such as poor parenting skills, family size, home discord, child maltreatment, and antisocial parents are risk factors linked to juvenile delinquency (Wasserman & Seracini, 2001).

We estimate that there is a cost of over £600 million per year to the Welsh economy of not intervening to prevent youth crime in Wales (Knapp et al., 1999; Ministry of Justice, 2010 & 2014).

The Dartington Social Research Unit has adapted some evidence from the US to a UK context, listing the benefits, costs and risks of a range of programmes. For example, the 'Good Behaviour Game' is a universal classroom intervention aimed at children aged 6-8 years. It seeks to reduce aggressive behaviour in order to prevent problem behaviours in middle childhood through to early adulthood. For every £1 invested, this intervention could yield £27 in avoided costs to society as a result of crime (Social Research Unit, 2013a).

## Investing in education and skills

### Pre-school

A good pre-school experience can lead to better job prospects and higher income levels in later life (Barros & Mendonca, 1999; Goodman & Sianesi, 2005). Children from low socio-economic backgrounds are more likely to succeed if they receive high quality pre-school education (Melhuish, 2003; Sylva et al., 2004).

Follow up studies from the US suggest that every \$1 investment in pre-school programmes can yield up to \$16 in return in adulthood (Schweinhart et al., 2005).

Early years education in Wales is provided part-time for those aged 3-4 in nurseries and full-time aged 4-5 in primary school reception classes. Statutory duty lies with local authorities to provide nursery education from the age of three onwards and at least 10 hours a week for 38 weeks is provided by the state. The actual number of hours varies between local authorities. The cost to local authorities in Wales is £11.32 per hour for deprived children enrolled in Flying Start Initiatives (National Assembly for Wales, 2014).

Sesame Street is a long running educational television programme for children which is shown in more than 150 countries around the world. In the US, the cost of producing the show equates to just under a million dollars a show and a cost of \$5 per child (Kearney & Levine, 2015). There have been numerous academic studies looking at the effect that Sesame Street has had on educational attainment, particularly literacy and numeracy and school readiness in early years (Fisch & Truglio, 2001; Mares & Pan, 2013; Kearney & Levine, 2015), producing comparable outcomes to other effective programmes such as Head Start but delivered at a fraction of the cost (Kearney & Levine, 2015).

In Wales, S4C runs a children's entertainment 'platform' known as 'Cyw', which includes television shows, a website and an app. It is not as directly educational as Sesame Street but nonetheless it has elements that help young children become school ready e.g. basic numbers and the alphabet. There have been no attempts to measure the benefits of Cyw to young children growing up in Wales. The programme encourages learning through the medium of Welsh. Bilingualism has beneficial cognitive effects across the life course (Marian & Shook, 2012; Pearl & Lambert, 1962) with benefits beginning in early infancy, well before the onset of speech (Kovács & Mehler, 2009).

### **Supporting children with disabilities to access education and gain skills**

In 2015, only 7% of local authorities in Wales said they had adequate nursery provision for children with disabilities compared with 21% in England (Rutter, 2015). All eligible disabled children aged two, three and four have a right to 15 hours of free childcare a week. However, 41% of parent carers said that they did not access the full 15 hours (Buckland & Glass, 2014). Parent carers of disabled children are reported to pay up to £20 per hour for childcare compared to the national average of £3.50 -£4.50 per hour for non-disabled children (Honstvet, 2013).

### **Primary school**

There have been some attempts to measure economic returns from programmes delivered within primary schools. Estimates range from returns of £1.96 for every £1 invested for group Multimodal Therapy for children with attention deficit hyperactivity disorder (ADHD) (Social Research Unit, 2013b) to nearly £27 in returns for the 'Good Behaviour Game' (Social Research Unit, 2013a).

There are nearly 70,000 children receiving free school meals across Wales. Establishing healthy eating practices early in life, such as a healthy breakfast, can yield educational attainment benefits (Littlecott et al., 2015).

The resources that a family has, including access to effective primary school education and the opportunities that then follow, have a significant impact over children's life trajectories (Alexander et al., 2014).

With respect to child development, 6% of children in the UK aged 5 have speech, language and communication needs which may not be currently fully met (Law et al., 2000). This is an area for considerable return on investment with every £1 spent on enhanced speech and language therapy resulting in £6.43 in return generated through increased lifetime earnings (Strelitz, 2013).

With respect to music in schools, Codi'r To is a music based intervention pilot, set up in two schools in deprived areas in North Wales, Ysgol Glancegin, Maesgeirchen, Bangor and Ysgol Maesincla,

Caernarfon. It is probably the only minority language (Welsh) focused El Sistema project in the world. El Sistema was created originally in Venezuela and focused on giving young children from disadvantaged backgrounds a better start in life through music. Its adaptation in Wales has proved to be very successful in improving educational, behavioural and social outcomes in children. Research by CHEME (Owen et al., 2015) has found the Codi'r To project to generate a ROI to the societal stakeholders of £1.76 for each £1 spent on the project.

## Investing in the child's environment and wider community

### Housing

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 (Nicol et 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). Energy efficiency and retrofitting as proposed by the Institute for Welsh Affairs (IWA) could create 9000 new jobs in Wales, improve energy efficiency and improve health (IWA, 2015).

Children who live in more cohesive neighbourhoods, who have stronger family units, and who attend better schools tend to maintain a higher economic status later in life (Alexander et al., 2014).

For example, the CHARISMA Study, undertaken in Wrexham, North Wales, was a pragmatic randomised controlled trial (n=177) of housing modifications for families of children with moderate and severe asthma. The economic analysis conducted by CHEME reported that heating and ventilation modifications led to a marginal 14% shift of children from severe to moderate asthma for a total programme cost of £151,152 to Wrexham Borough Council (Edwards et al., 2011; Woodfine et al., 2011).

### Accidents

Accidental injuries are a feature of inequalities, with children from poorer backgrounds being three times more likely to be admitted to hospital and five times more likely to die as a result of an accident than children from less deprived families (ROSPA, n.d.; White et al., 2000).

For example, lifetime NHS costs for treating scalds in the UK are estimated to be as high as £250,000 per person (Phillips et al., 2011b). Every £1 spent on thermostatic mixers would save £1.41 in public sector spending from prevented childhood scalds in Wales (Phillips et al., 2011b).

With respect to road traffic accidents, we estimate that in Wales, the cost to society of road accidents involving children is £39.4 million per year (Child Accident Prevention Trust, 2012).

Evidence from the US of ROI on a range of accident prevention interventions:

Every dollar spent on	Saves society
Childproof cigarette lighters	\$72
Child booster seats	\$71
Bicycle helmets	\$48
Child safety seats	\$42
Smoke alarms	\$17
Prevention counselling by paediatricians	\$9

Source: Centers for Disease Control and Prevention (CDCP) (2012)

## Playgrounds and public spaces

Physical inactivity in adults and children has poor health consequences (Han et al., 2010) and we estimate that this currently costs the Welsh NHS over £786 million per year (Welsh Assembly Government, 2009). In Wales, 35% of children (under 16) are overweight with 19% considered obese (National Assembly for Wales, 2013). Obesity is set to overtake smoking as the main cause of premature death in the UK (Hennekens & Andriotti, 2013).

Play provision provides an important context in which children can counter the effects of poverty and deprivation. Where the home environment is poor or there is a restricted range of stimuli, play services and spaces offer variety and even comfort. Good play provision offers a welcoming space where children can meet on a more equal basis. For this reason, play provision can be the starting point for tackling social exclusion, engaging with marginalised families and communities and working to build their capacity to improve their social, environmental and economic circumstances (Hill-Tout et al., 1991).

A recent study on playgrounds in England found that for every £1 spent they provided a return on investment of £1.32 in social benefit (Matrix, 2010).

## Community Health Assets

Health assets are resources that individuals in a community have that can protect against poor health. There are some examples of social return on investment (SROI) calculated on a whole community level; however, there is little evidence about what works specifically for children, especially in terms of their SROI.

## Research in Wales

Welsh higher education institutes have been at the forefront of high quality Early Years research. In this report, we have marked examples of such Welsh led Early Years research of international standing with the following logo:



Examples include evaluation of the Incredible Years Parenting Programme (Hutchings et al., 2007; Edwards et al., 2007; Hutchings & Gardner, 2012); evaluation of the effect of moving house frequently in childhood (Hutchings et al., 2016); and evaluation of free school breakfasts (Littlecott et al., 2015).

There is an economic argument for disinvestment in programmes without a strong evidence base and re-investment in programmes, both universal and targeted, with a strong evidence base of effectiveness and cost-effectiveness. What is unlikely to work is, in the interest of keeping costs down, delivering watered down versions of evidence based programmes in an attempt to bring their key principles into current practice. With respect to future research, Wales has the capacity and expertise to, given resources, evaluate roll out of evidence based programmes, their fidelity of delivery, and the reasons why they do or do not deliver anticipated returns (Hutchings & Williams, 2014).

## Conclusions

Overall, this timely report exploring the economic argument for investing in Early Years, provides evidence to support and emphasise the following:

- Health economics highlights the fact that decisions about resource use involve choices that are ultimately trade-offs in the use of public sector resources, trade-offs between different groups in society and trade-offs between different stages in the life course.
- There are efficiency and equity economic arguments for investing in Early Years, both for this generation and for future generations (Suhrccke & Kenkel, 2015). Investment in Early Years in Wales can contribute to the building of social capital and promote economic growth and should be considered in the same way as European or National investment in wider economic development.
- There is a need to understand which potential areas for investment in Early Years might generate value for money and a substantial body of evidence developed over the last 25 years can help guide a case for early childhood interventions as being a medium for social change (Suhrccke & Kenkel, 2015).
- Based on international evidence, investment that focuses on the critical window of the first few years of life is likely to provide the most efficient use of public resources, yielding returns over and above other forms of financial investment and investment at other points of the life course.
- Although it is well recognised that public health initiatives can have a lasting effect across the life course, political horizons and current economic recession mean that our focus should be on achieving measurable immediate and intermediate benefits within 2-5 years, which evidence tells us will yield sustained benefits for decades to come. There is a need for public services that adopt both a short term and a long-term focus with a shift from treatment to prevention. The time is right to act now with the Future Generations Act in Wales and a set of National indicators that will facilitate long term monitoring of key outcomes.
- Public sector agencies including Local Councils, wanting to invest in Early Years would benefit from true valuations of the financial, economic, environmental and social value of community assets which already exist in Wales, such as playgrounds and public spaces.
- Welsh higher education institutions continue to make a significant contribution to the international evidence on the effectiveness and cost-effectiveness of programmes and practice relating to Early Years.
- The early care and education industry is important as a source of employment and wider economic driver in Wales.
- There is a need to make best use of technology, by sharing data across sectors to promote joined up strategic planning. Furthermore, there is a need for joined up services that view the whole family not just the individual.
- Through investment in Early Years, Wales will benefit in terms of the economy and improved social cohesion. Babies born today could have a greater opportunity to thrive than at present.

## References

- 1,000 Days Partnership. (2013). *Nutrition: An Investment in Growth Policy Brief June 2013*.
- Alexander, K., Entwisle, D., & Olson, L. (2014). *The Long Shadow: Family Background, Disadvantaged Urban Youth, and the Transition to Adulthood*. Russell Sage Foundation.
- All Wales Heads of Children's Services. (2013). *Research on differences in the looked after children population*. Retrieved from <http://www.wlga.gov.uk/publications-social-services-and-housing/all-wales-heads-of-childrens-services-research-on-differences-in-the-looked-after-children-population>
- Andre, F. E., Booy, R., Bock, H. L., Clemens, J., Datta, S. K., John, T. J., & Santosham, M. (2008). Vaccination greatly reduces disease, disability, death and inequity worldwide. *Bulletin of the World Health Organization*, 86(2), 140-146. Retrieved from <http://www.who.int/bulletin/volumes/86/2/07-040089/en/>
- ASH. (2013). *Smoking in Wales*. Retrieved from <http://ashwales.org.uk/en/information-resources/topics/smoking-in-wales>
- Ball, T. M., & Wright, A. L. (1999). Health care costs of formula feeding in the first year of life. *Paediatrics*, 103, 870-6.
- Barros, R. P. de, & Mendonca, R. (1999). *Costs and benefits of preschool education in Brazil*. Rio de Janeiro: Institute of Applied Economic Research.
- Bellis, M. A., Hughes, K., Leckenby, N., Hardcastle, K. A., Perkins, C., & Lowey, H. (2014). Measuring mortality and the burden of adult disease associated with adverse childhood experiences in England: a national survey. *Journal of public health*, fdu065.
- Bellis, M. A., Ashton, K., Hughes, K., Ford, K., Bishop, J., & Paranjothy, S. (2015) *Adverse Childhood Experiences and their impact on health-harming behaviours in the Welsh adult population: Alcohol Use, Drug Use, Violence, Sexual Behaviour, Incarceration, Smoking and Poor Diet*. Centre for Public Health. Retrieved from <http://www.cph.org.uk/wp-content/uploads/2016/01/ACE-Report-FINAL-E.pdf>
- Belsky, J., Melhuish, E., Barnes, J., Leyland, A. H., & Romaniuk, H. (2006). Effects of Sure Start local programmes on children and families: early findings from a quasi-experimental, cross sectional study. *BMJ*, 332(7556), 1476.
- Björkenstam, E., Hjern, A., Mittendorfer-Rutz, E., Vinnerljung, B., Hallqvist, J., & Ljung, R. (2013). Multi-exposure and clustering of adverse childhood experiences, socioeconomic differences and psychotropic medication in young adults. *PloS one*, 8(1), e53551.
- Bryan, M., DelBono, E., & Pudney, S. (2013). *Licensing and regulation of the cannabis market in England and Wales: Towards a cost-benefit analysis*. Institute for Social and Economic Research, University of Essex & The Beckley Foundation.
- Buck, D., & Gregory, S. (2013). *Improving the public's health. A resource for local authorities*. London: The King's Fund.
- Buck, D., & Maguire, D. (2015). Inequalities in life expectancy. *Changes Over Time and Implications for Policy*. The King's Fund.
- Buckland, R., & Glass, P. (2014). Parliamentary Inquiry into childcare for disabled children: Levelling the playing field for families with disabled children and young people. Retrieved from <http://www.familyandchildcaretrust.org/sites/default/files/files/Parliamentary%20Inquiry%20into%20childcare%20for%20disabled%20children%20report.pdf>
- Cabinet Office. (2013). *A Guide to Social Return on Investment*. The New Economics Foundation. Retrieved from [http://www.bond.org.uk/data/files/Cabinet\\_office\\_A\\_guide\\_to\\_Social\\_Return\\_on\\_Investment.pdf](http://www.bond.org.uk/data/files/Cabinet_office_A_guide_to_Social_Return_on_Investment.pdf)
- Centers for Disease Prevention and Control. (2012). *National Action Plan for Child Injury Prevention*. CDC, National Center for Injury Prevention and Control. Atlanta (GA).
- Chabot, I., Goetghebeur, M. M., & Gregoire, J.-P. (2004) The societal value of universal childhood vaccination. *Vaccine* ; 22: 1992-2005
- Child Accident Prevention Trust (2012). *The Cost of Road Accidents*. Retrieved from <http://www.makingthelink.net/tools/costs-child-accidents/costs-road-accidents>
- Currie, J. (2009). Healthy, Wealthy and Wise: Socioeconomic Status, Poor Health in Childhood, and Human Capital Development. *Journal of Economic Literature*, 47(1), 87-122.
- Currie, J., & Moretti, E. (2007). Biology as Destiny? Short-and Long-Run Determinants of Intergenerational Transmission of Birth Weight. *Journal of Labor Economics*, 25(2), 231-264.

- Davidson, M., Nicol, S., Roys, M., & Beaumont, A. (2011). *The Cost of Poor Housing in Wales*. BRE Trust, Watford: UK.
- Department for Communities and Local Government. (2015). *Policy paper - 2010 to 2015 government policy: support for families*. Retrieved from <https://www.gov.uk/government/publications/2010-to-2015-government-policy-support-for-families>
- Department for Education and Skills. (2006). *Teenage Pregnancy: Accelerating the Strategy to 2010*. Retrieved from <http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.education.gov.uk/publications/eOrderingDownload/DFES-03905-2006.pdf>
- Drummond, M.F., Sculpher, M.J., Claxton, K., Stoddart, G.L. & Torrance, G.W. (2015). *Methods for the economic evaluation of health care programmes*. Oxford University Press.
- Edwards, R. T., C elleachair, A., Bywater, T., Hughes, D. A., & Hutchings, J. (2007). Parenting programme for parents of children at risk of developing conduct disorder: cost effectiveness analysis. *BMJ*, 334(7595), 682.
- Edwards, R. T., Charles, J. M., & Lloyd-Williams, H. (2013). Public health economics: a systematic review of guidance for the economic evaluation of public health interventions and discussion of key methodological issues. *BMC public health*, 13(1), 1001.
- Edwards, R. T., Jones, C., Berry, V., Charles, J., Linck, P., Bywater, T., & Hutchings, J. (2016). Incredible Years parenting programme: cost-effectiveness and implementation. *Journal of Children's Services*, 11(1), 54-72.
- Edwards, R. T., Neal, R. D., Linck, P., Bruce, N., Mullock, L., Nelhans, N., Woodfine, L. (2011). Enhancing ventilation in homes of children with asthma: cost-effectiveness study alongside randomised controlled trial. *The British Journal of General Practice*, 61(592), e733–e741. <http://doi.org/10.3399/bjgp11X606645>
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., ... & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American journal of preventive medicine*, 14(4), 245-258.
- Field, F. (2010). The Foundation Years: preventing poor children becoming poor adults. *The report of the Independent Review on Poverty and Life Chances*. London Cabinet Office.
- Filby, A., Taylor, M., & Jenks, M. (2015). Examining the Cost-Effectiveness of Moving the Healthy Start Vitamin Programme from a Targeted To a Universal Offering. (*NICE Final Report*). York Health Economics Consortium.
- Fisch, S., & Truglio, R. (Eds.). (2001). *"G" is for Growing: Thirty Years of Research on Sesame Street* (pp. 97-114). Mahwah: Erlbaum.
- Friedli, L., & Parsonage, M. (2007). *Mental Health Promotion: Building an Economic Case*. Northern Island Association for Mental Health.
- Giant, N. (2014). *Life Coaching for Kids: A Practical Manual to Coach Children and Young People to Success, Well-being and Fulfilment*. Jessica Kingsley Publishers: London and Philadelphia.
- Godfrey, C., Eaton, G., McDougall, C., & Culyer, A. (2012) The economic and social costs of Class A drug use in England and Wales, 2000. *Home Office Research Study 249*. Retrieved from <http://webarchive.nationalarchives.gov.uk/20110218135832/rds.homeoffice.gov.uk/rds/pdfs2/hors249.pdf>
- Godfrey, C., Pickett, K. E., Parrott, S., Mdege, N. D., & Eapen, D. (2010). Project Final Report A3-06: Estimating the Costs to the NHS of Smoking in Pregnancy for Pregnant Women and Infants. *Public Health Research Consortium* (PHRC), University of York.
- Goodman, A., & Sianesi, B. (2005). *Early education and children's outcomes: How long do the impacts last?* Institute for Fiscal Studies. Retrieved from <http://www.ifs.org.uk/publications/3403>
- Green, H., McGinnity, A., Meltzer, H., Ford, T., & Goodman, R. (2005). Mental health of children and young people in Great Britain, 2004: Full Survey report. *National Statistics*. Retrieved from <http://www.hscic.gov.uk/catalogue/PUB06116>
- Hawkins, J. D., Herrenkohl, T. L., Farrington, D. P., Brewer, D., Catalano, R. F., & Harachi, T. W. (1998). A review of predictors of youth violence. In R. Loeber and D.P. Farrington (Eds.), *Serious and Violent Juvenile Offenders: Risk Factors and Successful Interventions* (pp. 106–146). Thousand Oaks, CA: Sage Publications,

- Hennekens, C. H., & Andreotti, F. (2013). Leading avoidable cause of premature deaths worldwide: case for obesity. *The American journal of medicine*, 126(2), 97-98.
- Hill-Tout, J., Doyle, A., & Allen, D. (1991). The Challenging Behaviour Service, South Glamorgan. In *Meeting the Challenge. Some UK Perspectives on Community Services for People with Learning Disabilities and Challenging Behaviour*. London: King's Fund Centre.
- Honstvet, H. (2013). *Breaking down barriers: making work pay for families with disabled children*. *Every Disabled Child Matters*. Retrieved from <http://lx.iriss.org.uk/content/breaking-down-barriers-making-work-pay-families-disabled-children>
- Hutchings, H. A., Evans, A., Barnes, P., Healy, M. A., James-Ellison, M., Lyons, R. A., ... & Dunstan, F. (2016). Does frequent residential mobility in early years affect the uptake and timeliness of routine immunisations? An anonymised cohort study. *Vaccine*, 34(15), 1773-1777.
- Hutchings, J., Bywater, T., Daley, D., Gardner, F., Whitaker, C., Jones, K., & Edwards, R. T. (2007). Parenting intervention in Sure Start services for children at risk of developing conduct disorder: pragmatic randomised controlled trial. *BMJ*, 334(7595), 678.
- Hutchings, J., & Gardner, F. (2012). Support from the Start: effective programmes for three to eight year-olds. *Journal of Children's Services*, 7(1), 29-40.
- Hutchings, J., & Williams, M. E. (2014). Joined-up thinking, joined-up services, exploring coalface challenges for making services work for families with complex needs. *Journal of Children's Services*. 9 NO. 1 2014, 31-41.
- Institute for Economics and Peace. (2013). *UK Peace Index*. Retrieved from [http://economicsandpeace.org/wp-content/uploads/2015/06/UK\\_Peace\\_Index\\_report\\_2013\\_0.pdf](http://economicsandpeace.org/wp-content/uploads/2015/06/UK_Peace_Index_report_2013_0.pdf)
- Institute for Welsh Affairs (2015). *An economic strategy for Wales?* Retrieved from [http://www.clickonwales.org/wp-content/uploads/IWA\\_EconomicStrategyforWales.pdf](http://www.clickonwales.org/wp-content/uploads/IWA_EconomicStrategyforWales.pdf)
- Jefferis, B. J., Power, C., & Hertzman, C. (2002). Birth weight, childhood socioeconomic environment, and cognitive development in the 1958 British birth cohort study. *BMJ (Clinical Research Ed.)*, 325(7359), 305.
- Johnson, C. D., Jones, S., & Paranjothy, S. (2016). Reducing low birth weight: prioritizing action to address modifiable risk factors. *Journal of Public Health*, fdv212.
- Karoly, L. A., & Bigelow, J. H. (2005). *The economics of investing in universal preschool education in California*. Rand Corporation.
- Kearney, M., & Levine, P. (2015). Early childhood education by MOOC: Lessons from Sesame Street. *NBER Working Paper no. 21229*. Retrieved from <http://www.nber.org/papers/w21229>
- Knapp, M., King, D., Healey, A., & Thomas, C. (2011). Economic outcomes in adulthood and their associations with antisocial conduct, attention deficit and anxiety problems in childhood. *The journal of mental health policy and economics*, 14(3), 137.
- Knapp, M., Scott, S., & Davies, J. (1999). The cost of antisocial behaviour in younger children. *Clinical Child Psychology and Psychiatry*, 4(4), 457-473.
- Law, J., Boyle, J., Harris, F., Harkness, A. & Nye, C. (2000). Prevalence and natural history of primary speech and language delay: findings from a systematic review of the literature. *International journal of language & communication disorders*, 35(2), 165-188.
- Littlecott, H. J., Moore, G. F., Moore, L., Lyons, R. A., & Murphy, S. (2015). Association between breakfast consumption and educational outcomes in 9–11-year-old children. *Public health nutrition*, 1-8.
- Lyons, M., & Ashton, J. R. (2004). Contraception, Fertility and Abortion Services. In A. Stevens, J. Raftery, J. Mant, & S. Simpson (Eds.), *Health Care Needs Assessment: The epidemiologically based needs assessment reviews*. First Series, Second Edition, Volume 2. Radcliffe – Oxford Medical Press
- Mares, M.-L., & Pan, Z. (2013). Effects of Sesame Street: A meta-analysis of children's learning in 15 countries. *Journal of Applied Developmental Psychology*, 34(3), 140-151.
- Marian, V., & Shook, A. (2012). The cognitive benefits of being bilingual. In *Cerebrum: the Dana forum on brain science (Vol. 2012 September)*. Dana Foundation.
- Matrix. (2010). *An economic evaluation of play provision. Play England, Final Report*. Retrieved from <http://www.playengland.org.uk/media/227879/play%20england%20an%20economic%20evaluation%20of%20play%20provision.pdf>

- McCormick, M. C. (1985). The contribution of low birth weight to infant mortality and childhood morbidity. *New England journal of medicine*, 312(2), 82-90.
- McGuire, A., & Hughes, D. (1995). *The economics of family planning services: a report prepared for the Contraceptive Alliance*. London: Family Planning Association.
- Melhuish, E. C. (2003). *A Literature Review of the Impact of Early Years Provision on Young Children, with Emphasis Given to Children from Disadvantaged Backgrounds*. London, UK: National Audit Office.
- Ministry of Justice. (2010). *The youth justice system in England and Wales: Reducing offending by young people*. Ministry of Justice. Retrieved from <http://www.nao.org.uk/wp-content/uploads/2010/12/1011663.pdf>
- Ministry of Justice. (2014). *Costs per place and costs per prisoner National Offender Management Service Annual Report and Accounts 2013-14 Management Information Addendum*. Retrieved from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/367551/cost-per-place-and-prisoner-2013-14-summary.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/367551/cost-per-place-and-prisoner-2013-14-summary.pdf)
- National Assembly for Wales. (2013). *National Assembly Committee begins inquiry into childhood obesity in Wales*. Retrieved from <http://www.assembly.wales/en/newhome/Pages/newsitem.aspx?itemid=1085>
- National Assembly for Wales. (2014). *Flying Start. Research Note*. Retrieved from <http://www.assembly.wales/Research%20Documents/Flying%20Start%20-%20Research%20note-03032014-254185/rn14-005-English.pdf>
- National Institute for Health and Care Excellence. (2011). Supporting investment in public health: Review of methods for assessing cost effectiveness, cost impact and return on investment. *NICE Proof of concept report*. Retrieved from <https://www.nice.org.uk/media/default/About/what-we-do/NICE-guidance/NICE-guidelines/Public-health-guidelines/Additional-publications/Cost-impact-proof-of-concept.pdf>
- National Institute for Health and Care Excellence. (2012). Methods for the development of NICE public health guidance (third edition). *NICE article [PMG4]*. Retrieved from <https://www.nice.org.uk/article/pmg4/resources/non-guidance-methods-for-the-development-of-nice-public-health-guidance-third-edition-pdf>
- National Institute for Health and Care Excellence. (2013). Antisocial behaviour and conduct disorders in children and young people: recognition and management. *NICE guidelines [CG158]*
- National Institute for Health and Care Excellence. (2015). Healthy start vitamins: special report on cost effectiveness. *NICE article [PMG25]*. Retrieved from <http://www.nice.org.uk/article/pmg25>
- New Economics Foundation. (2011). *Catalysts for Community Action and Investment: A Social Return on Investment analysis of community development work based on a common outcomes framework*. Retrieved from <http://www.cdf.org.uk/wp-content/uploads/2011/12/SROI-Report-FINAL.pdf>
- Nicol, S., Roys, M., & Garrett, H., (2015). *The Cost of Poor Housing to the NHS*. Building Research Establishment. Retrieved from <https://www.bre.co.uk/filelibrary/pdf/87741-Cost-of-Poor-Housing-Briefing-Paper-v3.pdf>
- North Wales Local Public Health Team. (2015). *Health 2020: Investment in Prevention*. Retrieved from [http://www.wales.nhs.uk/sitesplus/documents/861/Item%2015\\_54%20Health%202020%20Investment%20in%20prevention%20\\_final\\_%20\\_3\\_%20\\_2\\_.pdf](http://www.wales.nhs.uk/sitesplus/documents/861/Item%2015_54%20Health%202020%20Investment%20in%20prevention%20_final_%20_3_%20_2_.pdf)
- NSPCC. (2014). *Estimating the Cost of Child Sexual Abuse in the UK*. Retrieved from <https://www.nspcc.org.uk/services-and-resources/research-and-resources/2014/estimating-costs-of-child-sexual-abuse-in-uk/>
- Office for National Statistics. (2016). Statistical bulletin: Conceptions in England and Wales: 2014. Retrieved from <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/conceptionandfertilityrates/bulletins/conceptionstatistics/2014>
- Owen, E., Lloyd-Williams, H., & Edwards, R.T. (2015). *Codi'r To: A Social Return on Investment Analysis. Unpublished report to Codi'r To funders*. CHEME, Bangor University.
- Owen, L., Morgan, A., Fischer, A., Ellis, S., Hoy, A. & Kelly, M.P.(2011). The cost-effectiveness of public health interventions. *Journal of Public Health*, p.fdr075.
- Papaioannou, D., Sutton, A., Carroll, C., Booth, A., & Wong, R. (2010). Literature searching for social science systematic reviews: consideration of a range of search techniques. *Health Information & Libraries Journal*, 27(2), pp.114-122.

- Phillips, C. J., Harper, C., Rance, J., & Farr, A. (2011a). *Assessing the costs to the NHS associated with alcohol and obesity in Wales*. Welsh Assembly Government. Retrieved from <http://gov.wales/statistics-and-research/assessing-costs-nhs-associated-alcohol-obesity/?lang=en>
- Phillips, C. J., Humphreys, I., Kendrick, D., Stewart, J., Hayes, M., Nish, L., ... & Towner, E. (2011b). Preventing bath water scalds: a cost-effectiveness analysis of introducing bath thermostatic mixer valves in social housing. *Injury prevention, 17*(4), 238-243.
- Phillips, P. P., & Phillips, J. J. (2004). ROI in the public sector: Myths and realities. *Public Personnel Management, 33*(2), 139-149.
- Pitman, R. J., Nagy, L. D., & Sculpher, M. J. (2013). Cost-effectiveness of childhood influenza vaccination in England and Wales: Results from a dynamic transmission model. *Vaccine, 31*(6), 927-942.
- Public Health Wales Observatory. (2011). *Measuring Inequalities: Trends in mortality and life expectancy in Wales*. Retrieved from [http://www2.nphs.wales.nhs.uk:8080/PubHObservatoryProjDocs.nsf/\(\\$All\)/BA402B3D53C6A33D8025795E00556236/\\$File/InequalitiesProfiles\\_AllWales\\_Final\\_English\\_v1.pdf?OpenElement](http://www2.nphs.wales.nhs.uk:8080/PubHObservatoryProjDocs.nsf/($All)/BA402B3D53C6A33D8025795E00556236/$File/InequalitiesProfiles_AllWales_Final_English_v1.pdf?OpenElement)
- Renfrew, M. J., Pokhrel, S., Quigley, M., McCormick, F., Fox-Rushby, J., Dodds, R., Williams, A. (2012). *Preventing disease and saving resources: the potential contribution of increasing breastfeeding rates in the UK*. London: UNICEF UK.
- ROSPA (n.d.). *Delivering Accident Prevention at local level in the new public health system Part 1: Context*. Public Health England. Retrieved from <http://www.rospa.com/rospaweb/docs/advice-services/public-health/delivering-accident-prevention-context.pdf>
- Rutter, J. (2015). *Childcare costs survey 2015*. London: Family and Childcare Trust. Retrieved from <http://www.familyandchildcaretrust.org/sites/default/files/files/Childcare%20cost%20survey%202015%20Final.pdf>
- Rutter, M. (2006). Is Sure Start an effective preventive intervention? *Child and Adolescent Mental Health, 11*(3), 135-141.
- Sainsbury Centre for Mental Health (2009) *Mental health care and the criminal justice system*. Retrieved from <http://www.ohrn.nhs.uk/resource/policy/SCMHMHandtheCJS.pdf>
- Scarborough, P., Bhatnagar, P., Wickramasinghe, K. K., Allender, S., Foster, C., & Rayner, M. (2011). The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: an update to 2006–07 NHS costs. *Journal of Public Health, 33*(4), 527-535.
- Schweinhart, L. J., Montie, J., Xiang, Z., Barnett, W. S., Belfield, C. R., & Nores, M. (2005). *Lifetime Effects: The High/Scope Perry Preschool Study Through Age 40* (pp. 194–215). Ypsilanti, MI: High/Scope Press.
- Shelter. (2006). *Chance of a lifetime: the impact of bad housing on children's lives*. Retrieved from [https://england.shelter.org.uk/\\_data/assets/pdf\\_file/0016/39202/Chance\\_of\\_a\\_Lifetime.pdf](https://england.shelter.org.uk/_data/assets/pdf_file/0016/39202/Chance_of_a_Lifetime.pdf)
- Social Research Unit. (2013a). *Good behaviour game*. The Social Research Unit at Dartington. Dartington, UK. Retrieved from <http://investinginchildren.eu/interventions/good-behaviour-game>
- Social Research Unit. (2013b). *Group Multimodal Therapy (MMT) for Children with ADHD*. The Social Research Unit at Dartington. Dartington, UK. Retrieved from <http://investinginchildren.eu/interventions/group-multimodal-therapy-mmt-children-adhd>
- StatsWales. (2015). *Children looked after at 31 March by local authority, gender and age*. Retrieved from <https://statswales.wales.gov.uk/Catalogue/Health-and-Social-Care/Social-Services/Childrens-Services/Children-Looked-After/childrenlookedafterat31march-by-localauthority-gender-age>
- Strelitz, J. (2013). *Chapter 3: The economic case for a shift to prevention. The Chief Medical Officer's report, Prevention pays: Our children deserve better*. London: Department of Health. Retrieved from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/255237/2901304\\_CMO\\_complete\\_low\\_res\\_accessible.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255237/2901304_CMO_complete_low_res_accessible.pdf)
- Suhrcke, M., & Kenkel, D. (2015). Social determinants of health: early childhood development and education. In D. McDaid, F. Sassi & S. Merkur (Eds.), *Promoting Health, Preventing Disease The Economic Case: The Economic Case*, (pp. 237-258). England: Open University Press.

- Sylva, K., Melhuish, E. C., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2004). *The Effective Provision of Pre-School Education (EPPE) Project: Final Report*. Nottingham: SureStart/DfES. Retrieved from <http://dera.ioe.ac.uk/18189/2/SSU-SF-2004-01.pdf>
- Wasserman, G.A., & Seracini, A.G. (2001). Family risk factors and interventions. In R. Loeber & D.P. Farrington (Eds.) *Child Delinquents: Development, Intervention, and Service Needs* (pp. 165–189) Thousand Oaks, CA: Sage Publications.
- Weatherly, H., Drummond, M., Claxton, K., Cookson, R., Ferguson, B., Godfrey, C., & Sowden, A. (2009). Methods for assessing the cost-effectiveness of public health interventions: Key challenges and recommendations. *Health policy*, 93(2), 85-92
- Welsh Assembly Government. (2009). *Creating an Active Wales*. Retrieved from <http://sport.wales/media/144469/creating%20an%20active%20wales.pdf>
- Welsh Government. (2015a). Well-being of Future Generations (Wales) Act 2015 <http://www.legislation.gov.uk/anaw/2015/2/contents/enacted>
- Welsh Government. (2015b). *Child Poverty Strategy for Wales*. Retrieve from <http://gov.wales/docs/dsjlg/publications/150327-child-poverty-strategy-walesv2-en.pdf>
- Whitaker, R., Hendry, M., Rabeea'h Aslam, A. B., Carter, B., Charles, J. M., Craine, N., & Rycroft-Malone, J. (2016). Intervention Now to Eliminate Repeat Unintended Pregnancy in Teenagers (INTERUPT): a systematic review of intervention effectiveness and cost-effectiveness, and qualitative and realist synthesis of implementation factors and user engagement. *Health technology assessment (Winchester, England)*, 20(16), 1.
- White, C. C., Koplan, J. P., & Orenstein, W. A. (1985). Benefits, risks and costs of immunization for measles, mumps and rubella. *American journal of public health*, 75(7), 739-744.
- White, D., Raeside, R., & Barker, D., (2000). *Road Accidents and Children Living in Disadvantaged Areas - Research Findings*. The Scottish Government. Retrieved from <http://www.gov.scot/Publications/2000/04/0c1a7de7-fee6-47a3-af0b-56e90b39ea8f>
- Woodfine, L., Neal, R. D., Bruce, N., Edwards, R. T., Linck, P., Mullock, L., & Russell, I. (2011). Enhancing ventilation in homes of children with asthma: pragmatic randomised controlled trial. *Br J Gen Pract*, 61(592), e724-e732.
- Zhou, F., Reef, S., Massoudi, M., Papania, M. J., Yusuf, H. R., Bardenheier, B., & McCauley, M. M. (2004). An economic analysis of the current universal 2-dose measles-mumps-rubella vaccination program in the United States. *The Journal of infectious diseases*, 189, S131-45.

## About the Authors

### Professor Rhiannon Tudor Edwards

*Rhiannon is Professor of Health Economics and Co-Director of CHEME. She is a graduate of the University of Wales, Aberystwyth, University of Calgary, Canada, and The University of York. Rhiannon was a Commonwealth Fund Harkness Fellow in Health Policy, visiting the United States 2004-05. She is a Health and Care Research Wales Senior Investigator, Fellow of the Learned Society of Wales and Honorary Member of the Faculty of Public Health. Rhiannon is Director of the Welsh Health Economics Support Service (WHESS), integral to health and social care research in Wales. She has a particular interest in the methodology of economic evaluation alongside trials of public health and psychosocial interventions.*

### Lucy Bryning

*Lucy is a Research Officer in Health Economics at CHEME. She has a 1<sup>st</sup> Class BSc (Hons) and a Masters by Research both in Psychology. Alongside her work, Lucy is undertaking a PhD in Health Economics exploring the economics of Mindfulness Based Interventions. Her research interests include the evaluation of antenatal and postnatal maternal health programmes and the appropriate methodology for assessing the cost-effectiveness of complex public health programmes and psychosocial interventions.*

### Huw Lloyd-Williams

*Huw joined CHEME in 2012 as a Research Officer. Since then Huw has worked on a number of grant applications including the cognitive rehabilitation for Parkinson's disease project and a project on digital dictation for BCUHB. Huw's background is in applied economics, having received a Masters in Applied Economics and Data Analysis from the University of Essex in 2003 and a first class degree in Economics from Bangor University. Huw has worked as a Research Officer at Swansea University, and Bangor University's Business School and Law School before joining CHEME. Huw is currently undertaking a PhD exploring the economics of tackling Adverse Childhood Experiences.*



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[r.t.edwards@bangor.ac.uk](mailto:r.t.edwards@bangor.ac.uk)



“This careful, thorough and evidence based review from one of the UK’s strongest Health Economics centres provides us with a refreshing, comprehensive and creative view. It takes us from a tired, if valuable, form of health service economics to a new and emerging discipline of Public Health Economics. Investment in the early years is not a luxury but an economic necessity and that a whole systems approach rather than a narrow, downstream medical approach is vital. An Asset Based Approach to Public Health and economic and social development is the logical conclusion with a focus on the life course and a recognition of the intergenerational benefits. The foundations of a new approach can be seen here. I am confident that this will be an influential report.”

**Professor John R Ashton C.B.E., Former President of the Faculty of Public Health**

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Centre for Health Economics and Medicines Evaluation  
Ardudwy Hall, Normal Site, Bangor University, Bangor, Gwynedd, LL57 2PZ  
Phone: 01248 382153