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I predict a riot! The public health economics of improving parenting

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I Predict A Riot!

The Public Health Economics of Improving Parenting

Joanna Mary Charles

Thesis submitted to the Institute of Medical and Social Care Research, Bangor University, in fulfilment of the requirements for the degree of Doctor of Philosophy

May 2012

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LIST OF ABBREVIATIONS

ACERS	Average Cost-Effectiveness Ratios
BDI	Beck Depression Inventory
BDI II	Beck Depression Inventory II
CBT	Cognitive Behavioural Therapy
CD	Conduct Disorder
CES-D	Centre for Epidemiologic Studies Depression Scale
CRD	Centre for Reviews and Dissemination
CSRI	Client Service Receipt Inventory
DSM IV	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision
DQ	Developmental Quotient
ECBI	Eyberg Child Behaviour Inventory
EPPI-Centre	Evidence for Policy and Practice Information Centre
GP	General Practitioner
HCHS	Hospital Community Health Service
ICD 10	International Classification of Diseases, 10^{th} Revision
ICERS	Incremental Cost-Effectiveness Ratios
IEP	Individual Education Plan
IY	Incredible Years
MRC	Medical Research Council
MCDA	Multi-Criteria Decision Analysis
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence

NWORTH	North Wales Organisation for Randomised Trials in Health
ODD	Oppositional Defiant Disorder
OHE	Office of Health Economics
PACS	Parent and Child Series Programme
PDHQ	Personal Development and Health Questionnaire
PEIP	The Elmira Pre-natal/Early Infancy Project
PSI	Parenting Stress Index
QALYs	Quality Adjusted Life Years
RCT	Randomised Controlled Trial
ROI	Return on Investment
SROI	Social Return on Investment
SGS II	Schedule of Growing Skills
U.K.	United Kingdom
U.S.	United States
WHO	World Health Organisation
WSIPP	Washington State Institute for Public Policy

THESIS SUMMARY

Costs of the U.K. summer riots of 2011 are estimated at over £100 million (Hawkes, Garside & Kollewe, 2011). Poor parenting was viewed as one of the main reasons for the riots. The high costs associated with problematic and antisocial child behaviour has led to an increased interest in parenting within U.K. policy and agendas (Allen, 2011a).

Health economics is an application of the discipline of economics and has grown from Welfarism and Extra Welfarism. Health economists have developed standard methods of evaluation to meet the evidence requirements of publicly funded health care systems facing the need for constrained choice. These standard methods are limited when it comes to measuring benefits where the direct beneficiaries are children. The aim of this thesis was to assess the different approaches required to conduct an economic evaluation of a complex intervention in which the principal beneficiaries are young children, using the Incredible Years (IY) Toddler and Basic Parenting Programmes as case studies (Webster-Stratton, 1984; 2008). It explored previous evidence in the form of a literature review and methodological issues in the form of micro-costing, cost-consequence, cost-effectiveness and social return on investment analyses. The thesis also explored the issue of externalities in the form of assessing outcomes for parents and long-term outcomes.

This thesis concludes that there is little economic evidence of parenting programmes for young children and a lack of standardisation of methodology, thereby making comparisons of programmes difficult. Future research should focus on the wider benefits of parenting programmes and take a longitudinal or modelling approach when assessing early intervention programmes. Researchers should also be mindful of who their evidence will serve, using outcomes and forms of analysis that are meaningful to service commissioners and policy makers. This will help build a strong clinical and economic evidence base of parenting programmes.

Chapter 1: Introduction

"...In too many cases, the parents of these children, if they are still around, don't care where their children are, or who they are with, let alone what they are doing..."

Rt. Hon. David Cameron MP, Prime Minister and Conservative Party Leader (August, 2011)

Introduction

Background/history of health economics

Health economics is a sub-discipline of economics; which is the study of how society uses scarce resources to meet its wants and needs. Health Economics views health care as an economic good and is predominately concerned with the scarcity of resources and the potential abundant uses for these scarce resources (McGuire, Henderson & Mooney, 1997). If health care is considered to be an economic good, choices are needed to determine what quantity and mix of health care to produce, how to produce it, who pays for it and how it is distributed. In making these choices it is inevitable that certain trade-offs occur. Opportunity cost refers to the costs of committing resources to produce a good, product or service in terms of the next best alternative foregone (Lipsey & Harbury, 1994). An example of this would be that resources used for one heart transplant surgery would no longer be available to be used for hundreds of vaccinations (Morris, Devlin & Parkin, 2007). In countries such as the U.K. where health and social care is predominately publically funded from taxes there is a top-down hierarchy of decision making as to what services will be produced and how services will be distributed (Drummond, Sculpher, Torrance, O'Brien, & Stoddart, 2005).

Health can have an impact on a person's welfare such as housing, employment and lifestyle; making health a "fundamental commodity" (McGuire et al., 1997). People want to be in good health, people are generally willing to pay for improvements in it and it is scarce relative to people's wants; however, health is not a conventional good, people cannot trade health or transfer their good health onto others (McGuire et al., 1997). As health cannot be traded, it is not possible to analyse it in the context of a competitive market; instead we focus on the production of health care (McGuire et al., 1997). In the U.K., The National Health Service (NHS) is based on a range of principles that ensure the provision of access to health care for all according to need, and regardless of ability to pay (Rivett, 1998). The NHS could pursue a range of goals from maximising societal health to improving the health of the worst off. This leads to the question of how to allocate health care resources; should it be based on efficiency goals (where need

equals an ability to benefit), equity goals or patient demand (e.g., private medicine)? Health economics can help inform these decisions.

Welfarism/ Extra Welfarism

Economic evaluation of health care encompasses a broad set of analytical approaches used to compare and contrast the benefits and costs of competing uses of resources. It is generally normative concluding one option is better value than another after weighing up all the benefits and costs of one intervention against another (Drummond et al., 2005). Economists are concerned with the value, whether it is expressed in monetary terms or health benefits and the trade-offs people for example, the general public and policy makers are willing to make such as cost, accessibility and time.

Welfarism describes a systematic analysis of the social desirability of any set of arrangements e.g. allocation of resources, solely in terms of the utility obtained by individuals (Culyer 1989; Morris et al., 2007). At the heart of welfarism lies the Pareto Principle, which states that when value judgements must be made the best is the one which would command the widest support (McGuire et al., 1997; Morris et al., 2007). The goal of Paretian analysis is to aggregate individual preferences to produce a social welfare ordering, which is a complete and consistent ranking of all possible states in terms of their social desirability (Morris et al., 2007; Drummond et al., 2005). Improvements under this principle are classed as either weak or strong (Morris et al., 2007). A weak Paretian improvement is one in which a change in the state of the world results in increased utility for all affected individuals (Morris et al., 2007). A strong Paretian improvement is one in which a change in the state of the world which increases the utility of at least one person, and does not decrease the utility of anyone else (Morris et al., 2007).

The Paretian principle is limited as it does not provide any means of ranking optimal states; a Paretian improvement is not concerned with who is better off or the size of the gain only that there are no losers (Tsuchiya & Williams, 2001). A possible solution to this limitation was proposed by Kaldor (1939) and Hicks (1939) using compensation tests, which assesses gains and

losses in terms of utility and money. It aims to compensate those who lose so their utility returns to the same level before the change (McGuire et al., 1997). For those who gain, this represents the appropriate amount of money that must be taken away from them so their utility returns to the same level before the change. Morris et al. (2007) illustrate compensation tests using an example between two health authorities For example, if one health authority is given an additional £3 million by the Government and another loses £2 million. If the gaining authority gave two of their £3 million to the losing authority, the losing authority breaks even (-£2 million - £2 million = 0) and the other authority still has an additional £1 million (Morris et al., 2007). There are a number of limitations to compensation tests. Compensation tests are hypothetical and compensation is costly to negotiate and organise. The use of money as a metric for utility opens the possibility of diminished marginal utility over time. This could lead to the amount of money required to fully compensate the loser being lower than the amount of money required to compensate the gainer for foregoing the change. The Pareto principle and compensation tests are social rankings of states of the world, which view people as a collective society (Morris et al., 2007). Measuring social welfare with respect to individual utilities alone is misleading because individuals' assessments of their well-being and utility are affected by their characteristics as people (Culyer, 1989).

Extra Welfarism is concerned with the non-goods characteristics of individuals (e.g., happiness, pain and physical mobility) (Culyer, 1989). Extra Welfarism does not exclude individual welfare from judgements about the social state, but it does supplement them with other aspects of the individuals e.g. preferences regarding the process by which goods are chosen or consumed (Culyer, 1989; Morris et al., 2007). Pareto principles take account of the social welfare function measuring society's welfare in real numbers as a function of its member's individual utilities (Drummond & McGuire, 2007). Extra-Welfarism takes the notion of social welfare order outlined by Pareto further by regarding it as a social welfare function (Culyer, 1989). Under Extra Welfarism, the social welfare function measures society's welfare as a function of its members' individual utilities and aspects such as, health (Morris et al., 2007). Culyer (1989) advocated for health to be included in the social welfare function alongside utility. Principles of Welfarism and Extra-Welfarism form the theoretical underpinning of

the practical technique known as economic evaluation. They are judgements about the superiority of one state of the world over another (Culyer, 1989). The economic evaluation "toolbox" comprising of cost-minimisation analysis, cost-effectiveness analysis, cost-utility analysis, cost-consequence analysis and cost-benefit analysis has been developed in order to operationalise these concepts and support decision makers. Cost-benefit analysis is the closest to Paretian principles by using money as a proxy for utility. Other methods of economic evaluation such as, cost-utility and cost-effectiveness analysis use health as a utility to quantify the social welfare function.

Economic Evaluation

Economic evaluation helps decision makers choose between alternative ways of using resources. There are five types of economic evaluation for example; cost-minimisation analysis, cost-effectiveness analysis, cost-utility analysis, cost-consequence analysis and cost-benefit analysis.

Cost-minimisation analysis is a form of economic evaluation used when an intervention or service and its alternative achieve outcomes that are the same (Brazier et al., 2007; Robinson, 1993d). Under these circumstances cost-minimisation analysis aims to identify the least costly option (Brazier et al., 2007, Robinson, 1993d). However, in practice it is difficult to find interventions or services with the same outcomes, as there is often uncertainty around the outcome measure of choice (Brazier et al., 2007). The use of cost-minimisation analysis highlights questions about the gathering of cost data such as, what perspective should be chosen, should costs reflect opportunity costs, should one take account of the effects of inflation and discounting.

Cost-effectiveness analysis compares the costs of alternative procedures, services or interventions with their outcomes, usually expressed in natural units such as cost per cases averted (Robinson, 1993b). A cost effectiveness ratio is used calculating the cost per unit of output or effect (Glick, Doshi, Sonnad, & Polsky, 2007). The cost-effectiveness ratio measures the incremental cost of an activity relative to its best alternative divided by the incremental effect (Glick et al., 2007). When making decisions this ratio is compared to a ceiling ratio, which

is a benchmark that the intervention must meet in order to be deemed cost-effective. This ceiling ratio is arbitrary and has been suggested in the U.K. at £20,000-£30,000, at $50,000 in the U.S. and between A$42,000-A$76,000 in Australia (Eichler, Kong, Gerth, Mavros, & Jönsson, 2004). Effectiveness data is typically collected from economic evaluations alongside clinical trials or randomised controlled trials (Robinson, 1993b). Robinson (1993b) recommends sensitivity analysis is performed when there is uncertainty in the results from cost-effectiveness analyses. Sensitivity analysis allows one to explore the extent to which assumptions made are held, whilst adjusting key variables. However, sensitivity analysis is not exclusive to cost-effectiveness analysis; it can be applied during other forms of economic analysis.

Cost-utility analysis is an extension of cost-effectiveness analysis. It is a form of economic evaluation in which health benefits are usually measured in preference-based non-monetary units such as Quality Adjusted Life Years (QALYs). QALYs are calculated by aggregating the number of years gained from a drug or health care intervention, weighted by the proportion that represents the relative value attached to a given health state (Robinson, 1993c). A cost-utility ratio is usually calculated in terms of a cost per unit of utility (Morris et al., 2007). QALYs are a cardinal, quantitative measure of utility; as such, QALYs break away from the principles of Welfarism (Sen, 1977). Assuming a pure maximisation of QALYs leads to a restriction of Pareto criterion (Wagstaff, 1991). Wagstaff (1991) uses the example of QALYs gains for the young and the elderly to highlight this point. If QALYs are gained more by the young, due to the fact they have more life left to lead than the elderly, then an efficiency criteria which states the maximisation of QALYs would cause a redistribution of health care resources away from the elderly and towards the young (Wagstaff, 1991).

Cost-consequence analysis analyses collects, categorises and lists the cost components of a chosen intervention (Brazier et al., 2007). This type of analysis lists the components of an intervention, without making judgements of their relative importance, the verdict is left to the decision maker (Brazier et al., 2007; ISPOR, 2003).

Cost-benefit analysis places monetary values on both costs and outcomes. The aim of cost-benefit analysis is to identify Pareto improvements or potential Pareto improvements, answering the question is a particular output worth the cost

(Morris et al., 2007). However, it can only value tangible outcomes e.g., money not intangible outcomes, which are yet to be, quantified e.g. happiness (Morris et al., 2007). In evaluations of health care services or procedures the use of monetary values allows one to examine if a service or procedure offers an overall gain to society if its total benefits surpass its total costs (Brazier, Ratcliffe, Saloman, & Tsuchiya, 2007; Robinson, 1993a). Benefits in this method can be valued using the human capital approach, an approach that values benefits in terms of productivity gains or by individual's preferences using willingness to pay (Robinson, 1993) or willingness to accept (Drummond & McGuire, 2007). Willingness to pay requires asking individuals how much they would be prepared to pay to obtain the benefits or avoid the costs (e.g., money or negative effects) of illness (Brazier et al., 2007; Robinson, 1993a). Willingness to accept requires asking individuals how much they would be prepared to pay to abandon a good or put up with something negative (e.g., side-effects from a medication that reduced other symptoms) (Drummond & McGuire, 2007). Willingness to pay and willingness to accept are often dependent upon how the individual values money itself, as well as their valuation of benefits and negative effects (Robinson, 1993a).

When conducting economic evaluations costs of the intervention in question are typically calculated by performing either macro-costing (top-down) or micro-costing (bottom-up) analyses. Macro-costing may use previous data or national average costs, proportioning them in line with the intervention being assessed (Morris et al., 2007). Micro-costing records the individual quantities of resource input for a particular programme in a certain context, for example staff time, materials, room rental, recruitment and supervision of staff. Unit costs, tariffs or prices are then assigned for a particular currency, year and under a certain perspective of analysis (Morris et al., 2007). Micro-costing may also use national costs where applicable. An accurate costing of an intervention/service and its alternative is important. A lack of clarity or underestimation in the costs of an intervention, could lead to an incorrect cost-benefit/effectiveness analysis. This could result in resource expenditure in perhaps a less effective more costly intervention, when a more effective, less costly alternative could have been chosen (Charles, Bywater, Edwards, & Hutchings, 2011b). Accurate costs are particularly important for new interventions, as no previous research is available.

Each method of economic evaluation measures the costs of an intervention; however, they each use different methods to value outcomes. As each method values outcomes differently; they have particular strengths and limitations when applied practically, one form of economic evaluation may be more suitable than another. A new form of economic analysis, Social Return on Investment analysis, a method more common in the U.S. is becoming of interest in the U.K.

Social Return on Investment analysis

Social Return on Investment (SROI) analysis calculates the ratio of money saved to money invested in services. This type of analysis, which is common in the U.S., is becoming of interest to U.K. policy makers, local service commissioners and charities. SROI is calculated by first producing estimates of what programmes work and what programme do not for key topics of legislative interest (e.g., crime prevention, Aos, 2010). Once this average effect is estimated, costs and benefits are inserted into the analysis to answer two questions; how much does it cost to produce the effect found in the initial estimates and how much is it worth (e.g., in terms of a cash equivalent, expended resources and beneficial outcomes) to people in a certain location to achieve the outcome (Aos, 2009). SROI analysis could be considered an extended form of cost-benefit analysis, which can produce a forecast of the return on investment in future years. SROI analysis conducted in the U.S. has shown the potential long-term financial savings of school-based programmes. Schweinhart et al. (1993, 2005) calculated the long-term SROI of the High/Scope Perry Preschool Programme (Weikart, 1966) in terms of return on investment to the education system, welfare and judicial system and the tax payer after the intervention was delivered to children at preschool, age 3-5 years. The total return on investment when the children were 27 years old was $7.16 per $1 invested and when the children were 40 years old, the total return on investment grew to $16.14 per $1 invested (using a discount rate of 3%). Methods of economic evaluations such as, cost-effectiveness and cost-benefit analyses are being increasingly used to evaluate public health interventions such as parenting programmes. These evaluations are viewed as complex interventions, comprising

of a multitude of factors (Medical Research Council [MRC], 2008) and are usually evaluated through randomised controlled trials of the clinical effectiveness of the intervention, with an economic evaluation performed alongside.

The importance of viewing parenting programmes as complex interventions

The Medical Research Council (MRC) 2008 complex intervention guidelines (MRC, 2008) describe a complex intervention as an intervention with;

1. a number of interacting components.
2. a number of behaviours required by those delivering or receiving the intervention.
3. a number of groups or organisational levels targeted by the intervention.
4. a number and variability and outcomes.
5. a degree of flexibility or tailoring of the intervention permitted.

The IY Parenting Programmes consist of a multitude of interacting components. The programme is delivered in a group setting using a range of techniques from group discussion to role-play and video-modelling. Each of these techniques requires a different set of behaviours from both the group leaders delivering the programme and the parents attending the session. The groups are typically delivered through community services and in areas of socio-economic deprivation in the U.K. Families living in Flying Start areas in Wales are offered the IY programmes as part of additional service support which also includes enhanced health visiting services, free childcare, parenting and basic skills support (Welsh Assembly Government, 2005a). The IY programmes are tailored to the families they serve. Barriers to attendance are reduced through the provision of crèche facilities, taxis to and from the weekly sessions (if required) and refreshments/food during the sessions, as part of the programme delivery.

Others define complex interventions as non-standard interventions, which have different forms and are delivered in different contexts, while still conforming to a specific theory driven process (Hawe, Shiell, & Riley, 2004). This definition is also true of the IY programmes. The IY series of programmes covers a range of age groups from infant programmes to programmes for parents of adolescents and there are programmes for parents, teachers and children. Though there are a range

of programmes they all conform to the same pattern of weekly sessions delivered by a group leader, and follow the same cognitive social learning theoretical background (Bandura, 1977; Bandura et al., 1975; Patterson, 1976; Piaget, 1952). The programmes have been delivered in many settings for example, urban and rural areas (Hutchings et al., 2007; Webster-Stratton, & Hancock, 1998). The programmes have also been delivered as both interventions aimed to treat problematic behaviours in school-aged children (Bywater et al., 2011; Scott et al., 2001b; Webster-Stratton, & Hancock, 1998), and as preventative interventions for children "at risk" of developing behavioural problems (Bywater et al., 2009; Hutchings et al., 2007; Miller & Rojas-Flores, 1999). The IY programmes have also been delivered in many countries from the U.S and U.K. to Jamaica and Denmark. The programmes have been translated from English into a number of other languages such as Spanish and Chinese.

The IY Parenting Programmes could be considered to have multiple complex interactions within the one programme. The programme consists of a synergistic interaction between group leaders, parents and families (Eames et al., 2010). Parents are taken through the weekly sessions by the group leader. During the session parents interact with the group leader and other parents who are attending the programme. After the session parents are expected to put the skills learnt in the session into practice at home, altering the current parent and child dynamic and bringing about a change in child behaviour (Gardner, Hutchings, & Bywater, 2010). The skills acquired could also have an impact upon the family, bringing about a change in family dynamic and perhaps a change in sibling behaviour (Hutchings et al., 2007). The programme also provides the group leaders with an opportunity for career development. Taking part in IY group leader training provides group leaders with accreditation and the opportunity to undertake further training to train others and provide supervision as well as providing the programme for families in need. Complex public health interventions can challenge the economic "toolbox" (Kelly et al. 2005; Weatherly et al. 2009).

Challenges of applying the economic toolbox to complex public health interventions.

Weatherly et al. (2009) highlighted four key challenges faced when conducting economic evaluations of public health interventions. These challenges are attribution of effects, measuring and valuing outcomes, indentifying inter-sectoral costs and consequences and incorporating equity considerations. Attribution of effects refers to the socio-economic circumstances and timing in which a trial takes place, as these may have a larger effect on outcomes than in a trial of a clinical intervention. The challenge of measuring and valuing outcomes is that although QALYs allow comparability with alternative uses of health care resources. QALYs may not capture health benefits sufficiently, for example spill over effects to family, community and society (Weatherly et al., 2009). Sectors such as housing, education and transport may have as much influence on public health as the NHS and may bear costs of public health interventions. These inter-sectoral costs and consequences should be taken into consideration in the analysis (Weatherly et al., 2009). The National Institute for Health and Clinical Excellence (NICE) and the NHS operate largely in an implicit health maximisation model where efficiency is paramount. Public health has long focussed on equity considerations for example, improving the health of the worst off in society (Weatherly et al., 2009).

Challenges of public health interventions – efficiency and equity considerations.

Methods of applied economic evaluation (e.g. cost-effectiveness and cost-benefit analyses) used by U.K. governing bodies such as the National Institute for Health and Clinical Excellence to inform health and social care resource allocation are based upon the principles of allocative efficiency and equity. These methods typically operate a QALY maximisation strategy aimed at increasing the utility of at least one person, but without decreasing the utility of anyone else (Morris et al., 2007). Cost-effectiveness and cost-benefit analyses allow one to compare the costs of a number of alternative procedures, interventions or services with their outcomes (Robinson, 1993b; Robinson, 1993c, Brazier et al., 2007). These costs

per outcome are then compared using a ceiling ratio of £20,000-£30,000 in the U.K. (Eichler et al., 2004). Since the development of NICE and its appraisal of new technologies, drugs, services and procedures, the postcode lottery system that previously operated in the U.K. has reduced significantly. Local authorities are required to fund new treatments approved by NICE within 3 months of publication (National Institute of Health and Clinical Excellence [NICE], 2012), which assists a more efficient and equitable access and provision to health and social care (NICE, 2001). However, it is argued by some that the implementation of recommendations made by NICE does not necessarily improve efficiency or equity (Burke, 2002; Doyle, 2001; Smith, 2000). Results that inform guidance such as an incremental cost-effectiveness ratio (ICER) are compared to the ceiling ratio solely in terms of the inputs and outputs calculated in that particular ICER. In general, other criteria beyond the ICER are not considered for example, it may be worth lowering the ceiling ratio for interventions with a large budgetary impact as they are likely to displace more than the marginal activities (McCabe, Claxton. & Culyer, 2008). The consideration of including criteria beyond the ICER is of particular importance in complex public health interventions. Complex public health interventions should be considered under the perspective of Extra Welfarism. Due to the multiple, non-linear interacting factors within complex interventions a multitude of factors should be considered and supplemented within the social welfare function when conducting economic evaluations. The current methods of cost-effectiveness and cost-benefit analyses do not allow for multiple outcomes to be assessed simultaneously. Thus, the current system of health and social care resource allocation, based under a Welfarist perspective of allocative efficiency and equity is not compatible with complex public health interventions. McCabe et al. (2008) also suggest the value of the NICE threshold should be reconsidered at regular intervals in order to capture changes in efficiency and budget over time.

The notion of applied economic evaluation for the allocation of resources has been discussed with regards to the interplay of efficiency and equity. However, under this system there is also the potential for trade-offs to occur between efficiency and equity (Wagstaff, 1991). For example, a local health authority may have to reduce or remove funds from another service, in order to allocate funds to a recently NICE recommended health technology. This trade-off

between efficiency and equity may become more likely under the context of public health interventions due to the vast nature of what constitutes and encompasses public health. What is considered to be "public health" can range from health and social care to transport and community services. Under such a wide definition decisions for resource allocation are extremely difficult. There are many services to consider and a limited budget in which to fund all these services. Take for example, a local authority that has a certain budget and two key areas of local concern to resolve within its community. One of the concerns is the need for improved transport links through the development of a new railway line and the other is for better family services through increased provisions of early years parenting programmes. In order to assess where the funds should be allocated, the local authority conducts an economic evaluation of the two options. However, the methods available using the current economic "toolbox" may not be most appropriate for the scenario above, as outcomes for each of these interventions will be different due to the composition of intervention, the population it is intended to serve and its level of complexity. What would be the most beneficial to the decision makers is an evaluation that could provide comparability between the two interventions.

NICE is currently developing guidance for the evaluation of public health interventions. Current publications by NICE detailing the development of this guidance state that health economic analysis and evaluation is an integral part of the public health guidance development process along with analysis and evaluation of clinical effect (NICE, 2009). Methods for development of NICE public health guidance set out how health economic evidence should be collated and analysed within public health assessments. The guidance also states the principles for conducting health economic modelling, when there is insufficient evidence to conduct cost-effectiveness analyses, (NICE, 2009). This document states the types of economic evidence that researchers are likely to see in previous evidence are cost–utility, cost–benefit, cost-effectiveness, cost-minimisation and cost–consequence analyses. This document also states the types of modelling that could be conducted include estimation procedures to predict long-term costs and outcomes and formal decision-analytic models such as multi-criteria decision analyses (MCDA). MCDA is an axiomatic based decision theory that provides a guiding principle for choosing between courses of action (Raiffa & Schlaifer,

1961). MCDA takes the form of decision trees showing sequences of acts and events, probabilities of uncertainty, and utility curves to capture decision makers' values of consequences and their risk aversion (Raiffa & Schlaifer, 1961). MCDA has been used in decision making for transport and environment resources (Department for Communities and Local Government, 2009). The MCDA process can be summed up in 8 steps (Department for Communities and Local Government, 2009);

1. Establishment of decision context (including aims and identification of decision makers).
2. Identification of the options to be appraised
3. Identification of objectives and criteria (including the consequences of each option and an organisation of criteria into a hierarchy based on objectives).
4. Scoring of the options against the criteria (including an assessment of the value associated with the consequences of each option, for each criterion).
5. Assignment of a weighting for each of the criterion to reflect their relative importance to the decision.
6. Combination of the weights and scores for each option to derive an overall value.
7. Examination of the results.
8. Execution of sensitivity analysis (including varying the options or creating new options and repeating steps 1-7 with these new options).

SROI or MCDA analyses could perhaps pose a solution to the example given earlier of the local authority needing to decide between a new railway line or early intervention parenting programmes.

Challenges of conducting economic evaluations of public health have been previously highlighted in the literature (Burke, 2002; Doyle, 2001; Kelly et al., 2009; Smith, 2000; Wagstaff, 1991; Weatherly et al., 2009). However, evaluations of public health interventions are particularly challenging when the programme benefits young children. In light of this, this thesis will focus on group based parenting programmes delivered in community settings with parents of children aged between 1-2 years at risk of conduct disorder (CD) and the implications of this for research and practice.

Prevalence of childhood behavioural disorders

CD is defined by antisocial and noncompliant behaviour, verbal and physical aggression, cruel and destructive behaviour towards the child's own and other people's property (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision, (DSM-IV- TR) (American Psychiatric Association, 2000; International Classification of Diseases, 10th revision, (ICD-10) (World Health Organisation, 2010). In the general population, it is estimated that 6.9% of boys and 2.8% of girls aged 5 to 10 years old present with CD in the U.K and 20% in socially disadvantaged areas (Attride-Stirling, Davis, Day, & Selare, 2000). Oppositional defiant disorder (ODD) a mild variant of CD is characterised by negative, defiant, disobedient and hostile behaviour towards figure of authority (International Classification of Diseases, 10th revision, (ICD-10) (World Health Organisation, 2010; Schachar & Wachsmuth, 1990). It is estimated that 4.5% of boys and 2.4% of girls for children aged between 5-10 years old in the general population in the UK have ODD (NICE, 2006). A diagnosis of a behavioural disorder in early life has shown to have a negative impact on an individual in later life such as; anti-social personality, crime, failure at school, unemployment, failure in relationships and financial dependency upon the state (Fergusson, Horwood, & Ridder, 2004; Farrington, Loeber, & Ttofi, in press; Robins, 1996; Rutter & Giller, 1983; Simonoff et al., 2004).

The clinical diagnoses above are usually identified from the ages of five years old and above; however, there are younger children who are at risk of developing these disorders later in life. Risk factors associated with the development of childhood behavioural problems include inconsistent or neglectful parenting, family poverty, single parenthood, large family size and living in disadvantaged areas (Farrington, 1995; Sainsbury's Centre for Mental Health, 2009). Protective factors against CD and behavioural difficulties in later life include good emotional and social competence in the early years of a child's life (Adi, Killoran, Janmohamed, & Stewart-Brown, 2007). Emotional competence refers to the ability to express one's emotions and successfully interpret the emotions of others (Welsh & Bierman, 2001). Social competence refers to the

group of social, emotional and cognitive behaviours/skills that children need in order to adapt successfully to social situations (Welsh & Bierman, 2001). Without these protective factors, children are likely to develop behavioural problems, placing large costs on the individual, family and society.

The impact of child behavioural disorders upon society

Childhood behavioural disorders place a huge financial burden on society. Previous research found the costs for National Health Services (NHS) to treat a child with CD was £2457 (per child, per year in 1999), which equates to £3656.22 for the cost year 2010/11 (Knapp, Scott, & Davies, 1999). Romeo, Knapp and Scott (2006), using a sample from a previous study (Scott, Knapp, Henderson, & Maughen, 2001a) found the mean total costs of NHS, voluntary and education services were £1,277 per child per annum (£1434.72 in 2010/11). Scott et al. (2001a) found the costs to publically resourced services for an individual aged 28 years who continued to experience behavioural problems associated with early onset CD was estimated to be £70019 (£94145.98 inflated to 2010/11), 10 times higher than the costs for an individual with no childhood behavioural problems. The costs above relate to the treatment of CD through the NHS; however, if CD is not effectively managed or treated then large costs can fall on society through unemployment, anti-social behaviour and crime.

The cost of youth unemployment is estimated at £10 million per day (The Prince's Trust, 2007). The average cost of an individual's lifetime on benefits is estimated at £430,000, not including the loss of tax revenue (Allen & Duncan Smith, 2008). The costs of youth crime in England and Wales in 2009 were estimated between £8.5-11 billion (National Audit Office 2010). It is estimated that around 80% of all criminal activity is attributable to individuals who had conduct problems either as children or adolescents (Sainsbury's Centre for Mental Health, 2009). The total cost of all crime in England and Wales committed by individuals who experienced CD or conduct problems in childhood is estimated at £65 billion a year (Sainsbury's Centre for Mental Health, 2009). Given the high costs associated with managing and treating CD and the potential costs to society

if nothing is done, it is imperative to find an effective and cost effective solution to child behaviour problems.

Parenting in the context of 2011 events

Events over the summer of 2011 shifted the issue of poor parenting into public consciousness and focus. In August 2011 riots took place across London, Manchester, Birmingham, Nottingham and Leicester. The riots lasted for five days, resulted in public expenditure of over £100 million for; policing costs, loss of revenue for retailers, judicial costs and compensation for those who lost their homes or places of business during the riots (Hawkes, Garside, & Kollewe, 2011). Seventy-four percent of those arrested were aged between 10-24 years old and recent statistics released show that on average individuals who were involved in the London riots had 15 previous offenses to their name (Ministry of Justice, 2011). The riots placed the issue of parenting in the U.K. into firm public focus. Media coverage showed footage of children as young as 8 years old involved in the riots, committing acts such as vandalism and looting. A Guardian poll in conjunction with ICM research, commissioned as part of the Reading the Riots study found that 86% of the public cited poor parenting as the main cause of the riots (Prasad & Bawdon, 2011). The Prime Minister David Cameron in a public address after the riots blamed "a lack of proper parenting, a lack of proper upbringing, a lack of proper ethics, a lack of proper morals" (Prasad & Bawdon, 2011). The U.K. riots of 2011 opened a larger debate of whether interventions should be implemented for children with behavioural problems and for children at risk of developing behavioural problems due to factors such as inconsistent or neglectful parenting, family poverty, single parenthood, large family size and living in disadvantaged areas (Farrington, 1995; Sainsbury's Centre for Mental Health, 2009). This has led to an increased need for effective and cost-effective parenting programmes, which could provide a solution for child behavioural problems and reduce the burden on wider society. Parenting and family agendas have been reflected in U.K. policy and practice for example, Sure Start, Flying Start and Family Nurse Partnership initiatives. Documents and reports such as Every Child Matters (2003) and Early Intervention: The Next Steps (Allen 2011a)

and Early Intervention Smart Investment, Massive Savings (Allen 2011b) which detail the costs to society without preventative action and offer suggestions of how the Government can fund evidence based effective interventions and invest in the future of children.

Evidence of effective treatment/management of child behavioural disorders using parenting programmes

Previous research has shown behavioural parenting programmes to be more effective in reducing conduct problems than school-based programmes (Farrington & Welsh, 2003). Parenting programmes have been shown to reduce behavioural problems in children. There is a large clinical evidence base of the effectiveness of these programmes. The Triple P Positive Parenting Programme (Sanders, 1999) is a multi-level parenting programme providing information, advice and interventions for parents of children with mild to severe behavioural difficulties. Triple P has been shown to be effective in improving the child behaviour of preschoolers and school-age children (Sanders, Markie-Dadds, Tully, & Bor, 2000a; Sanders, Markie-Dadds, & Bor, 2004). The Incredible Years series of programmes has an evidence base, which spans 30 years. These programmes have been shown to be effective at reducing problematic child behaviour in school-aged children (Bywater et al., 2011; Scott, Spender, Doolan, Jacobs, & Aspland, 2001b; Webster-Stratton, & Hancock, 1998; Webster-Stratton, & Hammond, 1997). These programmes have also shown to be effective as preventative interventions in populations where children are deemed "at risk" of developing CD due to socio-economic risk factors such as living in disadvantaged areas (Bywater et al., 2009; Hutchings et al., 2007; Miller & Rojas-Flores, 1999). Effective components of the IY programmes include group discussion, role-play, and video-modelling to enhance skills to manage problematic behaviour and teach pro-social alternatives (NICE, 2006). The IY Basic Parenting Programme (for parents of children aged 3-6 years) is designed to promote positive strategies and to assist parents in managing children's behaviour problems. The programme is broken down into 4 parts delivered between 14-18 weeks. The programme develops social skills, promotes school readiness,

encourages co-operative behaviour and develops positive discipline practices such as rules, routines and effective limit setting (Webster-Stratton, & Hancock, 1998). The IY Toddler programme (for parents of children aged 1-3 years) teaches praise and encouragement to build children's self-esteem, develops strategies to cope with toilet training, sharing, plus bed times, and encourages social and emotional competences. The programme is broken down into 4 parts delivered over 12 weeks (Webster-Stratton, 2008).The IY series of programmes are based upon principles of cognitive social learning theory, particularly Patterson's coercion hypothesis of negative reinforcement developing and maintaining deviant behaviour (Patterson, 1976), Bandura's philosophy of self-efficacy (Bandura, 1977) and modelling (Bandura, Jeffery, & Gajdos, 1975) and Piaget's developmental interactive learning methods (Piaget, 1952). The programme adopts a self-learning model employing self-monitoring and weekly goal setting through a collaborative relationship between group leaders and parents (Webster-Stratton, 2012).

Recently parenting programmes have been trialled as prevention interventions for children under three years old. Results have demonstrated improved child behaviour (McMenamy, Sheldrick, & Perrin, 2011; Niccols, 2009; Elliot, Prior, Merrigan, & Ballinger, 2002; Love et al., 2005) and improved child social and emotional development (Love et al., 2005). Though there is a large clinical evidence base for parenting programmes, there is a relatively smaller evidence base for economic evaluations of parenting programmes. This lack of evidence can hinder the practical implementation of parenting programmes.

Why is it important to assess parenting programmes from an economic perspective?

Economic evidence can help local governments, service managers and decision makers implement effective and cost-effective programmes within their local communities. The use of effective and cost-effective programmes could also reduce the cost burden on publically resourced services (e.g., health and social care services) that deal with the consequences of untreated or unmanaged conduct

problems. There are few previous full economic evaluations conducted on parenting programmes, in comparison to the number of clinical effectiveness evaluations (Charles et al., 2011a). Previous research has tended to focus on the delivery costs of the programme, rather than conducting full economic evaluations (Charles et al., 2011b). Of the previous full economic evaluations that have been conducted, the majority have focussed upon outcomes for children, for example, costing improvements in child behaviour following the intervention (Edwards, Ó Céilleachair, Bywater, & Hutchings, 2007; Furlong et al., in press; O'Neill, McGilloway, Donnelly, Bywater, & Kelly, 2011). However, as parenting programmes are complex interventions it is worth considering the wider impact a programme can have upon parents, siblings and other family members, plus the impact the parenting programme can have long-term.

Parenting programmes have been shown to reduce parental self-reported depression and stress (Bywater et al., 2009; Furlong et al., in press; Hutchings et al., 2007), as well as improve child behaviour and the behaviour of siblings (Hutchings et al., 2007). Bywater et al. (2009) demonstrated the potential long-term effects of parenting programmes, through the maintained improvements found 18 months after intervention delivery in their long-term follow-up of the Hutchings et al. (2007) sample. Though the above-mentioned studies assessed the wider impact of parenting programmes, this consideration is not common practice (Charles, Bywater, & Edwards, 2011a). This issue is the subject of this thesis.

Aims of the thesis

This thesis aims to explore how the economic "toolbox" can be applied to a complex intervention in which the main beneficiaries are ultimately children.

- The thesis will examine previous research in the form of a systematic review (Chapter 2).
- Apply a structured framework designed for the micro-costing analysis of parenting programmes (Chapter 3) using the Incredible Years (IY) Toddler Parenting Programme as a case study, to illustrate the framework.

- Utilise the IY Toddler Parenting Programme as a case study to perform a cost-consequence analysis (Chapter 4).
- Explore the wider benefits of parenting programmes, such as parental self-reported depression and parental health and social service use (Chapter 5).
- Present how cost-effectiveness and social return on investment analyses may be applied to the IY Basic Parenting Programme (Chapter 6).

Specific research questions of the thesis

1. (Chapter 2) What evidence exists about the cost-effectiveness of parenting programmes? How can future research into this field be improved?

2. (Chapter 3) How much does it cost to set up and deliver the Incredible Years Toddler Parenting Programme in the context of normal service delivery and as part of a research trial?

3. (Chapter 4) What are the costs and consequences of participating in the Incredible Years Toddler Parenting Programme for parents and children?

4. (Chapter 5) Do parents of children with challenging behaviour utilise more health, social services and at what cost? Does the frequency of utilisation decrease after participation in an IY programme?

5. (Chapter 6) How could researchers apply Social Return on Investment analysis and cost-effectiveness analysis to the Incredible Years Parenting Programmes?

Thesis structure

The remainder of this thesis is structured as a series of six chapters including five papers, which follow a logical sequence: a literature review paper, followed by four empirically based papers that present an economic evaluation of the IY Toddler and Basic Parenting Programmes.

A review of the economic evidence of parenting programmes for CD (Chapter 2) sets out to answer what evidence exists about the cost-effectiveness of parenting programmes? How can future research into this field be improved? This paper outlines CD, associated risk factors and effective treatment. The review examines existing economic evidence of parenting programmes critically appraising studies found and making recommendations for future research in an underdeveloped field.

The second paper (Chapter 3) sets a unique framework for micro-costing, which is illustrated through a worked example of the IY Toddler Parenting Programme in three contexts; first time set up and running IY Toddler Parenting Programme, subsequent running of the IY Toddler Parenting Programme (initial training already undertaken, materials purchased and supervision has been undertaken) and set up and running Incredible Years Toddler Parenting Programme within a research context.

The third paper (Chapter 4) sets out to answer what the costs and consequences of participating in the IY Toddler Parenting Programme are using the Beck Depression Inventory II (Beck, Steer, & Brown, 1996) as the parental outcome measure and the Schedule of Growing Skills (SGS II, Bellman, Lingnam, & Aukett, 1996) as the child outcome measure. Costs will be assessed using a modified version of the Client Service Receipt Inventory (CSRI, Beecham & Knapp, 1992).

The fourth paper (Chapter 5) examines the wider implications of parenting programmes. Using a previous sample of targeted families assigned to receive the IY Basic Parenting Programme. This paper sets out to answer do parents of children with challenging behaviour utilise more health and social services? Does the frequency of utilisation decrease over 12 months after participation in the IY Basic Parenting Programme?

The fifth paper (Chapter 6) will focus on the long-term cost benefits of parenting programmes and sets out to answer how can long-term benefits of participation in parenting programmes be assessed? This paper will compare the methodology of cost-effectiveness analysis and social return on investment analysis, using a worked example of the IY Basic Parenting Programme.

Concluding the thesis is a general discussion chapter (Chapter 7) of the thesis in its entirety, addressing applied implications and future research. Figure 1 summarises the research questions, structure and layout of the thesis.

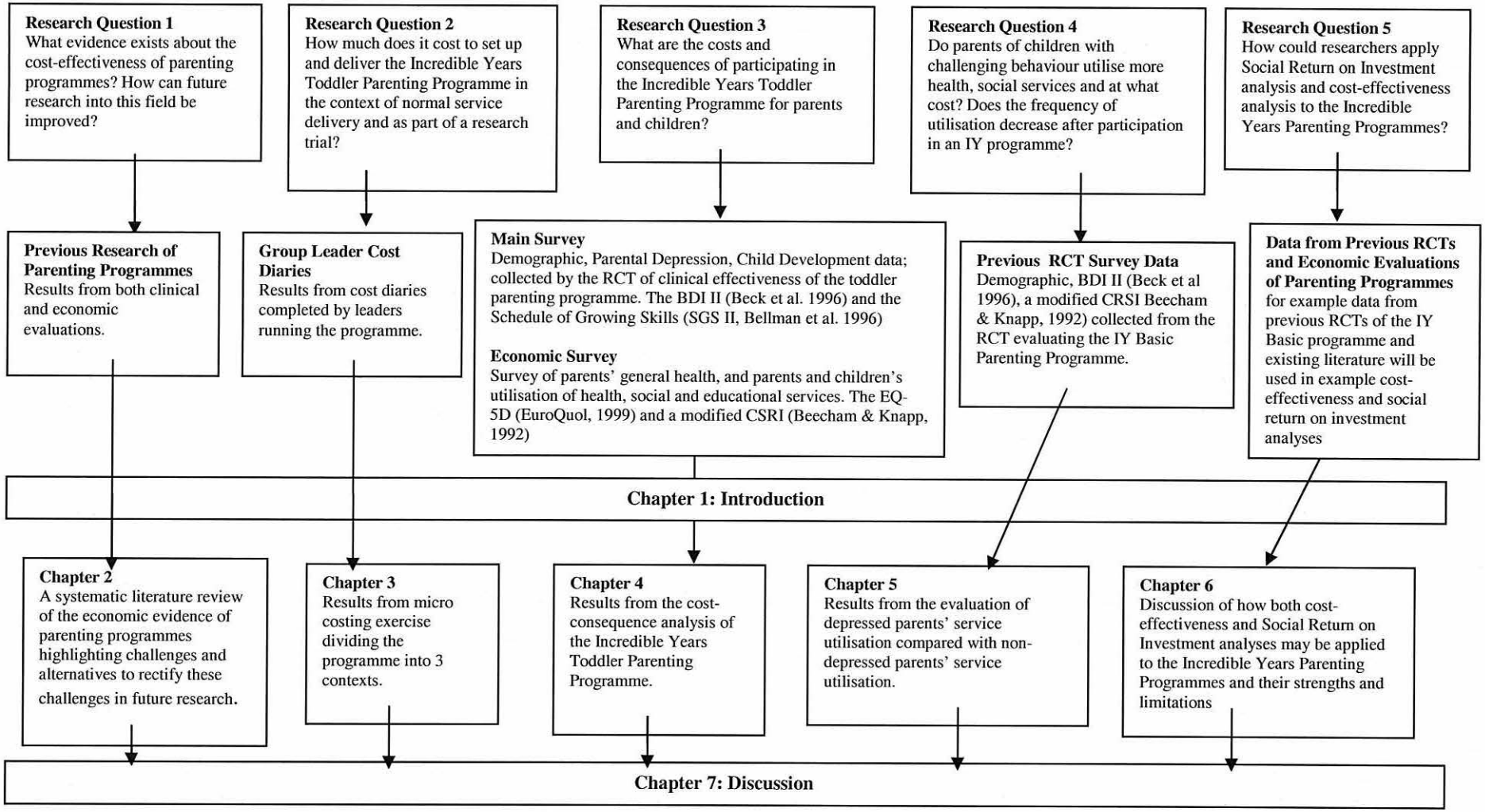

Figure 1. The structure and layout of the thesis

Dissemination of Findings

The thesis author aims to publish chapters 2-5 in peer-reviewed academic journals. To date, chapter 2 has been published; chapters 3 and 5 have been submitted for publication and are under review, chapters 4 and 6 are awaiting submission, as detailed below:

Chapter 2:
Charles, J.M., Bywater, T., & Edwards, R.T. (2011a). Parenting Interventions: a systematic review of the economic evidence. *Child, Care, Health, & Development, 37*, 462-474.

Chapter 3:
Charles, J.M., Bywater, T., Edwards, R.T. & Hutchings, J. (2011b). *Micro-costing in public health economics: steps towards a standardised framework, using the Incredible Years Toddler Parenting Programme as a worked example.* Manuscript submitted for publication.

Chapter 4:
Charles, J.M., Bywater, T., & Edwards, R.T. (2011c). *A pilot cost-consequence analysis of the Incredible Years Toddler Parenting Programme delivered in socially disadvantaged Flying Start areas in the U.K.*

Chapter 5:
Charles, J.M., Bywater, T., Edwards, R.T & Hutchings, J. (2011d). *Parental Depression and Conduct Problems in Children: Evidence of Parental service use and costs after attending the Incredible Years Basic Parenting Programme.* Manuscript submitted for publication.

Chapter 6:
Charles, J.M., Bywater, T., Edwards, R.T. (2011e). *A methodological comparison of social return on investment analysis and cost-effectiveness analysis: how the two approaches could apply to the Incredible Years Basic Parenting Programme.*

Chapter 2: Parenting Interventions: a systematic review of the economic evidence

Summary

Conduct disorder (CD) places huge costs on the individual, family and society. Parenting programmes can reduce CD symptomatology, but economic evaluations of their cost-effectiveness are rarely undertaken. The objective of this paper was to conduct the first specific systematic review of the published economic evidence of parenting programmes as a means to support families with children with or at risk of developing CD. A systematic search of 12 electronic databases was conducted. We identified 93 papers, of which six fulfilled the inclusion criteria. The search found one review article, mainly focusing upon clinical evidence with secondary focus on cost-effectiveness, one cost-effectiveness study, two partial economic evaluations and two cost studies. The costs of group parenting programme delivery ranged from £629.00 to £3839.00. Cost-effectiveness was influenced by intervention type and delivery method, i.e. individual versus group programme. The review highlights a need for a more standardized approach towards the comparison of the cost-effectiveness of parent programmes. In future studies it may be helpful to adopt a 'complex intervention approach', exploring in detail the attribution of cause and effect, the role of socio-economic setting and ripple effects, e.g. benefits to other family members.

Charles, J.M., Bywater, T., & Edwards, R.T. (2011a) Parenting Interventions: a systematic review of the economic evidence. *Child, Care, Health, & Development, 37*, 462-474.

Introduction

Parenting programmes can provide a treatment or preventative intervention for children with, or at risk of developing conduct disorder (CD) by supporting parents in the acquisition of strategies to reduce negative behaviours and promote positive behaviours. CD is defined by persistent antisocial and noncompliant behaviour e.g. verbal and physical aggression, cruel and destructive behaviour concerning the child's and other people's property (DSM IV- TR, American Psychiatric Association, 2000). In the general population, it is estimated that 6.9% of boys and 2.8% of girls aged five to ten years old present with CD in the U.K. and 20% in socially disadvantaged areas (Attride-Stirling, Davis, Day, & Selare, 2000).

CD is the most common reason for referral of young children to mental health services, with early onset associated with poor prognosis (Knapp, Scott, & Davies, 1999; Moffit, Caspi, Dickson, Silva, & Stanton, 1996). Sixty-two percent of three year olds with conduct problems continue to experience problems through to the age of six and above (Richman, Stevenson, & Graham, 1985). Forty to fifty percent of children with CD go on to develop anti-social personality problems as adults (Robins, 1996; Simonoff et al., 2004). CD is also associated with failure at school, subsequent joblessness, failure in relationships and financial dependence upon the state (Rutter & Giller, 1983; Fergusson, Horwood, & Ridder, 2004). CD has also been linked to criminal behaviour. Farrington (1995) found children with CD progress to non-psychiatric anti-social behaviours. Thirty-seven percent of the children in his study were convicted of criminal offences, such as theft, violence, drunk driving, illegal drug use, group violence and carrying and/or using weapons, with 40% of these conduct disordered children becoming persistent young offenders (Farrington, 1995). Fergusson & Howard (1995) found 90% of fifteen year olds who matched three or more criteria for CD were self reported frequent offenders at age sixteen; compared with 17% of children with no CD criteria.

CD places significant costs on health services, social, education and criminal justice systems. Knapp et al. (1999) established that 30% of child consultations with general practitioners were for CD. The cost of resources

necessary to manage CD e.g. hospital inpatient costs and psychiatric outpatient costs for one child for one year on the National Health Service (NHS) was £2457 (£3499.21 inflated to 2008/09) (Knapp et al., 1999)[1]. The cost of publically resourced services for an individual aged 28 years who continued to experience behavioural problems associated with early onset CD was estimated to be £70019 (£91076 inflated to 2008/09), 10 times higher than for someone with no childhood behavioural problems. CD not only places costs on the public health system, but also on local authorities who provide services such as childhood foster and residential care and special education (Scott et al., 2001a). Additional education costs are incurred through the provision of extra support staff and funding special schools for emotionally and behaviourally challenging children (Knapp et al., 1999). Knapp et al. (1999) found the cost of treating a child with CD was £991 (per child, per year) (£1411.36 inflated to 2008/09) for social services and £4754 (per child, per year) (£6770.54 inflated to 2008/09) for special education services. There is a need to address, or prevent CD early, in a child's life, in light of the high costs associated with the disorder in subsequent years. There is growing literature on the effectiveness of parenting programmes but few economic evaluations of parenting programmes have been conducted.

Successful parent programme interventions for CD

In the U.S. Mihalic, Fagan, Irwin, Ballard, & Elliott (2002) developed the, "Blueprints for Violence Prevention" a review of 600 different parenting programmes worldwide. To become a "blueprint" programme a programme had to meet three strict criteria; 1) evidence of deterrent effect with a strong research design, 2) sustained effect and 3) multiple site replication. The Incredible Years (IY) Parenting Programmes is one of 11 programmes certified by "Blueprints". The Triple P Community-Wide Positive Parenting Programme is certified as a

[1] In this review of costs, we have used the International Monetary Fund (2009) to convert costs into pounds sterling and the Hospital & Community Health Services (HCHS) pay and prices index (Curtis, 2008) to inflate all costs to 2008/2009 costs, shown in brackets following published costs.

"promising" programme as it met the first criteria only. This programme requires independent replication through randomised controlled trials (RCTs).

The British Government has recognised the effectiveness of parenting programmes in the reduction and prevention of CD, and is recommending the wide spread implementation of such programmes. In the U.K, the National Institute for Health and Clinical Excellence (NICE, 2006) has recommended the IY and Triple P Parenting Programmes in treating and preventing CD. In Wales (U.K.), the Welsh Assembly Government has funded the training of facilitators in the IY Parenting, School and Child Programmes (Welsh Assembly Government, 2005b).

The IY Series was developed in the U.S. by Webster Stratton (1984). It consists of programmes for teachers, children and parents. It is designed for families with children between 0-13 years of age (Webster-Stratton, 1984). The basic parent programme for 3-8 years of age uses group discussion, role-play, video-modelling and home work tasks to enhance the skills needed to manage and alter difficult behaviour. The effectiveness of the programme has been demonstrated in a number of RCTs (Webster-Stratton, 1984; Webster-Stratton, 1990; Webster-Stratton, & Hammond, 1997; Taylor, Schmidt, Pepler, & Hodgins, 1998; Miller, & Rojas-Flores, 1999; Scott, Spender, Doolan, Jacobs, & Aspland, 2001b; Webster-Stratton, Reid, & Hammond, 2001; Black et al., 2002; Hutchings et al., 2007). Results have shown significant increases in positive parenting techniques such as effective limit setting, parental communication, problem solving and self-confidence, as well as significant reductions in parental depression (Hutchings et al., 2007). The Triple P Positive Parenting Programme was developed in the University of Queensland, Australia, by Sanders (1999). Triple P is a multi-level system of parenting and family support providing information, advice and interventions for families targeting children with mild to severe behavioural difficulties. RCTs have shown Triple P to be effective in improving behaviour in preschoolers and school-age children (Sanders et al., 2000a, & Sanders et al., 2004). Using prevalence rates Mihalopoulos Sanders, Turner, Murphy-Brennan, & Carter (2007) estimated costs of 19.7 million Australian dollars (£8.4 million inflated to 2008/09), A$34 per child (£14.48 per child inflated to 2008/09) to offer Triple P to all children aged 2-12 years in Queensland, Australia. Whilst research into clinical effectiveness of parenting

programmes dates back to the 1980s; little research has been conducted into the cost-effectiveness of parenting programmes.

Economic evaluations help decision makers choose between alternative approaches of resource use. These types of evaluations generally measure efficiency (allocation of resources which maximise the total quantity of benefit), particularly in areas where there is large public involvement and no market-based measures. There are four main methods used to conduct economic evaluations, which share a common costing approach. Cost-benefit analysis values both outcomes and costs in monetary terms rather than valuing outcomes in health gains for both the intervention in question and an alternative. Cost-minimisation analysis compares the costs of alternative interventions which have proven equal effects. Cost-utility analysis measures health benefits usually in terms of quality of adjusted life years (QALYs) of the intervention and an alternative. Cost-effectiveness analysis expresses results as a ratio of a cost per unit of health outcome, normally expressed in "natural units" appropriate to the study in question. In the case of parenting interventions, a child behaviour scale such as the Eyberg Child Behaviour Inventory (ECBI), (Eyberg, 1980) would be appropriate. Economic Evaluations are usually conducted from a public sector or societal perspective. Cost-effectiveness is expressed as an incremental cost-effectiveness ratio, a technique that expresses the difference in costs between one intervention and an alternative, divided by the difference in outcomes (OHE 2008; Morris, Devlin, & Parkin, 2007).

In the U.S. health and social care operates through a mixed system of private insurance and government funded schemes, (Morris et al., 2007). This infra-structure results in a market economy where there is often a need for a "business case" as opposed to cost-utility or cost-effectiveness analysis (Morris et al. 2007). Under this system return on investment (ROI) would be considered a type of economic evaluation, as costs and benefits are presented purely in monetary terms. In the U.S., research has been conducted into the ROI of early childhood programmes. ROI calculates the ratio of money saved to money invested. This is a more typical method used in the U.S. Four studies have calculated ROI related to child development/behaviour including the individual, society, the government and tax payer through the reduced demand of public services. It should be noted these four programmes offered different types of early

childhood services across different decades; however, they all show a positive ROI. The Elmira Pre-natal/Early Infancy Project (PEIP), Olds, Henderson, Phelps, Kitzman, & Hanks (1993) showed a total ROI of $6.92 (£8.36 inflated to 2008/09) for every $1 (£1.21 inflated to 2008/09) invested. The Carolina Abecedarian Project, Masse & Barnett (2002) showed a total ROI of $4.01 (£7.81 inflated to 2008/09) for every $1 (£1.78 inflated to 2008/09) invested. The High/Scope Perry Preschool Programme, Schweinhart, Barnes, & Weikart (1993) showed a total ROI of $8.74 (£10.57 inflated to 2008/09) for every $1 (£1.21 inflated to 2008/09) invested and the Chicago Child-Parent Centres, Reynolds, Temple, Robertson, & Mann (2001) showed a total ROI of $7.10 (£6.81 inflated to 2008/09) for every $1 (£0.96 inflated to 2008/09) invested.

These studies demonstrate the importance of investing in the early years of a child's life, and the potential for ROI of delivering parenting programmes early. In the UK the emphasis has historically been on demonstrating incremental cost-effectiveness rather than ROI; though this is currently changing, as noted in our discussion section.

This paper offers a review of current literature on the cost-effectiveness of parenting programmes; focusing purely upon published economic evidence and discusses a range of methodological issues for the design, conduct and reporting of future studies. CD is an important issue with wide implications and costs.

Method

Search strategy

A systematic search was conducted to identify literature relating to the costs and cost-effectiveness of parenting interventions for families with children with or at risk of developing CD, based on Griffith, Edwards, & Gray (2004) and the "Cochrane" systematic review guidelines (2009). Titles, abstracts and papers were searched for using the search terms; conduct disorder, parenting interventions, cost-effectiveness and economic evaluation. The following electronic databases were searched; the British Medical Journal Archive, Database of Abstracts of

Reviews of Effects, NHS Economic Evaluation Database, Health Technology Assessment Database, Cambridge Scientific Abstracts, Applied Social Sciences Index and Abstracts, British Library Catalogue, WorldCat, ISI Web of Knowledge, Resource Discovery Network and the Cochrane Library. Retrieved papers were hand searched for further references not identified in the electronic search.

Research inclusion criteria:

1. a general review article of parenting programmes and their cost-effectiveness;
2. a partial or full economic evaluation of a parenting intervention designed to combat CD.

Research exclusion criteria:

1. was published in a language other than English;
2. was not specifically related to CD;
3. was a clinical effectiveness paper that did not include an economic evaluation.

Figure 1 presents the search strategy process.

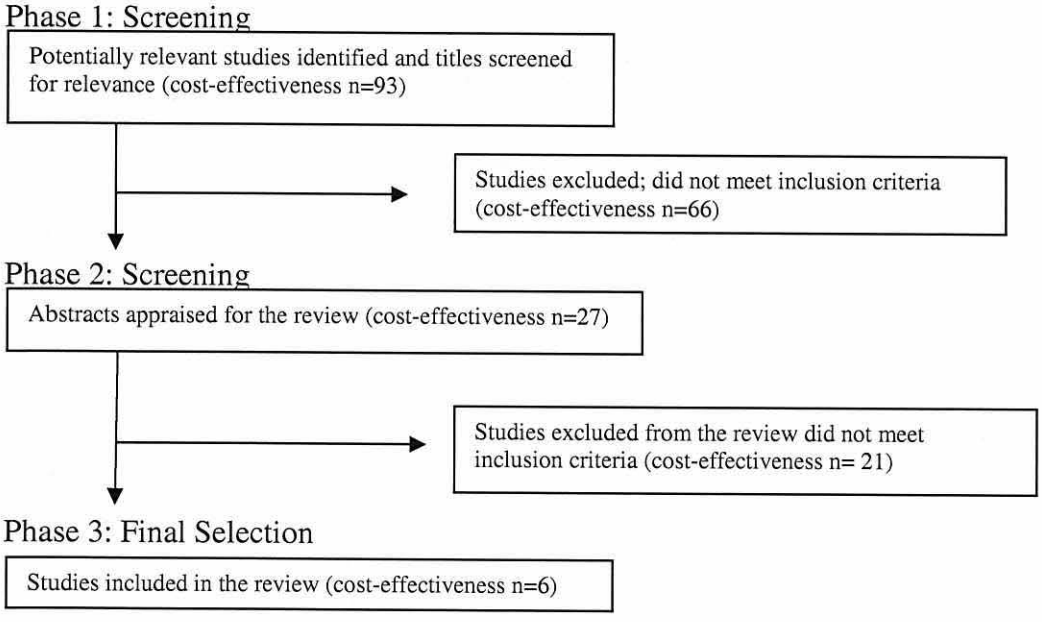

Figure 1. Flow chart outlining paper selection process.

This review was carried out over a 12 month period between January 2009 and January 2010. Databases were searched over a 2 month period from January 2009 to March 2009. Twenty clinical effectiveness papers were retained as evidence of the beneficial outcomes gained from participation in parenting programmes.

All abstracts were assessed for relevance. All relevant or potentially relevant articles were reviewed in full. Costs were converted into pounds sterling (International Monetary Fund, 2009) and inflated to the cost year 2008/2009, for papers included in the review (Curtis, 2008). We used the 10-item checklist of Drummond, Sculpher, Torrance, O'Brien, & Stoddart (1997) for a sound economic evaluation (see Table 1) to appraise all papers included in the systematic review.

Results

Five RCTs incorporated the monetary costs of the intervention as part of the trial. Five of the six retained studies are presented in Table 1 in order from lowest number of elements from Drummond et al's (1997) 10-item checklist present in the paper to highest number of elements (left to right). We do not attempt to make any explicit judgement as to the relative importance of these elements. Drummond et al.'s (1997) checklist is used as originally intended i.e. to appraise the papers and tally elements one should find in a well-executed economic evaluation; this checklist has been used in previous reviews (Griffith et al., 2004; Jones & Edwards, 2009).

Table 1.

Paper appraisal against Drummond et al.'s 1997 10-item checklist.

Drummond Question	Thompson et al. (1996)	Cunningham et al. (1995)	Olchowski et al. (2007)	Muntz et al. (2004)	Edwards et al. (2007)
Was a well-defined question posed in an answerable form?	√	√	√	√	√
Was a comprehensive description of the competing alternatives given?	√	√	√	√	√
Was the effectiveness of the programmes or services established?	√	√	√	√	√
Were all the important and relevant costs and consequences for each alternative identified?	X	√	√	√	√
Were costs and consequences measured accurately in appropriate physical units?	√	√	√	√	√
Were costs and consequences valued credibly?	X	√	√	√	√
Were costs and consequences adjusted for differential timing?	X	X	√	√	√
Was an incremental analysis of costs and consequences of alternatives performed?	X	X	X	√	√
Was allowance made for uncertainty in the establishments of costs and consequences?	X	X	√	X	√
Did the presentation and discussion of study results include all issues of concern to users?	√	√	√	√	√

Drummond et al. (2005) state that a well-executed economic evaluation should examine the costs and consequences of a particular programme/intervention/service, compared with the costs and consequences of an alternative programme/intervention/service. The alternative should be described; if no alternative was used then an explanation should be given. The effectiveness of the programme/intervention/service should be assessed through an RCT with any biases considered. Costs and consequences should be valued credibly e.g. monetary values or patient views/preferences depending upon the programme/intervention/service under evaluation. Where applicable costs and consequences should be adjusted for differential timing e.g. discounting of future costs and consequences compared to their present value. When discounting is employed justification of the discount rate should be given. Allowances should be made for uncertainty in the estimates of cost and consequences such as using the appropriate statistical analyses and/or performing sensitivity analysis on the data. The presentation and discussion of results should include issues of concern such as; previous research, the generalisability of results to other settings and/or patient/client groups, ethical issues and implementation e.g. barriers to adopting the "preferred" programme/intervention/service such as financial constraints.

The studies included in this review are described and reviewed in the order in which they appear in Table 1. Figure 2 shows published definitions (OHE, 2008) of economic terms used to describe the different forms of analyses applied.

Cost Analysis - a technique that involves the systematic collection, categorisation and analysis of programme costs.

Cost-Effectiveness Analysis - a form of economic analysis in which the results are expressed as a ratio of a cost per unit of health outcome, normally expressed in "natural units". This is the preferred method of economic analysis in the U.K.

Average Cost-Effectiveness Ratio - a technique that provides a cost for a given treatment that produces a one-unit change in outcome.

Incremental Cost-Effectiveness Ratio - the difference in costs between one intervention and an alternative, divided by the difference in outcomes.

Return on Investment – technique used to calculate the ratio of money saved to money invested. This is the preferred method of economic analysis in the U.S.

Figure 2. Definitions of economic terms, (OHE, 2008)

Videotape modelling delivered in a group setting is as effective in improving child behaviour as individual therapy and less costly to deliver (Webster-Stratton, Kolpacoff, & Hollinsworth, 1988; & Webster-Stratton, Hollinsworth, & Kolpacoff, 19890. Thompson, Ruma, Schuchmann, & Burke (1996) developed the streamlined Common Sense Parenting Programme, to reduce set-up and delivery costs, based on the Teaching Family Model (Phillips, Phillips, Fixsen, & Wolf, 1973; Wolf et al., 1976), and the Boys Town Family Home Programme (Coughlin & Shanahan, 1988). Both these programmes teach couples behavioural methods to reduce child and adolescent conduct problems in group settings. Participants (N=66) were assigned to a parent training group or a waiting list control group. The parenting programme used video-modelling, group discussion problem-solving, role-playing solutions and homework to facilitate the training. Groups of 10-12 parents were led by two facilitators, two hours each week for eight weeks. The trial simultaneously evaluated clinical effectiveness and cost of implementation. Cost analysis showed this streamlined programme reduced costs so it may be delivered to more families with the same resources proved effective. The programme required approximately 30 hours of staff time to serve 10 families at a cost of approximately $160 (£169.72 inflated to 2008/09) per family; this is less than staff time required for individual parent-child therapy

(Webster-Stratton, 1984). This study should be considered a cost study and not an economic evaluation. An alternative was not evaluated in conjunction with the programme in question. There is little information on how costs were established in this study. The main evaluative statement relies upon the variable of staff time; which was shown to be minimal in comparison to an individualised programme; the modified intervention was considered to be cost effective on this basis. This is not an incremental cost-effectiveness analysis; the study fails to mention if the staff time used to calculate cost-effectiveness was based on past research or the date the intervention was delivered. There were no allowances made for uncertainty in the estimation of costs of staff time. Thompson et al. (1996) used their own streamlined intervention in the study but based costs and comparison of costs upon Webster-Stratton's individual parent-child therapy (Webster-Stratton, 1984). These two different interventions would require different resources in order to implement and deliver; this creates uncertainties in the estimation of costs and the comparability between the two interventions, which was not accounted for by the researchers. A more meaningful comparison would be to compare costs of an IY group delivered programme with the intervention in question.

Cunningham, Bremner, & Boyle (1995) assigned participants (N=150) to either a 12-week individual based parent training programme, a 12-week community/group based parent training programme, or a waiting list control condition. To test the effectiveness and costs of the community/group based intervention compared to the individual based intervention. The parenting programme used in the study was devised by Cunningham et al. (1993) employing a coping modelling problem solving approach. Conditions in both the individual and community group setting were identical; both used video modelling, role-play problem solving and homework assignments to train the parents to cope with difficult behaviour. The costs per session and the overall 12-week programme total costs were compared across conditions. The costs were not adjusted for differential timing; the researchers calculated the costs of the intervention based on the figures at the time of intervention delivery. Cost analysis showed the community/group intervention to be more than six times less costly per participant than the individual intervention. Looking at direct costs of the parenting programme e.g. room rental, one time set up costs and travel mileage, the community group intervention for a group of 18 parents cost 2207.41 Canadian

dollars (£8383.15 inflated to 2008/09); whilst the individual intervention for 18 parents cost $C14449.50 (£54875.27 inflated to 2008/09). This study should be considered a cost study, a study that describes costs and not a cost-effectiveness analysis. It did not carry out a comparative analysis of alternative interventions in terms of their costs and their outcomes. The researchers took into account uncertainties in their estimation of cost e.g. the community based intervention families were offered childcare during their weekly session; the majority of participants preferred to use their own babysitters. This was noted; however, costs were not adjusted to reflect this in the analysis. This study provides evidence in support of the use of community/group based parenting intervention, as compared with one-to-one interventions.

Olchowski, Foster, & Webster-Stratton (2007) evaluated the cost-effectiveness of delivering multiple-stacked IY interventions versus a single-component IY intervention, from a multi-agency perspective (N=459). The interventions were split into categories either individual e.g. parent training or stacked i.e. child training plus parent training plus teacher training. The costs of each combination were calculated by adding the running costs e.g. leader accreditation, handbooks, administration costs and day care facilities. The figures were obtained from the IY programme developer, Webster-Stratton and relate to the financial year 2003. The costs do not include initial group delivery training. An average cost-effectiveness ratio (ACER) was calculated; the costs per child for which each treatment category produced one standard deviation decrease in negative child behaviour were plotted against the standardised pre-post test difference scores measured by the Behar Total Problem Behaviour Score (Behar, 1977). These are not incremental cost-effectiveness ratios (ICERS) (Glick, Doshi, Sonnad, & Polsky, 2007; Morris et al., 2007) as advocated by NICE (2008b). The different combinations were not compared to an alternative intervention providing a similar multi-faceted delivery method of intervention. Using cost analysis and the ACER the single component child training intervention was the lowest cost option with a cost per child of $1,164 (£747.17 inflated to 2008/09), followed by the stacked combination of child and teacher training intervention with a cost per child of $1,454 (£933.31 inflated to 2008/09), followed by parent training with a cost per child of $1,579 (£1013.55 inflated to 2008/09), followed by the combination of parent training and teacher training, with a cost of $1,868

(£1199.06 inflated to 2008/09) per child. The two combinations with the highest cost were child training and parent training with a cost of $2,713 (£1741.46 inflated to 2008/09) per child. All interventions delivered in combination proved the highest cost option per child at, $3,003 (£1927.61 inflated to 2008/09).

Muntz, Hutchings, Edwards, Hounsome & Ó Céilleachair (2004) conducted an incremental cost-effectiveness analysis of an intensive practice-based parent programme compared to the standard treatment for families with children displaying severe behavioural problems. This cost-effectiveness analysis was conducted alongside a RCT evaluating the clinical effectiveness of the two treatments using a multi-sectoral service perspective. Due to a small sample size (N=42) this study should be regarded as a pilot with further research required to provide support for the outcomes found. The study used a base year of 1996/1997; costs beyond this year were discounted by 3%, costs were then adjusted to 1999/2000 by using Hospital and Community Health Service Pay and Prices Index. The cost analysis accounted for direct costs e.g. staff time, training and travel and employed bootstrapping to produce a confidence interval around the estimate of the mean ICER. The total mean cost of the standard treatment was £189.09 per child (£269.30 inflated to 2008/09) and the total mean cost of the intensive treatment was £912.22 per child (£1299.16 inflated to 2008/09). No allowances were made for uncertainty in establishing costs or consequences in this paper. The cost-effectiveness acceptability curve showed the costs and effects for the intensive treatment was not significantly different to those in the control.

Dretzke et al. (2005) reviewed primarily the clinical effectiveness evidence of parenting training programmes for the treatment of children with CD up to 18 years of age. Dretzke et al. (2005) reviewed cost-effectiveness evidence as a secondary focus within their paper. Using a bottom-up cost analysis approach, the costs of providing parent training programmes per family ranged from £629 to £3839 (£727.29 to £4438.90 inflated to 2008/09) depending on the type of programme and delivery method. These costs were based on the programme being delivered by a health visitor with a salary of £25,015 per year (£28,923.93 inflated to 2008/09), undertaking a high level of supervision, with two health visitors delivering a programme to an average of eight parents per group. The majority of studies were conducted in North America and Australia;

the results may not be generalisable to the UK. The review concluded parenting programmes appear to be an effective and potentially cost-effective method of intervention for children with CD. However the model contained a number of strong assumptions and results should be viewed with caution. Dretke et al. (2005) argue for further research in this field particularly in the UK. This review paper is not included in Table 1.

Edwards, Ó Céilleachair, Bywater & Hutchings (2007) conducted an incremental cost-effectiveness analysis of the IY Basic Parenting Programme compared to a waiting list control group alongside a pragmatic RCT (N=116). Costs were evaluated from a multiagency public sector perspective, including health, special educational and social services costs. Effectiveness was measured by reductions found in the intensity and problems scores of the Eyberg Child Behaviour Inventory (ECBI) (Eyberg, 1980). Participants completed a measure to assess their child's and their own personal use of health, special educational and social services in the preceding six months. National unit costs were applied to this, (Department of Health NHS reference costs for 2003-4 and Netten & Curtis, 2004). The costs of setting up and implementing the Basic Parenting Programme were calculated using group leader cost diaries. The analysis required no discounting of costs or effects as all costs and effects fell within a one year time horizon. The cost of running one 12-week parenting course to a group of 8 families including non-recurrent (training) and recurrent (room rental, crèche facilities) costs was £1933.56 (£2310.29 inflated to 2008/09). The authors calculated an ICER of £71 (with a confidence interval of 95%) per 1 point improvement in the ECBI intensity score (Eyberg, 1980). If society was willing to pay £100 then the intervention proved to be 83.9% cost-effective. Sensitivity analysis showed the intervention became more cost-effective in children at greater risk of developing CD (children with higher baseline ECBI intensity scores, Eyberg, 1980). This study suggests that it would cost £5486 (£6554.89 inflated to 2008/09) to bring a child with the highest intensity score in the study below the clinical cut-off point on the ECBI (Eyberg, 1980). Table 2 summaries the above appraisals.

Table 2.

Summary table of the structure and results of the six papers included in the systematic review

Authors	Aims of study	Study sample (N)	Type of Intervention	Method of Delivery	Length of Follow-Up	Cost of Intervention	Type of Economic Analysis Conducted	Outcomes
Thompson et al.	To test an intervention developed to reduce costs of set up and delivery.	66 parents (39, intervention 27, wait list control). Target children range between (2-17 years).	Common Sense Parenting Intervention.	Parents of children who exhibited severe behaviour problems in a Midwestern Community were taught parenting skills in groups of 10-12, two times a week for eight weeks.	Pre-intervention, post-intervention and a 3 month follow up using measures of family satisfaction and child behaviour.	$160, (£104.89) per family (based on a group of 10 parents).	Cost study, calculation of common sense intervention group delivery staff time compared with an individually delivered parenting intervention's staff time.	Common sense parenting found to be less costly than the individual intervention.
Cunningham et al.	To test if the outcome of large group interventions, matched that of individual interventions.	150 parents randomly assigned to either a group parent training (n=48), an individual parent training (n=46) or a waiting list control condition (n=56).	Researchers own developed invention used video-modelling and homework to teach parenting skills.	Sessions ran during 12 weeks (weekly 2 hour session) in the Canadian district of Hamilton.	Six months after intervention.	Group intervention cost $C2207.41 (£1368.51) (group of 18 parents); the individual intervention cost $C14449.50 (£8958.15) (group of 18 parents).	Intervention costed looking at direct costs e.g. room rental, staff time and training materials and compared to each method of delivery.	Group intervention found to be less costly than the individual intervention.
Olchowski et al.	To add to research conducted on the cost-effectiveness of parenting programmes.	459 children ages 3-8 years who had participated in IY series research over the last 20 years.	IY Parenting Series.	Parents of the 459 children assign to random conditions of either a single component condition (CT, PT, or TT) or a stacked component condition (CT+PT, PT+TT, CT+TT and CT+PT+TT).	Pre and post intervention measures only.	The combination of CT+TT was the lowest cost option with a cost per child of $1,454 (£742.55). The two combinations with the highest cost were CT+PT with a cost of $2,713 (£1385.52) per child.	The costs of each combination were calculated. The costs per child were then plotted against the standardised pre-post test difference scores measured by the Behar Total Problem Behaviour Score.	Outlines to agencies and decision makers the differences in cost between the individual and stacked intervention options so a decision can be made on which programme to implement depending upon budget constraints.

Authors	Aims of study	Study sample (N)	Type of Intervention	Method of Delivery	Length of Follow-Up	Cost of Intervention	Type of Economic Analysis Conducted	Outcomes
Muntz et al.	To estimate from a multi-sectoral service perspective, the longer term cost-effectiveness of an intense practice based parenting programme for children with severe behaviour problems; compared to a standard treatment.	42 families with children aged between 2-10 years exhibiting conduct problems. 22 families allocated to the intensive treatment and 19 to the standard treatment.	Intensive treatment trained parents in accurate observation of their child's behaviour and effective management strategies. Standard treatment currently available treatment offered by CAMHS.	For both treatments intervention was delivered by a CAMHS team, a five hour session with a child psychologist was added to the intensive treatment condition.	Six month and four year follow-up after intervention.	£189.09 per child for the standard treatment and £912.22 per child for the intensive treatment.	An incremental cost effectiveness ratio was calculated. Yielding a £-224 cost saving gained from changing to the intervention treatment from the control. The CEAC showed the costs and effects for the intensive treatment were not significantly different to those in the control.	Due to the small sample size this should be considered a pilot study with further research required to provide support for the outcomes found.
Edwards et al.	To investigate the cost-effectiveness of the IY Basic Parenting Programme.	116 parents of children aged 3-4 years at risk of developing CD, were randomly assigned to intervention (73) or wait list control condition (43).	IY Basic Parenting Programme.	Parents in the intervention attended 12 weekly sessions with a trained IY group leader and were taught parenting skills. Parents recruited from Sure Start areas.	Six months after intervention.	The cost of running one intervention to a group of 8 families including non-recurrent and recurrent costs was £1933.56.	Calculating CEAC, if a cost ceiling of £100 was set then the intervention proved to be 83.9% cost-effective.	Sensitivity analysis showed the intervention became more cost-effective in children at greater risk of developing CD.
Dretze et al.	To review the clinical and cost-effectiveness of parenting training programmes for the treatment of children up to 18 years with CD.	37 randomised controlled trials met the inclusion and exclusion criteria.	Range of interventions aimed at providing parents with management strategies for CD.	Not stated specifically, majority of studies were undertaken in North America and Australia.	Not stated specifically.	Costs of providing parent training programmes per family ranged from £629 to £3839 depending type and delivery method.	Bottom-up costing approach, assumes health visitor is employed to implement the programme on a salary of £25,015 per year.	Range of costs dependent upon type and delivery method of programme, further research in this field is required.

Discussion

Main findings

This review highlights a lack of consistent methods of economic appraisal across a growing literature. The studies applied a range of methods from cost analysis to cost-effectiveness analysis. All studies with the exception of one were lacking elements of Drummond et al.'s (1997) checklist for a well-executed economic evaluation, suggesting results and conclusions should be viewed with caution. The evaluated programmes presented a range of costs with the highest cost items being staff salaries, staff training and mode of delivery (whether programmes are delivered to a group or individually). There are three that could be considered cost-effectiveness studies; however, all used different methods, intervention programmes and effect/outcome measures, thereby making comparisons difficult. Edwards et al. (2007) was the only study to conduct a robust cost-effectiveness analysis conducted alongside a RCT, using an ICER and adequate sample size. Although Muntz et al. (2004) conducted their cost-effectiveness analysis alongside an RCT, using ICERs their sample was small and should be regarded as a pilot. Olchowski et al. (2007) conducted a cost-effectiveness analysis; however, the method applied, ACERs, is not advocated by NICE (2008b). All the studies reviewed had a relatively short follow up period ranging from immediately post-intervention to 12 month follow up. Few studies stated their perspective, whether the economic evaluation came from a multi-agency or payer perspective. Edwards et al. (2007) was the only paper to consider issues of fidelity with regards to the delivery of the IY Basic Parenting Programme. More research needs to be conducted into the cost-effectiveness of parenting programmes. It is an ideal time to make recommendations for future cost-effectiveness studies. There is little guidance on the application of methods of economic evaluations to specific challenges of public health interventions, such as parenting programmes (Kelly McDaid, Ludbrook, & Powell, 2005; Weatherly et al., 2009). A general review of economic evaluations in public health found little consistency in research methods (McDaid & Needle, 2007). It may be helpful to consider the following issues in future economic evaluations of parenting programmes as highlighted below; parenting programmes as complex interventions, wider societal benefits,

applicability of Quality Adjusted Life Year (QALY) figures, the use of economic modelling, statistical issues, equity implications and learning lessons.

Parenting programmes as complex interventions

Parenting programmes should be viewed firmly as upstream preventative public health measures and be recognised as "complex interventions". The Medical Research Council (MRC, 2008) defines complex interventions as any intervention that contains a multitude of interacting factors. These present a number of special problems for evaluators, in addition to the practical and methodological difficulties of any successful evaluation. These guidelines propose a cycle of piloting or assessment of feasibility, trial, where possible an RCT and evaluation of such interventions.

Wider societal benefits

It is important that future studies consider the potential social and economic importance of parenting programmes. This will help researchers recognise the long-term potential ROI across health, social care, education and judicial systems rather than focusing purely upon one type of benefit (health benefits). ROI of adequate sample size, follow-up and collection of full economic data is essential in determining wider societal benefits. Schweinhart et al. (1993, 2005) calculated the long-term ROI of the High/Scope Perry Preschool Programme (Weikart, 1966) after the intervention was delivered to children at preschool age 3-5 years. The ROI at aged 27 years was $7.16 (£8.65 inflated to 2008/09) per $1 (£1.21 inflated to 2008/09) invested and at the age of 40 years was $16.14 (£9.91 inflated to 2008/09) per $1 (£0.61 inflated to 2008/09) invested. This study demonstrates the potential for long-term ROI of preventative delivery of parenting programmes.

Economic evaluations of parenting programmes need to adopt a multiagency public sector perspective, spanning the range of sectors, not just the NHS. This reduces the underestimation of benefits and costs over time. Costs are accrued by health, educational, social services. The taxpayer also bares some of

the costs by providing funds to the Government for additional services. There is fairly standard guidance on the range of costs that should be collected in economic evaluations of specific healthcare interventions, for example direct costs such as staff time, indirect costs such as lost productivity and intangible costs such as pain and anxiety associated with ill health. In the economic evaluation of public health interventions, such as parenting programmes, these categories need to be widened to reflect the full range of costs, both training and roll out of, for example group parenting programmes (Edwards et al., 2007).

Applicability of Quality Adjusted Life Year (QALY) figures

Kelly et al. (2005) have argued that the QALY approach, (NICE, 2008a) may be too narrow to capture the full range of benefits from public health interventions. Weatherly et al. (2009) have argued for cost-consequence analysis alongside cost-effectiveness or cost-utility analysis. This method requires the researcher to set out a full range of disaggregated benefits clearly alongside any cost per QALY or cost-effectiveness ratio. NICE (2008a) states the QALY should be used because it is a standardised and internationally recognised method to compare and measure clinical effectiveness and cost-effectiveness across different treatments and patient groups. Unless future studies of the cost-effectiveness of parenting programmes consistently use the same measure e.g. ECBI (Eyberg, 1980) it becomes impossible to compare one study with another. Therefore we are still left with the need for common denominators such as the QALY, as well as the need for disaggregation of a wide range of benefits. For example, the IY parent programmes have shown a ripple effect in benefits gained, as sibling behaviour also improved at follow-up, as did self-reported parental depression levels (Hutchings et al., 2007 & Edwards et al., 2007).

Use of economic modelling

This review did not find any economic modelling studies of parenting programmes for the families of children with or at risk of developing CD.

Research funding is often limited to at best 3 or 4 years for RCTs, yet there is a need to follow-up families for 10 or 15 years to assess long-term clinical and cost-effectiveness, and allow population of wider economic models. Economic modelling can provide a way of estimating longer term costs and effects of short term public health interventions, such as parenting programmes. However at present such models would be difficult to populate with accurate data on effectiveness and pathways of causality. There is growing interest in return on public investment modelling. A U.K. example of using ROI methods is Birmingham City Council's "Brighter Futures Strategy" (Prevention Action, 2008). Birmingham City Council (Prevention Action, 2008) is currently piloting the Incredible Years, Triple P Parent and PATHS school-based programmes in rigorous RCTs with a view to roll out across the city should the programme be shown to be effective and cost-effective in Birmingham's multi-ethnic, multi-faceted city.

Statistical issues

There is growing interest in health economics and how researchers deal with statistical uncertainty in reporting economic evaluations. Future economic evaluations of parenting programmes need to adhere clearly to best practice, for example offering confidence intervals around estimates of cost-effectiveness, report sensitivity analysis where assumptions have been made and undertake subgroup analysis in order to illustrate where limited public resources might be best targeted. Kelly et al. (2005) highlight the importance of setting and delivery mode. The Welsh IY RCT was undertaken in Sure Start areas in North and Mid Wales and was delivered with fidelity with regular group leader supervision (Hutchings et al., 2007; Edwards et al., 2007; & Bywater et al., 2009). What is clear is that the mode of delivery, take up and, compliance will have a big effect on the overall cost-effectiveness of such programmes.

Equity implications

Weatherly et al. (2009) argue that policy makers interested in the effectiveness and cost-effectiveness of public health interventions may in fact be more interested in equity implications of such programmes. If parenting programmes have a positive effect on families facing the greatest socioeconomic challenges (raising opportunities for the most challenged children), this may be more important than the technical efficiency (absolute ratio of costs and benefits of such programmes). As well as reporting cost-effectiveness estimates and setting out all costs and consequences, it may also be helpful to report results of a parenting programme in terms of the costs shifting the distribution of children (the cost of shifting 10% of children with CD to below a clinical cut off in a particular geographical area and over a given time period).

Learning lessons

Finally each economic evaluation of a parenting programme will yield methodological lessons for the design and conduct of future trials. It is important that studies report both successful and unsuccessful research experiences. The authors make recommendations for future economic evaluations of parenting programmes (see Figure 3).

In future studies, the following should be considered:

a. To what extent parenting programmes are helpfully viewed as complex, upstream public health interventions.
b. A clear description of the usual "condition" against which parenting programmes are being evaluated and any associated costs.
c. Careful choice of outcome measures, spanning both quality of adjusted life years (QALYs), child behaviour measures and parent well being measures; preferably enabling comparison with previous published studies.
d. Adoption of a broad perspective for the measurement of costs and consequences e.g. public sector, multi agency payer perspective.
e. Careful use of diaries recording hours of staff time, room rental, travel, refreshments, training in order to measure the full costs of parenting programmes, acknowledging when volunteer time is also an element. In addition, clear distinction between set up costs and roll out costs for parenting programmes.
f. Where possible, some modelling of longer term costs and benefits, beyond the original timeframe of the RCT.
g. Cost-effectiveness ratios (ICERs) could be expressed in terms of a range of outcomes e.g. cost per QALY, cost per point improvement on a child behaviour scale, and in addition, it may be helpful to present the total cost of a parenting programme alongside a shift in the proportion of children "case" or "non case".
h. It is essential to provide confidence intervals around estimates of cost-effectiveness and to present policy makers and commissioners with the probability that a parenting programme is cost effective at different payer thresholds.
i. How positive/negative externalities e.g. ripple effects such as benefits to siblings and parental mental health going to be dealt with in the economic evaluation of parenting programmes?
j. How can sensitivity analysis and subgroup analysis be used to address questions of effectiveness of parenting programmes determined by setting, compliance and take up of programmes and to suggest where scarce resources might best be targeted?
k. How can issues of equity be considered? For example, do parenting programmes reach hard to reach parents, whether because of cultural, ethnic or socio-economic reasons?
l. What methodological improvements does this economic evaluation suggest could be used in future trials of parenting programmes?

Figure 3. Authors' recommendations of what future economic evaluations of parenting programmes in conjunction with RCTs should include.

Summary

Parenting programmes have been shown to reduce CD (Webster-Stratton et al., 2001; Black et al., 2002; Hutchings et al., 2007; Sanders et al., 2000a; Sanders et al., 2004). ROI studies from America have shown the potential for long-term economic benefit of such programmes (Olds et al., 1993; Masse & Barnett 2002; Schweinhart et al., 1993; Reynolds et al., 2001; Schweinhart et al., 2005). However, there is a lack of U.K. cost-effectiveness research in this field. Previous research has used mixed methods yielding mixed results; therefore, there is a need for standardisation in economic evaluations of parenting programmes. Evidence from cost-effectiveness analysis is essential, as this outlines an intervention in terms of its cost and its effectiveness compared to an alternative. A payer perspective is required, to give parenting programmes their appropriate priority when compared with value for money of other health and social care interventions.

More research is needed in this field, the recommendations outlined in Figure 3, if adhered to successfully, will help to inform policy makers and service managers as to resources required, both in time, staff and money, to achieve certain levels of clinical outcomes. Policy makers and service managers will then be able to make an informed judgement on deciding which intervention will achieve what outcomes, and at what cost, to embed within local or national services.

Key Messages of Chapter 2

1. Parenting programmes have been shown in many RCTs to reduce CD behaviours in children; however, economic evaluations of these programmes are rarely undertaken.

2. Evidence of the cost-effectiveness of parenting programmes is essential for decision makers; there is a paucity of research in this field.

3. Full economic evaluations can inform policy and practice decisions of which intervention to use, at what cost, and with what benefit. This is vital, especially when these decisions could be potentially constrained by budgetary limitations.

4. More research is needed in this field and we have recommended key criteria that we feel should be included in future economic evaluations of parenting programmes.

Chapter 3: Micro-costing in public health economics: steps towards a standardised framework, using the Incredible Years Toddler Parenting Programme as a worked example.

Summary

Background: Complex interventions, such as parenting programmes, are rarely evaluated from a public sector, multi-agency perspective. An exception is the Incredible Years (IY) Basic Parenting Programme; which has a growing clinical and cost-effectiveness evidence base for preventing or reducing children's conduct problems.

Objective: To use a micro-costing example of the 12-session IY Toddler Parenting Programme from a public sector, multi-agency perspective, to provide a micro-costing framework to inform future researchers.

Setting: This micro-costing was undertaken as part of a community-based randomised controlled trial of the programme in disadvantaged Flying Start areas in Wales, U.K.

Methods: Programme delivery costs were collected by group leader cost diaries. Training and supervision costs were recorded. Sensitivity analysis assessed the effects of a London cost weighting and group size. Costs were reported in 2008/2009 pounds sterling.

Results: Direct programme initial set-up costs were £3305.73; recurrent delivery costs for the programme based on eight parents attending a group were £752.63 per child, falling to £633.61 based on 10 parents. Under research contexts (with weekly supervision) delivery costs were £1509.28 per child based on eight parents, falling to £1238.94 per child based on 10 parents. When applying a London weighting, overall programme costs increased by £1695.38.

Conclusions: Costs at a micro-level must be accurately calculated to conduct meaningful cost-effectiveness/cost-benefit analysis. A standardised framework for assessing costs is needed; this paper outlines a suggested framework. In prevention science it is important for decision makers to be aware of intervention costs in order to allocate scarce resources effectively.

Charles, J.M., Bywater, T., Edwards, R.T. & Hutchings, J. (2011b) *Micro-costing in public health economics: steps towards a standardised framework, using the Incredible Years Toddler Parenting Programme as a worked example.* Manuscript submitted for publication.

Introduction

Research has typically focused upon the scientific rigor of interventions, evaluations and trials rather than the generalisability of results when interventions go to scale (Steckler & McLeroy, 2008). Prevention science has placed greater emphasis upon outcomes measures rather than assessments of cost. Health economists are recently making efforts to standardise data collection methods for economic evaluations (Ridyard & Hughes, 2010); however, this standardisation is not currently wide-spread in newer sub-disciplines of public health economics, which focus on upstream prevention. Micro-costing is a method which provides crucial, detailed cost data of, for example, setting up and delivering a service or intervention. Accurate costs of an intervention at the micro-level are required in order to perform accurate cost-effectiveness or cost-benefit analysis, thus giving a complete analysis of outcomes alongside the cost at which they are achievable. Cost-effectiveness analysis (commonly used in the U.K.) expresses results as a ratio of a cost per unit of health outcome, normally expressed in "natural units" (Morris, Devlin & Parkin, 2007). Cost-benefit analysis constructs an inventory of all costs and benefits valued in monetary terms for the intervention in question and an alternative, whatever they are and whoever incurs them (Morris et al., 2007).

Results from micro-costing can be transferred transparently between different settings and situations (Kinsella, 2004; Morris et al., 2007). First one must identify the perspective of the micro-costing, for example, healthcare, social care or multi-agency, public sector. Perspective determines the range of cost elements included and excluded in the micro-costing. A multi-agency perspective would take account of all costs related to all services accessed by individuals (e.g., healthcare, social care and education services for children). Second, the individual resources required for the delivery of the service must then be identified and each assigned a quantity and value (Drummond, Sculpher, Torrance, O'Brien, & Stoddart, 2005; Morris et al., 2007). Third, the individual resources need to be categorised, for example, recurrent and non-recurrent costs. If a service relies heavily upon staff time, staff costs may be quantified by the total time (plus relevant overheads) necessary to deliver to the service, and then valued as the total

wages for that time (Drummond et al., 2005; Morris et al., 2007; National Institute for Health and Clinical Excellence [NICE], 2006). Each intervention/service will require different resources. Resources are likely to be identified and categorised in diverse ways by different researchers, with differing analytic perspectives. It is therefore vital that the decision process and methods are clearly described when reporting micro-costing exercises.

Kinsella (2004) outlines lessons learned from conducting previous micro-costing exercises. Firstly precision is vital; researchers should obtain as much data as possible on each aspect of the area under study. For example, to value staff travel time, a mileage estimate is required plus their time foregone (opportunity cost) which would require information about their wages. When estimates have to be made, they must be noted and justified, as any error in estimates will impact upon the reliability of results. When selecting variables for costing there is a need for discretion. It is extremely difficult to account for every cost associated with a service. Secondly, define the remit before performing the micro-costing. Researchers may trade increased precision depending upon the availability of data and time allowed for the study. Thirdly, co-operation with staff members providing costs is essential to obtain accurate data, while keeping legal implications such as data protection in mind. Without the collaboration of professionals such as medical and administrative staff to gather accurate data, micro-costing will not be successful. Finally, it is advisable to use a time-stamped electronic data gathering device such as, a laptop computer to collect data prospectively. Micro-costing allows for extrapolations; which may ultimately focus health care provision because the precision gained from this method allows a more targeted and detailed evaluation (Kinsella, 2004).

There are very few references to micro-costing methods relevant to prevention science. This paper describes a newly developed framework based on Edwards, Ó Céilleachair, Bywater, & Hutchings (2007), Griffith, Edwards, & Gray (2004) and Kinsella (2004), using the preventative Incredible Years (IY) Toddler Parenting Programme to improve social and emotional well-being, as a worked example.

Parenting programmes

In the U.K. parenting programmes are typically delivered through health and social care services, provided through a predominately tax funded system. The Government usually sets the budget, and local commissioners allocate funds to local services. A report by the National Institute for Health and Clinical Excellence (NICE, 2006) stated evidence based parenting programmes such as IY are effective for both the treatment and prevention of behavioural problems including conduct disorder (CD), and associated social and emotional problems (detailed descriptions of the IY programmes are available at http://www.incredibleyears.com).

Previous micro-costing analyses of parenting programmes

A recent review of the economic evidence of parenting interventions for CD (Charles et al., 2011a) found that previous economic evidence in relation to parenting programmes reported intervention costs, but rarely reported details of the strategy employed to calculate programme costs. In these times of austerity, such as the present time in the U.K. micro-costing is vital to inform decision makers of the detailed costs associated with implementing parenting programmes in order to commission programmes that are both effective and cost-effective. A critique of previous micro-costing exercises involving the IY Parenting Programme follows.

Olchowski, Foster and Webster-Stratton (2007) gathered and presented costs of IY programmes, but did not use the micro-costing data to conduct a full cost-effective analysis. The costs included leader training, handbooks, materials such as puppets, worksheets, staff session preparation and delivery time, catering, cab vouchers, day care facilities or compensation for off-site childcare. Reported total programme costs did not include rental of space in which to conduct the programme, and administrative costs. Olchowski et al. (2007) state that rental of space costs were not included as agencies were usually able to provide 'free' space in which to deliver the programme, but suggested including rental of space

costs in per child cost estimates. No estimation of space costs, however, was provided. Administrative costs were also omitted from total programme cost calculations. If included; programme costs would increase, potentially resulting in a higher ratio of cost per unit of outcome, and reduced cost-effectiveness. In other words, the lack of detail and strategy when conducting micro-costing exercises affects further cost-analysis, illustrating the need for a standardisation in micro-costing methods. Programme costs presented in the original published paper were converted into Pounds Sterling and inflated to 2008/2009 costs (Curtis, 2009; International Monetary Fund 2009) (Appendix J).

Edwards et al. (2007) conducted a micro-costing of the 12-week IY Basic Parenting Programme, adopting a multi-agency public sector perspective, alongside a pragmatic RCT of the clinical effectiveness of the programme (Hutchings et al., 2007). Costs were divided into non-recurrent initial training and group set-up costs such as purchase of programme materials, the recruitment of parents through home visits, letters and telephone calls and recurrent group running costs such as room rental and crèche (child care/ day care) facilities. Programme costs presented in the original published paper were converted into Pounds Sterling and inflated to 2008/2009 costs (Curtis, 2009; International Monetary Fund 2009) (Appendix J). The micro-costing performed by Edwards et al (2007) was more detailed than the micro-costing performed by Olchowski et al. (2007). Edwards et al. (2007) were precise in their micro-costing as advocated by Kinsella (2004); they divided programme costs into two distinct categories (non-recurrent costs and recurrent costs) and labelled each element of cost in their paper. Edwards et al. (2007) enlisted the help of group leaders and the IY Wales Centre to develop cost diaries in order to gather accurate costs, and assist them in the decision making process of which cost elements to be included in their micro-costing.

More recently, O'Neill, McGilloway, Donnelly, Bywater, & Kelly, (2011) conducted a micro-costing of the 12-14 week IY Parenting Programme in Ireland, alongside a pragmatic RCT of the clinical effectiveness of the programme (McGilloway et al., in press). O'Neill et al. (2011) included a range of programme costs (e.g., staff time and mileage to conduct home visits and telephone calls to recruit parents, session preparation time, group running time, supervision time, and costs of facilities such as crèche (child care/ day care) facilities, taxis, food

and administrative costs); however, initial training and group set up costs were not included in the micro-costing. Costs were divided into three broad categories; direct wages, mileage and other expenses, but no specific detail was given about how each element of cost was identified, or valued within the specified categories. Programme costs presented in the original published paper were converted into Pounds Sterling and inflated to 2008/2009 costs (Curtis, 2009; International Monetary Fund, 2009) (Appendix J). O'Neill et al. (2011) also enlisted the help of group leaders and the IY Wales Centre to develop cost diaries to gather all cost information, thus enhancing the quality and accuracy of cost information. However, the broad categories used in their micro-costing (e.g., other expenses) provide little detail for the reader of the specific cost elements associated with that particular category.

The three examples above highlight the different approaches and levels of detail given in micro-costing. It is clear that micro-costing strategies with regard to accuracy, detail and inclusiveness potentially affect estimates of cost-effectiveness. A standard approach is needed. Using a recent RCT of the IY Toddler Parenting Programme as a case study this paper provides practical guidance for service managers, decision makers, health services, prevention scientists and health economics researchers when conducting micro-costing exercises of parenting programmes.

Method

Our micro-costing was conducted from a public sector, multi-agency perspective as a component of a pragmatic RCT evaluating the IY Toddler Parenting Programme in Wales, U.K. (Hutchings et al., submitted). The trial was funded by the Welsh Assembly Government and the micro-costing element by the Welsh Health Economics Support Service. The trial ran from 2008-2010. The sample consisted of 89 parents of toddlers aged 1-3 years living in disadvantaged Flying Start areas (Welsh Assembly Government, 2005a) in Wales, U.K. The main trial findings will be reported in 2012.

IY Toddler Parenting Programme Group Format

A maximum of 10 parents (both parents, where applicable were invited), typically the primary caregiver, attended weekly 2-2.5 hours parent programme sessions for 12 weeks. Only the primary caregiver completed the assessments in the RCT. Two trained leaders introduced a structured sequence of topics using video-examples and role-play.

Group Leaders

The group leaders were trained in the IY Toddler Parenting Programme and supervised by the fourth author, an accredited IY trainer. The leaders were health visitors and child care practitioners. Health visitors are qualified nurses or mid-wives who provide advice and health care in the community as part of a primary healthcare team (often through home visitation), to older people and parents of pre-school children. Child care practitioners hold a qualification in early years care and education and provide high quality childcare in children's centres. The group leader's main job role is to deliver the IY parenting programmes.

Setting

The programme was delivered in community settings in disadvantaged Flying Start areas in Wales, U.K. Flying Start is a Welsh Assembly Government initiative in which families living in areas of socio-economic disadvantage are eligible to receive additional services (e.g., enhanced health visiting services, free childcare, parenting and basic skills support) (Welsh Assembly Government, 2005a).

Micro-costing

Parenting programmes are defined by the Medical Research Council (Medical Research Council [MRC], 2008) as complex interventions. Costs and benefits of participating in such a programme can be accrued by multiple agencies; therefore, a public sector, multi-agency perspective was chosen. The costs of the IY Toddler Parenting Programme were calculated in three "real world" contexts; 1) the initial set up of the IY Toddler Parenting Programme as part of normal service delivery with newly trained leaders; 2) the subsequent delivery of the IY Toddler Parenting Programme as part of normal service delivery (with initial training and supervision already undertaken and materials purchased) and 3) the set up and delivery within a research/development context with newly trained (uncertified) leaders.

The developed micro-costing framework to follow was based on standard methods of cost gathering and previous examples of micro-costing (Drummond et al., 2005; Edwards et al., 2007; Griffith et al., 2004; Kinsella, 2004; Morris et al., 2007). Each element of cost (e.g., training costs, group material pack costs and venue rental costs) was labelled individually and given its own unit cost. These costs were then summed to give sub-totals for each category of cost (e.g., set-up costs and group costs) and the sub totals were then summed to calculate a total cost for the whole programme. Costs were also divided into the following two components based on the "real world" process necessary to set up and deliver the programme; 1) set-up costs (e.g., initial training costs, supervision and set-up before the start of the programme); 2) group costs and delivery costs (e.g., engagement/recruitment of parents, room rental for programme delivery, administrative costs and crèche facilities). The crèche facility provides child/day care for children, whilst their parents attend the group session. Supervision provides an opportunity for an experienced, accredited IY leader to rate the quality of the group leader's delivery of the programme, and offer feedback while viewing tapers, with the leaders present. Supervision whilst delivering the programme is encouraged to promote implementation fidelity. In non research contexts the supervision lasted a day (7.5 hours); however, under research/development conditions, an additional three hours of supervision took place weekly throughout programme delivery. Weekly supervision is suggested in

order to maintain fidelity when delivering the IY parenting programmes as part of a research trial, using uncertified leaders (Webster-Stratton, 2004). Supervision assures a supportive infrastructure and quality control of the programme delivery; in order to make sure that the research is a true test of the programme as established in its initial efficacy trial (Webster-Stratton, 2004).

Sources of unit costs

The mean unit delivery costs of running the group such as parent recruitment letters, home visits and telephone calls, room preparation, session delivery time, catch up home visits, rental of halls, taxis, food and crèche (child/day care) facilities were extracted from cost diaries, completed weekly by both leaders of five of the nine groups (n=10) in the intervention arm of the trial.

Micro-costing framework for the IY Toddler Parenting Programme example

Step 1 – development of cost diaries

A cost diary developed with group leader focus groups and the IY Wales Centre by Edwards et al. (2007), was used in the current RCT to establish the costs to set up and deliver the IY Toddler Parenting Programme. Activities such as the purchase of raffle prizes, felt-tip pens, paper and photocopying were listed as examples under the heading of 'administrative costs' in the diary, to guide and inform leaders. The categories were listed in a Microsoft Excel table, with a column for each week of programme delivery (Appendix I).

Step 2 – cost data gathering from group leaders taking part in the RCT

Group leaders were first contacted by phone by the first author to explain the study and to ask if they would consent to completing a cost diary. We endeavoured to obtain diaries from every group leader taking part in the RCT, in order to provide us with as much cost information as possible. Ten of the 18 group

leaders consented to complete the diaries. They represented two of the three groups in South Wales, U.K., two of the five groups in North Wales U.K. and the single group run in Mid Wales, U.K. Of the groups delivered in South and North Wales, U.K. The eight leaders that declined did so due to time restrictions.

The consenting group leaders received the diary via email as a Microsoft excel file. Group leaders were requested to give as much detail as possible about length of time spent on different tasks, for example, travel to group sessions, room preparation and running the group sessions. The leaders completed their electronic diaries weekly, and returned their completed cost diary by e-mail at the end of the 12 weeks to the first author. Leaders received a £20 book token in recognition of their time in completing the diary. There was a high consensus of agreement about time taken to for tasks related to the engagement and recruitment of parents and to deliver the programme (e.g. time to prepare the room and materials for the session). Travel time to weekly supervision and costs of crèche facilities, rental of halls, food and additional administrative costs differed slightly between the groups; therefore, a mean of the group running costs was calculated to provide the average cost across groups for the delivery of the programme.

Step 3 – cost data gathering from additional sources

This was a necessary step as some costs were not retrieved through the diaries (e.g., salaries of group leaders, group material costs and training costs). We used national costs where available and referred to service managers and the IY Wales Centre when these costs were unavailable. The hourly wage for health visitors was extracted from the U.K. Health and Social Care Unit Costs (Curtis, 2008). The hourly wage for child-care practitioners was provided by a range of participating service managers whose services deliver the IY programmes. An additional 25% was added to the child-care practitioner wage for national insurance and superannuation. The hourly wage presented in the tables shows the mean wage for group leaders, which formed the basis for calculation of costs for all staff-related tasks in delivering the programme. The purchase costs of the programme materials, initial training and trainers' wages to deliver supervision were supplied by the IY Wales Centre.

Step 4 – construction of tables

Tables 1-3 present the overall cost of the programme in three "real world" contexts, which can be used as a guide/template to calculate a cost per person of other programmes and under different contexts, to enable comparisons between other programmes and settings.

Results of the micro-costing analysis

Step 5 – conduct micro-costing analysis, in this case using the IY Toddler Parenting Programme example

Micro-costing creates a clear picture of costs if conducted accurately and sensitively. For the year 2008/2009; the total costs to set up and deliver the programme as part of normal service delivery were £9326.73 (total costs from Table 1 £3305.73 plus total costs from Table 2 £6021.00). Thus the total cost to set up and deliver the programme to a group of eight parents was £1165.84 per child. The cost of the programme, excluding initial training and initial set-up costs (e.g., materials), based on eight parents per group was £752.63 per child. Within a research/development context, with the associated high levels of supervision the total costs for a group consisting of eight parents including initial training, recruitment and group running costs were £1509.28 per child. The costs of the programme without initial training and initial set-up costs (e.g., materials) were £1096.07 per child.

The tables present data collected from the cost diaries, completed on a weekly basis. Table 1 presents the reported set up costs. The total costs of materials, training and one day supervision was £3305.73 (per programme).

Table 1.

Total costs to set up the Incredible Years Toddler Parenting Programme with one health visitor and one child care practitioner running the group.

Type of Cost	Units	Unit cost (£)	Total cost (£)
Set-Up Costs:			
Initial training costs:			
Materials (programme materials)	1 pack of IY toddler programme materials	£1027.89 for one pack of IY toddler materials (including Value Added Tax)	£1027.89
Training course fee	3 day training	£470.00 (including Value Added Tax) per leader	£940.00 (including Value Added Tax) for 2 leaders to attend training
Leader wages for two group leaders to attend training	3 day training (7 hours each day)	£493.92 per leader	£987.84 for 2 leaders to attend training
One day supervision before start of programme			
Supervision of group leaders before start of programme including travel	1 day (7.5 hours)	£350.00 (flat rate) for trainer wages to deliver supervision	£350.00
Total:			£3305.73

Table 2 presents the reported delivery costs of the IY Toddler Parenting Programme with initial training and supervision already undertaken and materials purchased.

Table 2.

Total costs and cost per child to deliver the Incredible Years Toddler Parenting Programme over 12 weekly sessions with one health visitor and one child care practitioner as the group leaders. Initial training and supervision has been undertaken and materials purchased (see Table 1).

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Delivery costs:				
Engagement and recruitment of parents:				
Time for two group leaders spent in home visits to recruit parents including travel time	90 minutes per family	90 minutes per family £35.28	720 minutes per group £282.24	900 minutes per group £352.80
Time for two group leaders to make telephone calls recruiting parents	120 minutes	120 minutes per family £47.04	960 minutes per group £376.32	1200 minutes per group £470.40
Administrative time for two group leaders to write and send out initial letter to parents	15 minutes for 1 letter	£5.88 in wages for 1 letter	£47.04 in wages to send letters to 8 families in first week	£58.80 in wages to send letters to 10 families in first week
Subtotal:			£705.60	£882.00
Group Costs:	Mean (Standard Deviation)			
Time for two group leaders to prepare the room for the group	42 minutes (7.3)	42 minutes per week £16.46	504 minutes per programme (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks	504 minutes per programme (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks
Time for two group leaders to prepare for the session	120 minutes (0)	120 minutes per week £47.04	1440 minutes per programme (running for 12 weeks) £564.48 in direct wages to prepare group session for 12 weeks	1440 minutes per programme (running for 12 weeks) £564.48 in direct wages to prepare group session for 12 weeks

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Group Costs:	Mean (Standard Deviation)			
Group time for two leaders including travel time to and from the group	396 minutes per week (78.2) (198 minutes per week for one leader)	396 minutes per week (£155.23 wages for two leaders) 198 minutes per week (£77.62 wages for one leader)	4752 minutes per programme £1862.76 in wages to conduct group session including travel time to session	4752 minutes per programme £1862.76 in wages to conduct group session including travel time to session
Time for two group leaders for catch up/ home visits sessions	60 minutes (0)	60 minutes per week £23.52	720 minutes per programme £282.24 in direct wages	900 minutes per programme £352.80 in direct wages
Time for two group leaders to make telephone calls to parents	58 minutes (14.6)	58 minutes per week £22.74	696 minutes per programme £272.88 in direct wages	870 minutes per programme £341.04 in direct wages
Subtotal:			£3179.88	£3318.60
Provision of crèche facilities (salary of Crèche staff)	£105.75 per week (67.3)	£105.75 per week	£1269.00 per programme	£1269.00 per programme
Taxis	0.00	0.00	0.00	0.00
Rental of halls	£60.83 per week (58.3)	£60.83 per week	£729.96 per programme	£729.96 per programme
Food and Catering	£5.20 per week (1.8)	£5.20 per week	£62.40 per programme	£62.40 per programme
Other costs (e.g., photocopying)	£6.18 per week (2.9)	£6.18 per week	£74.16 per programme	£74.16 per programme
Subtotal:			£2135.52	£2135.52
Costs of delivering parenting group over a 12 week programme:				
Total Cost/child based on 8 parents per group Cost/child based on 10 parents per group including additional recruitment letters, telephone calls, home visits, catch up visits and telephone call costs			£6021.00 £752.63	£6336.12 £633.61

Table 3 presents the reported set up and delivery costs of the programme. This table differs from the previous two tables, as under the guidelines of fidelity as advocated by the IY Series developer Webster-Stratton; weekly supervision should be undertaken throughout delivery when the programmes are delivered within a trial setting by uncertified leaders (Webster-Stratton, 2004).

Table 3.

Total costs and cost per child of set up and delivery of the Incredible Years Toddler Parenting Programme over 12 weekly sessions delivered within a research trial with one health visitor and one child care practitioner as group leaders.

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Set-Up Costs:				
Initial training costs:				
Materials (programme materials)	1 pack of IY toddler programme materials	£1027.89 for one pack of IY toddler materials (including Value Added Tax)	£1027.89	£1027.89
Training course fee	3 day training	£470.00 (including Value Added Tax) per leader	£940.00 (including Value Added Tax) for 2 leaders to attend training	£940.00 (including Value Added Tax) for 2 leaders to attend training
Leader wages for group leader to attend training	3 day training (7 hours each day)	£493.92 for one leader	£987.84 in wages for 2 leaders to attend training	£987.84 in wages for 2 leaders to attend training
Supervision before start of programme ("Set Up Day") costs:				
Supervision of group leaders before start of programme including travel	1 day (7.5 hours)	£350.00 (flat rate) for trainer wages to deliver supervision	£350.00	£350.00
Subtotal:			£3305.73	£3305.73

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Delivery Costs:				
Engagement and recruitment of parents:				
Time for two group leaders conducting home visits to engage and recruit parents (including travel time)	90 minutes per family	90 minutes per family £35.28	720 minutes per group £282.24	900 minutes per group £352.80
Time for two group leaders to make telephone calls recruiting parents	120 minutes	120 minutes per family £47.04	960 minutes per group £376.32	1200 minutes per group £470.40
Administrative time for two group leaders to write and send out initial letter to parents	15 minutes for 1 letter	£5.88 in wages for 1 letter	£47.04 in wages to send letters to 8 families in first week	£58.80 in wages to send letters to 10 families in first week
Subtotal:			£705.60	£882.00
Group Costs:	Mean (Standard Deviation)			
Time for two group leaders to prepare the room for the group	42 minutes (7.3)	42 minutes per week £16.46	504 minutes per programme (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks	504 minutes per programme (running for 12 weeks) £197.52 in direct wages to prep a room for 12 weeks
Time for two group leaders to prepare for the session	120 minutes (0)	120 minutes per week £47.04	1440 minutes per programme £564.48 in direct wages to prepare group session for 12 weeks	1440 minutes per programme £564.48 in direct wages to prepare group session for 12 weeks

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Group time for two leaders including travel time to and from the group	396 minutes per week (78.2) (198 minutes per week for one leader)	396 minutes per week (£155.23 wages for two leaders) (£77.62 wages for one leader)	4752 minutes per programme £1862.76 in direct wages to conduct group session including travel time	4752 minutes per programme £1862.76 in direct wages to conduct group session including travel time
Time for two group leaders for catch up/ home visits sessions	60 minutes (0)	60 minutes per week £23.52	720 minutes per programme £282.24 in direct wages	900 minute per programme £352.80 in direct wages
Time for two group leaders to make telephone calls to parents	58 minutes (14.6)	58 minutes per week £22.74	696 minutes per programme £272.88 in direct wages	870 minutes per programme £341.04 in direct wages
Subtotal:			£3179.88	£3318.60
Weekly supervision time for two group leaders	180 minutes attending supervision	180 minutes per week £70.56	2160 minutes per programme in supervision £846.72	2160 minutes per programme in supervision £846.72
Mileage to and from weekly supervision for two group leaders	Varied depending upon group leader location. 66 miles mean round trip.	£26.40 for the round trip (40p per mile)	£316.80 per programme (travel to 12 supervision sessions)	£316.80 per programme (travel to 12 supervision sessions)
Trainer costs (wages for delivering Supervision)	180 minutes per session	£132.00 per session	£1584.00 per programme in Supervisor wages	£1584.00 per programme in Supervisor wages
Group Costs:	Mean (Standard Deviation)			
Provision of crèche facilities (salary of Crèche staff)	£105.75 per week (67.3)	£105.75 per week	£1269.00 per programme	£1269.00 per programme
Taxis	0.00	0.00	0.00	0.00

Type of Cost	Units	Unit cost (£)	Total cost (£) based on 8 per group	Total cost (£) based on 10 per group
Group Costs:	Mean (Standard Deviation)			
Rental of halls	£60.83 per week (58.3)	£60.83 per week	£729.96 per programme	£729.96 per programme
Food and Catering	£5.20 per week (1.8)	£5.20 per week	£62.40 per programme	£62.40 per programme
Other costs (e.g., photocopying)	£6.18 per week (2.9)	£6.18 per week	£74.16 per programme	£74.16 per programme
Subtotal:			£4883.04	£4883.04
Costs of establishing and running parenting group over a 12 week programme:				
Total			£12074.25	£12389.37
Cost/child based on 8 parents per group			£1509.28	
Cost/child based on 10 parents per group including additional letters, home visits, catch up visits and call costs				£1238.94
Costs of running parenting group excluding non-recurrent costs:				
Total			£8768.52	£9083.64
Cost/child based on 8 parents per group			£1096.07	
Cost/child based on 10 parents per group including additional recruitment letters, telephone calls, home visits, catch up visits and telephone call costs				£908.36

Step 6 – conduct sensitivity analysis

Sensitivity analysis was applied to establish costs for ten/group instead of eight by calculating additional recruitment letters, telephone calls, home visits, and catch up visits and calls. The costs per child reduced from £752.63 to £ 633.61 under normal service delivery (excluding initial set up costs) and within a research trial from £1509.28 to £1238.94 (excluding initial set up costs).

This paper is based on a trial undertaken in Wales, U.K.; to estimate parenting programme delivery costs in a high cost, urban area such as London, U.K. A London weighting calculation was applied for staff salaries (e.g., group leader salaries to deliver the programme, trainer salaries to deliver supervision and crèche staff salaries) using the London Multiplier (Curtis, 2009). When this London weighting was applied to the costs of set up and delivery of the

programme as part of normal service delivery, the total programme costs increased from £9326.73 to £10560.27, making the programme £1233.54 more expensive if delivered in London and as part of a research trial, the costs increased from £12074.25 to £13769.63, making the programme £1695.38 more expensive if delivered in London, U.K.

Discussion

This paper sets out for the first time, a framework with easy to follow steps for undertaking a micro-costing of a parenting programme;

1. Use service staff and intervention provider's knowledge to establish cost parameters.
2. Develop methods such as diaries for cost gathering.
3. If costs are unavailable from diaries for example, staff salaries use national costs, where available and knowledge from intervention providers such as service managers to fill in the gaps.
4. From the information gathered construct clear tables outlining each element of cost and its value.
5. Conduct micro-costing analysis to calculate programme costs.
6. Conduct sensitivity analysis varying costs depending on group size, setting, or another adjustable variable.

Taking on board lessons outlined by Kinsella (2004), the methods applied in this micro-costing gained precision and accuracy by collaborating with key stakeholders and user groups. It is extremely difficult to account for every cost associated with a service, but by developing and using cost diaries with group leaders we had a specific list of delivery programme costs at ground level. The weekly completion of the diaries during the delivery of the programme reduced the need for estimates to be made. The framework presented in Tables 1-3 adds to the lessons outlined by Kinsella (2004) and other authors (Drummond et al., 2005; Edwards et al., 2007; Griffith et al., 2004; Morris et al., 2007) by developing a practical framework and steps to follow demonstrated through a working example, to facilitate the standardisation of micro-costing of future parenting programmes.

Our case study illustrates for the first time national U.K. costs for the newly developed IY Toddler Parenting Programme, delivered both as part of normal service delivery and within a research trial, thus highlighting how costs can differ depending upon context. To set up and deliver the programme as part of normal service delivery with eight parents per group it would cost £9326.73, which is £2747.52 less expensive than the costs of setting up and delivering the programme as part of a research trial with eight parents per group (£12074.25). The additional costs associated with the set-up and delivery of the programme within a research trial were created by additional weekly supervision sessions. Service managers and decision makers who are considering incorporating a new programme into their menu of services would require cost information to establish whether their budget could support the set up, delivery and roll out of such a programme (Tables 1 & 2). In contrast, service providers interested in assessing the clinical and cost-effectiveness of the programme before roll-out, would require within their budget the means to set up and deliver the programme under research contexts, with additional (weekly) supervision (Table 3). Eliminating barriers to attendance in order to improve retention to the programme is important. Service managers will still incur the same fixed costs for example, staff salaries, crèche (child care/ day care) facilities, room rental and catering, regardless of the number of parents who attend.

Lessons from sensitivity analysis

Sensitivity analysis established how the costs of the IY Toddler Parenting Programme were affected by increasing group participants from 8 to 10. The IY series developer recommends that the number of parents in a group does not exceed 12, (Webster-Stratton & Reid, 2010). The number of parents per group in this trial ranged from 7 to 10, with an average of eight parents per group. The average number per group was used in the micro-costing exercise to calculate the average cost per parent. Sensitivity analysis showed the difference in cost per parent with increasing numbers, whilst keeping below 12 parents per group, as recommended by Webster-Stratton & Reid (2010). The costs per child fell when group size increased, which has implications for cost-effectiveness. If the

programme is delivered to a larger group at a lower cost, this could result in a higher cost-effectiveness ratio. Sensitivity analysis also demonstrated the effect of running the programme in London U.K., a high cost urban area in comparison to the predominantly rural delivery sites in Wales, U.K. Overall programme costs increased by £1233.54 under normal service delivery and £1695.38 when conducted as part of a research trial when the London Multiplier was applied.

Sensitivity analysis enables allowances to be made for budgetary limitations, high demand from families and target setting by an organisation or Government policy. The highest cost item (Tables 2 & 3) is group leader wage to engage/recruit parents and deliver the programme; the second is provision of crèche facilities. Parents experience many barriers to attending a group, such as complications arranging child care and difficulties travelling. By providing crèche facilities parents have one less barrier to overcome. It is, therefore a crucial additional cost that affects uptake and programme completion by parents. The programme was costed as being delivered by one health visitor and one child care practitioner. Costs would increase if the groups were run by two health visitors, as their wage is higher than that of a child care practitioner. Service mangers may feel lower paid should be trained to reduce costs; however, it is important to have qualified, trained staff with the appropriate background to deliver the programme well. The IY Toddler Parenting Programme is a 2-2.5 hour a week programme, delivered by two group leaders, but staff time to prepare and deliver one weekly session, and make catch up telephone calls or home visits results in approximately 11 hours of staff time, (i.e., one and a half full days per week is required to deliver a 2-2.5 hour session).

Strengths

This paper is the first to offer a template/guide by providing the first working micro-costing example of a parenting programme for children under three years old. Previous micro-costing exercises of parenting programmes have used varied methods and given little detail of their decision making process and selection of cost elements. In contrast, this paper offers a framework detailing how the costs of the programme were collected, labelled and divided into categories; beginning

with defining the perspective of analysis, through to the use of leader cost diaries to construct Tables 1-3.

Precise and accurate costs were gathered by diaries developed in partnership with the IY Wales Centre and group leaders. Diaries were completed weekly by leaders; therefore, reducing the need for estimates to be made. By using cost diaries we were able to compile a list of programme delivery costs based upon group leaders' direct experiences of delivering the programme. This paper sets out the total programme costs of the 12-session IY Toddler Parent Programme within the three contexts of initial set up of the programme as part of normal service delivery with newly trained leaders, the subsequent delivery of the programme with initial training and supervision undertaken, materials purchased and the set up and delivery of the programme within a research/development context with newly trained (uncertified) leaders. By separating the costs in this manner the reader can find the appropriate cost of the programme based upon their need.

Limitations

Using the framework in this instance highlights context-bound cost issues for example, travel costs to attend weekly supervision. Under research contexts (Table 3) groups were run in rural Wales, U.K., where long distances were travelled; hence the presented costs may be higher than in urban settings. Supervision was delivered in two main areas - North and South Wales, U.K., to reduce travel costs as much as possible; however, a small number of group leaders in Mid Wales, U.K., had to travel a few hours to one of the North or South locations to receive supervision. This is important for policy as well as costs, as reductions in costs and increased fidelity could be achieved through each location having an accredited leader who could provide supervision in their local areas.

Though viewed as a strength, the use of diaries as the primary method to gather costs has potential risks. There was the possibility that the leaders may miss hidden costs or be unable to identify specific categories of costs such as administrative costs. We minimised this potential risk by listing activities such as

the purchase of raffle prizes, felt-tip pens, paper and photocopying as examples under the heading of 'administrative costs' in the diary.

The importance of micro-costing in early intervention programmes

Early preventative interventions have the potential to impact greatly upon outcomes for children. There is a large evidence base of the costs to society without such interventions during childhood for example, anti-social behaviour, crime and unemployment (Allen, 2011a). The availability of cost data for decision makers is critical. There is growing interest from U.K. Government policy makers in early intervention programmes. This paper is the first micro-costing of a parenting programme for children under three years old.

Programme costs need to be accurately calculated at the micro-level before undertaking further economic analysis. The cost-effectiveness or cost-benefit of a programme cannot be accurately determined without precise programme set up and delivery costs. A lack of detail or underestimation of costs when performing micro-costing could result in a flawed cost-effective analysis with considerable implications. For example, if a cost-effectiveness analysis is performed using underestimated programme costs, and the programme is deemed to be cost-effective programme; decision makers who decide to roll out the programme could find they have not chosen the most cost-effective programme.

Future research

In our view, the main unanswered question in micro-costing is how and why researchers define and choose certain parameters when conducting their micro-costing. The lack of detail in previous published studies leaves unanswered questions as to why the researchers chose a particular perspective, included certain elements and costs, but may have excluded others. Further detail and explanation of the methodology adopted by researchers conducting micro-costing exercises is required, as we look to previous examples to inform future research. A lack of detail in previous micro-costing exercises could hinder future research

and lead to expenditure in costly and ineffective programmes. There is a need for standardisation in micro-costing; this standardisation will provide researchers with a guide of what typically should be included when performing micro-costing. We have provided the cost diary used in the trial (Appendix I) in order to facilitate standardisation of future micro-costing exercises of parenting programmes.

Conclusion

This paper describes the rationale for, and value of, micro-costing parenting programmes as upstream public health prevention programmes; not only for researchers who may be conducting economic evaluations alongside RCTs, but also for service managers and decision makers. The suggested framework addresses issues such as accuracy, sensitivity analysis and highlights the lack of economic research conducted in this field. The method and steps of the micro-costing performed on the IY Toddler Parenting Programme are based on accuracy, precision, collaboration and definition of a remit before beginning the micro-costing (Edwards et al., 2007; Griffith et al., 2004; Kinsella, 2004).

Researchers need to be clear, accurate and detailed in their micro-costing methods so others may learn from their experiences; using similar methodology where appropriate, and improving methods where necessary. Micro-costing is a useful economic tool, if conducted accurately it can help to support standardisation in the field of health economics, future economic evaluations, research and intervention delivery. We present a framework, detailed steps and a cost diary template to facilitate the standardisation of micro-costing of parenting programmes, which has not previously been offered.

Key Messages of Chapter 3

1. Micro-costing is important and forms the bedrock of accurate cost-effectiveness and cost-benefit analyses.

2. There is increased policy interest in the cost-effectiveness of upstream programmes and interventions in the current economic climate. Economic evaluations of complex interventions such as parenting programmes are needed to inform service managers and decision makers.

3. Economic evaluations should be undertaken as standard alongside RCTs of clinical effectiveness to show potential cost-effectiveness or cost-benefits of a programme or intervention.

4. Researchers need to consider lessons learnt from previous micro-costing exercises such as the need for accuracy, precision, collaboration, choosing the perspective and defining the parameters of the micro-costing in order to develop the technique further.

5. A standardisation in the methods of micro-costing is required to bring transparency to the method, allowing for comparison between different programmes or interventions.

6. Removing barriers to parental attendance is fundamental. Service managers will still incur the same fixed and variable costs to set up and deliver the programme whether two parents attend or ten.

Chapter 4: A pilot cost-consequence analysis of the Incredible Years Toddler Parenting Programme delivered in socially disadvantaged Flying Start areas in the U.K.

Summary

Background: The Incredible Years (IY) series comprises of parent programmes with a growing clinical and cost-effectiveness evidence base in promoting positive parenting practices and reducing child behavioural problems. Preventative programmes increasingly target younger age children, an example is the recently developed IY programmes for parents of infants and toddlers. Cost-consequence analysis collects and categorises the cost components of a chosen intervention and presents a range of disaggregated outcomes for example, alongside a trial.
Objective: To conduct a secondary cost-consequence analysis of the IY Toddler Parenting Programme alongside a randomised controlled trial (RCT) of the clinical effectiveness of the IY Toddler Parenting Programme (N=103), in a sub-sample of families (N=38) of toddlers aged between 1-3 years.
Setting: Community-based, disadvantaged Flying Start areas in Wales U.K.
Method: An integrated economic analysis adopting a public sector, multi-agency (health, social and education) perspective, was conducted. Health, social and education service use as measured by the Client Service Receipt Inventory (CSRI) and clinical outcome measures to assess parental depression (Beck Depression Inventory II, BDI II and child development (Schedule of Growing Skills II, SGS II for children) were compared by a one-way between groups analysis of covariance for the intervention and control groups between baseline and six months post-baseline, whilst controlling for baseline BDI II scores, SGS II DQ scores and the costs of parent's and children's service use between baseline and six months post-baseline.
Results: It cost £1509.28 per child to set up and deliver the programme, based on eight families per group. A statistically significant difference in BDI II total scores was found for parents in the intervention group six months post-baseline compared to parents in the control group. No statistically significant differences were found in costs of service for parents in the intervention group post intervention compared to the control group. No statistically significant differences were found in total SGS II Developmental Quotient (DQ) score, and costs of service use for children in the intervention group post-baseline compared to the control group.

Conclusion: Significant reductions were found in parental self-reported depression post-intervention. No significant differences were found for parental and child service use or child development; however, due to a small sample size this study should be regarded as a pilot and results should be viewed with caution. The lack of significant findings for the other outcome measures may be attributed to the age of the sample and the short timescale of the RCT. By performing cost-consequence analysis a number of outcomes could be assessed. This is an advantage when assessing complex interventions, which have many interacting components. Cost-consequence analysis provides service commissioners and policy makers with a full picture of costs and consequences. The growing interest in early intervention programmes from Governments and local service commissioners may need a longer time horizon than typically provided by RCTs.

Charles, J.M., Bywater, T., & Edwards, R.T. (2011c) *A pilot cost-consequence analysis of the Incredible Years Toddler Parenting Programme delivered in socially disadvantaged Flying Start areas in the U.K.*

Introduction

Recently there has been a surge of worldwide interest in early prevention interventions such as parenting programmes, aimed at increasingly younger age groups. These parenting programmes are typically delivered in the early years of a child's life. Responding to need, developers of evidence-based parenting programmes have gradually produced infant and toddler varieties for example, the Incredible Years (IY) series, and Triple P. Previous studies demonstrate the potential of early intervention programmes for young children for improved child behaviour (McMenamy, Sheldrick, & Perrin, 2011; Niccols, 2009; Elliot, Prior, Merrigan, & Ballinger, 2002; Love et al., 2005) and child social and emotional development (Love et al., 2005). Other studies (Elliot et al., 2002; Love et al., 2005; McMenamy et al., 2011; Niccols, 2009) demonstrate effectiveness in randomised controlled trials (RCTs); which usually have a follow up period of 6-12 months.

Increased interest in early intervention programmes in the U.K.

Recent U.K. Government initiatives support families with young children to give them the "best start in life". In the U.K. "Every Child Matters, a Change for Children" (Department for Education and Skills, 2004) and the "Parenting Action Plan" (Welsh Assembly Government, 2005a) set out a national framework for local change programmes to build services around the needs of children and young people that maximise opportunity and minimise risk. Graham Allen, a U.K MP has recently published two reports outlining evidence of effective early interventions (Allen 2011a; 2011b). The first report outlined the evidence base of early interventions, highlighting previous effective interventions, such as the IY series of programmes (Allen, 2011a). The second report outlined the societal costs of not intervening in child behavioural problems and steps necessary to fund the implementation and roll out of effective programmes in the U.K.

Against the political backdrop of "every child matters" the internationally developed infant and toddler parenting programmes such as IY are being trialled and implemented within Flying Start areas.

Flying Start is a Welsh Assembly Government initiative for families of children up to three years old (Welsh Assembly Government, 2005b). This initiative is designed to give children a "flying start" in life through the provision of additional services such as; enhanced health visiting services, childcare, parenting and basic skills services for the most disadvantaged children (Welsh Assembly Government, 2005b). These are areas of significant deprivation, with a high proportion of young, single parents. An area (typically primary school catchment area) is deemed a Flying Start area if over 45% of the children are eligible for free school meals, as this closely relates to income poverty (Welsh Assembly Government, 2005b). Through Flying Start, families receive additional support such as increased health visitor consultations, childcare, parenting programmes, and language and play sessions. A health visitor is a qualified nurse or mid-wife. In the U.K., health visitors provide advice and health care in the community as part of a primary healthcare team, to parents of pre-school children through home visits.

A qualitative interim report of Flying Start commissioned by the Welsh Assembly Government (2010) explored families' experiences and outcomes of three of the four elements; childcare, parenting programmes, and language and play. Findings showed Flying Start significantly increased parents' access to services, leading to higher levels of take up and engagement with wider services. Flying start helped to build relationships with hard to reach families (families who engage minimally with mainstream services), allowing them to identify the needs of families earlier and wider issues or problems within families. Flying Start strengthened parental relationships with local schools leading to an easier transition from Flying Start childcare to nursery and then school (Welsh Assembly Government, 2010). Parents who lived in Flying Start areas accessed child care provided by the initiative. Parents commented on the quality of childcare provided by Flying Start and said they noticed improved language, literacy, numeracy, social development and behaviour (Welsh Assembly Government, 2010). Previous research has shown an association between living in a disadvantaged area and problematic child behaviour (Sainsbury's Centre for Mental Health, 2009). Inconsistent parenting, prevalent in families living in disadvantaged areas can lead to behavioural problems (Farrington, 1995). Attride-Stirling, Davis, Day, & Selare (2001) found 20% of children in socially

disadvantaged areas in the U.K. are diagnosed with conduct disorder (CD) compared to 4.9% (6.9% of boys and 2.8% of girls) aged five to ten years old in the general population in the U.K (National Institute for Health and Clinical Excellence [NICE], 2006).

Costs to society of problematic child behaviour

Costs to the public health and social service system to manage and treat behavioural problems such as CD are significant. Scott, Knapp, Henderson and Maughen (2001a) found the costs of publicly resourced services for an individual aged 28 years old with CD in childhood to be 10 times higher (£70,019) than individuals aged 28 years with no childhood history of CD (£7,423). Romeo, Knapp and Scott (2006) using a sample from a previous study (Scott et al., 2001a) evaluating parenting groups for childhood antisocial behaviour found the mean cost of the U.K. tax funded health care system, the National Health Service (NHS), voluntary services and education services used by children in the sample was £1277 per child, per year. The overall mean total cost per child for NHS services, local authority education services, voluntary sector services and non-service costs to the family such as household repairs was £5960 per year. The Sainsbury's Centre for Mental Health (2009) estimated that around 80% of all criminal activity is attributable to individuals who had conduct problems either as children or adolescents. The Sainsbury's Centre for Mental Health (2009) estimated the total cost of all crime in England and Wales committed by individuals who experienced conduct problems in childhood is estimated at £60 billion a year.

Romeo et al. (2006) found 71% of children in the Scott et al. (2001a) sample had GP consultations for parental concerns regarding their child's behaviour. Forty percent of the children in the sample had been admitted to hospital for accidental injuries such as head injuries, scalds and burns. A co-morbid link has been shown between children who exhibit behavioural problems and accidental injuries (Matheny, 1991; Pulkkinen, 1995; Plumet & Schwebel, 1999). Previous research has also shown children under five years old are at the

greatest risk of accidental injury than older children (Consumer Safety Unit, 2002).

There is evidence of risk factors that can increase the likelihood of children developing conduct problems such as, inconsistent or neglectful parenting, family poverty, single parenthood, large family size and living in disadvantaged areas (Farrington, 1995; Sainsbury's Centre for Mental Health, 2009). However, protective factors such as social and emotional competence have been shown to prevent children from developing conduct problems in later life (Adi, Killoran, Janmohamed, & Stewart-Brown, 2007). Social competence refers to the group of social, emotional and cognitive behaviours/skills that enable children to successfully adapt to social situations (Welsh & Bierman, 2001). Emotional competence refers to the ability to express one's emotions and successfully interpret the emotions of others (Welsh & Bierman, 2001). Protective factors reduce risk of CD, and early interventions increase protective factors by attempting to promote positive parent-child interactions and social and emotional competence.

The Incredible Years Series

The IY series (Webster-Stratton, 1984) are aimed at families with children aged between 0-12 years, and enhance parenting skills to help families manage problematic behaviour and develop pro-social alternatives. There is growing interest in parent programmes as preventative interventions for young children at risk of developing behavioural problems (Allen, 2011a; 2011b). Webster-Stratton has recently developed two programmes aimed at very young children to provide a preventative intervention for 'at risk' families (detailed descriptions of the IY programmes are available at http://www.incredibleyears.com).

The IY Toddler Parenting Programme is aimed at families with children aged between 1-3 years old and focuses upon promoting positive relationships, praise, encouragement, developing strategies to deal with toilet training, sharing, and bed times and encouraging and developing social and emotional competences. Social competence refers to the group of social, emotional and cognitive behaviours/skills that children need in order to adapt successfully to social

situations (Welsh & Bierman, 2001). Emotional competence refers to the ability to express one's emotions and successfully interpret the emotions of others (Welsh & Bierman, 2001). Social and emotional competence and well-being in the early years of a child's life has shown to be a protective factor against CD and behavioural difficulties in later life (Adi et al., 2007; NICE 2006).

The IY parent programmes have a broad evidence base of their clinical effectiveness, when delivered in community settings as preventative interventions for children "at risk" of developing CD (Black et al., 2002; Bywater et al., 2009; Hutchings et al., 2007; Miller, & Rojas-Flores, 1999), and when delivered in community settings for children with CD, and early onset CD (Scott, Spender, Doolan, Jacobs, & Aspland, 2001b; Webster-Stratton, 1984; Webster-Stratton, 1990; Webster-Stratton, & Hammond, 1997). The IY series of programmes have undergone a number of economic evaluations ranging from cost studies (Olchowski, Foster, & Webster-Stratton, 2007) to cost-effectiveness (Edwards, Ó Céilleachair, Bywater, & Hutchings, 2007; Muntz, Hutchings, Edwards, Hounsome, & Ó Céilleachair, 2004) and cost-benefit analyses (McGilloway et al., 2009; O'Neill, McGilloway, Donnelly, Bywater, & Kelly, 2011).

Cost-consequence analysis of the Incredible Years Toddler Parenting Programme

Given the recent interest in using parenting programmes as preventative interventions rather than treatments; the IY Toddler Parenting Programme was used to perform a cost-consequence analysis. The IY group-based parenting programmes have an evidence base spanning 30 years, and have undergone more rigorous economic evaluation than any other group-based parenting programme (Furlong et al. in press; Charles et al., 2011a); however, this research relates to the IY programmes as treatments rather than preventative interventions and no specific cost-consequence analyses of the IY parent programmes has been conducted previously. There is a need to evaluate the newly developed IY preventative programmes aimed at infants and toddlers to assess their effectiveness, using accurate costs of the programme (Charles et al., 2011b), in order to inform policy and decision makers.

Cost-consequence analyses collects, categorises and lists the cost components of a chosen intervention (ISPOR, 2003). This type of analysis does not make any judgement of the relative importance of the components listed, that verdict is left to the decision maker (ISPOR, 2003). Within a public health context where complex interventions are primarily used, cost-consequence analysis may be a more appropriate form of economic analysis compared with cost-effectiveness analysis. Weatherly et al. (2009) suggest using cost-consequence or a cost-benefit analysis alongside other forms of economic evaluation, in order to consider all costs and benefits. Cost-effectiveness analysis has been used previously to evaluate the IY Basic Parenting Programme (Hutchings et al., 2007; O'Neill et al., 2011). However, cost-effectiveness analysis may be limited when assessing complex interventions such as parenting programmes. Cost-effectiveness analysis uses a single outcome measure. In contrast, cost-consequence analysis can assess multiple outcomes, which is an advantage when assessing complex interventions, containing multiple interacting components.

This paper aims to conduct a cost-consequence analysis of the IY Toddler Parenting Programme and assess the impact of the programme for clinical outcomes for both children and parents such as child development and parental mental well-being and economic outcomes such as frequency and costs of healthcare and social care service use.

Method

Cost-consequence analysis

The cost-consequence analysis was conducted from a public sector, multi-agency perspective as the parenting programme in question is considered a complex intervention; therefore, costs and benefits of participating in such a programme are accrued by multiple agencies (Medical Research Council [MRC], 2008). Costs were calculated for both the intervention and control groups for the time period

baseline to 12 months post-baseline using national costs (Curtis 2008; Department of Health 2007/2008) (Appendix K) and inflated to 2009/2010 costs using Hospital and Community Health Services (HCHS) pay and prices index (Curtis 2010).

Sample

This cost-consequence analysis took place alongside a pragmatic randomised controlled trial (RCT) assessing the clinical effectiveness of the IY Toddler Parenting Programme (N=103) funded by the Welsh Assembly Government, conducted in disadvantaged Flying Start areas in North, Mid and South Wales see Hutchings et al. (submitted). Families taking part in the trial were randomised to the intervention or a six month waiting list control group allocated on a 2:1 ratio by a U.K. registered trials unit (North Wales Organisation for Randomised Trials in Health, NWORTH).

The families were approached at their six month and twelve month post-baseline follow-up of the main RCT to complete additional economic measures on their general health and their contacts with healthcare, social care and educational services. The sample for the economic evaluation was smaller than that of the main RCT, as fewer participants completed both the clinical and economic measures, which were necessary in order to compare data for the cost-consequence analysis. Full economic data was gathered for 28 families in the intervention group and 10 in the control group six months post-baseline (N=38), and at twelve months post-baseline we had full data for 28 families in the intervention group and 10 in the control group (N=38).

Intervention

The IY Toddler Parenting Programme was developed by Webster-Stratton, (2008). It is a 12-week programme designed to enhance parenting skills to manage challenging behaviour through role-play, group discussion, video-

modelling and homework tasks undertaken with supervision from a trained group leader. The size of the intervention groups varied from 7 to 10 parents across areas, with an average of 8 parents attending 2.5 hour weekly sessions of the Incredible Years Toddler Parenting Programme.

Costs of the IY Toddler Parenting Programme

The total programme set-up and delivery costs were £1509.28 per child based on eight parents per group and £1096.76 per child based on ten parents per group (Charles et al., 2011b, Chapter 3). Set up costs consisted of the purchase of programme materials and initial training costs (e.g. training course fee and group leader's wages to attend the training). Delivery costs consisted of group leader wages to; engage and recruit parents to the programme (e.g. home visits, telephone calls and letters), deliver the parenting programme group session (e.g. prepare the room, prepare the session, group time in session, including travel time and catch up visits or telephone calls to parents who were absent from the session), and attend weekly supervision to ensure programme is delivered with fidelity (e.g. time at supervision session, travel to supervision session and trainer costs to deliver supervision). Programme costs also included the provision of crèche facilities, rental of space in which to conduct the group sessions, administrative costs (e.g. photocopying, pens, paper and raffle prizes), and food and catering. The intervention was delivered to participants in the intervention group between baseline and six months post-baseline.

Outcome measures assessed in the main RCT

The trial participants completed a battery of measures consisting of; demographics, measures of parental competences, measures of parental mental health, measures of child development, measures of parent and child interaction through observation and measures of the home environment at baseline, six months post-baseline and twelve months post-baseline for the full list of measures

used in the main RCT and results of the clinical trial see Hutchings et al. (submitted).

Outcome measures for cost-consequence analysis

Cost-consequence analysis was performed on the data collected at baseline and six months post-baseline. The wait-list control group were offered the intervention after the six-month follow-up, resulting in a lack of comparable data at twelve months post-baseline.

From the main battery of measures, the outcome measures of interest to perform the cost-consequence analysis are;

The Schedule of Growing Skills (SGS II, Bellman, Lingnam, & Aukett, 1996) (Appendix G), a developmental screening tool used by health professionals involved in the care of young children from birth to five years old. The measure is divided into five broad developmental fields; posture and large movements, vision and fine movement, hearing and speech, social behaviour and play, and cognitive. The Development Quotient (DQ) scoring method was used (Williams Hutchings, Bywater, Daley, & Whitaker, submitted).

The Beck Depression Inventory II (BDI II, Beck, Steer, & Brown, 1996) (Appendix F) is a self-report questionnaire that assesses parental depression. It yields sub-scales of depression from the total score of all 21 items on the questionnaire; the minimal depression range is 0-13, mild depression 14-19, moderate depression 20-28 and severe depression 29-63. The clinical cut off point for the BDI II is a score of 19 and over.

A modified version of the Client Service Receipt Inventory (CSRI) (Beecham & Knapp, 1992) (Appendix E) was administered to assess parent's and children's number of contacts with healthcare, social care and education professionals in the six months prior to completion.

These measures were chosen as a co-morbid link between parental depression and CD problems has been demonstrated previously (Alpern & Lyons-Ruth, 1993; Hutchings et al., 2007; Lahey et al. 1988), and high levels of depression have been associated with increased service use (Charles et al., 2011d). Child outcomes such as child development and service use were chosen to assess

the impact of the programme upon children. Developmental measures were used in the main RCT rather than child behavioural measures as the children in the sample were three years old and under. Love et al. (2011) also assessed the impact of a parenting programme using child developmental measures. Child and parent service use was assessed, as previous clinical and economic evaluations of parenting programmes have assessed service use as one of the main outcomes.

Analysis Strategy

Analysis was performed for participants for whom, complete data-sets of both the clinical and economic measures of interest at baseline, six and twelve months post-baseline. Participants were also included in the analysis irrespective of uptake of the intervention providing the above criteria were met. Normality tests using Kolmogorov-Smirnov statistic and inspection of the Q-Q plots as recommended by Field (2009) and differences between demographic characteristics of the intervention and control groups at baseline were assessed prior to analyses.

A one-way between-groups analysis of covariance was conducted to compare intervention and control group outcomes to measure the effectiveness of the IY Toddler Parenting Programme to enhance child development. SGS II (Bellman et al., 1996) DQ total scores at six months post-intervention were compared for the intervention and control group, using the SGS II (Bellman et al., 1996) DQ total score at baseline as the covariate in the analysis. Preliminary checks were conducted prior to analysis, to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measure of covariate.

A one-way between-groups analysis of covariance was conducted to compare the effectiveness of the IY Toddler Parenting Programme on children's health, social care and education service use. Total costs of service use in the six month period between six and twelve months post-baseline as measured by the CSRI (Beecham & Knapp, 1992) at twelve months post-baseline were compared for the intervention and control group, using the costs of service use in the six month period between baseline and six months post-baseline collected at six

months post-baseline as the covariate in the analysis. Preliminary checks were conducted prior to analysis, to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measure of covariate.

A one-way between-groups analysis of covariance of BDI II (Beck et al., 1996) total scores at six months post-intervention were compared for the intervention and control group, using the BDI II (Beck et al., 1996) total scores at baseline as the covariate in the analysis. Preliminary checks were conducted prior to analysis, to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measure of covariate.

A one-way between-groups analysis of covariance of total costs of service use in the six month period between six and twelve months post-baseline as measured by the CSRI (Beecham & Knapp, 1992) at twelve months post-baseline were compared for the intervention and control group, using the costs of service use in the six month period between baseline and six months post-baseline collected at six months post-baseline as the covariate in the analysis. Preliminary checks were conducted prior to analysis, to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes and reliable measure of covariate.

Results

No differences were found in demographic characteristics between the intervention and control group at baseline using chi-square and independent samples t-tests prior to conducting analyses see Table 1.

Normality tests revealed non-significant results using a Kolmogorov-Smirnov statistic for total BDI II (Beck et al., 1996), and total DQ SGS II (Bellman et al., 1996), scores at baseline and inspection of histograms and Q-Q plots supported these results, meaning total BDI II (Beck et al., 1996) and total DQ SGS II (Bellman et al., 1996) scores at baseline were normally distributed.

Significant results were found using a Kolmogorov-Smirnov statistic for total BDI II (Beck et al., 1996) scores at six months post-baseline, D (38) = .17, p < .05, total DQ SGS II (Bellman et al., 1996) scores, at six months post-baseline, D (38) = .16, p < .05, total frequency of service use and total cost of service use at six months post-baseline for children D (38) = .30, p < .05, D (38) = .30, p < .05, and parents, D (38) = .16, p < .05, D (38) = .28, p < .05, total frequency of service use and total cost of service use at twelve months post-baseline for children D (38) = .25, p < .05, D (38) = .25, p < .05, and parents, D (38) = .23, p < .05, D (38) = .25, p < .05. Inspection of histograms and Q-Q plots supported these results, meaning this data was not normally distributed. From the results of the Kolmogorov-Smirnov statistic transformation was conducted on the data that violated the assumption of normality. Following these transformation normality tests were conducted again and revealed non-significant results using a Kolmogorov-Smirnov statistic for these variables, shown in brackets.

A square root transformation was performed on total DQ SGS II (Bellman et al., 1996) scores at six months post-baseline, (D (38) = .14, p > .05). Logarithmic transformations were performed on parent costs of service use between baseline and six months post-baseline (D (38) = .12, p > .05) and parent's costs of service use between six months post-baseline and twelve months post-baseline (D (38) = .18, p > .05). Logarithmic transformations were performed on children's costs of service use between baseline and six months post-baseline (D (38) = .09, p > .05) and children's costs of service use between six months post-baseline and twelve months post-baseline (D (38) = 0.12, p > .05), with a small shift in data to eliminate zero counts.

A square root transformation was performed on BDI II (Beck et al., 1996) total scores at six months post-baseline, with a small shift in data to eliminate zero counts. Following this transformation normality tests revealed a non-significant result using a Kolmogorov-Smirnov statistic for BDI II (Beck et al., 1996) total scores at six months post-baseline (D (38) = .16, p > .05).

Transformation of costs within economic evaluation is acceptable, and assumptions about the difference in arithmetic mean cost can be inferred from log cost, providing there is no violation of equal variance in the transformed data, (Glick, Doshi, Sonnad, Polsky, 2007). A non-significant result derived from Levene's tests of equality of error variances confirmed transformed child total

costs of service use and parent's total costs of service use did not violate the assumption of equality of variances.

Table 1 describes the characteristics of the participants in the secondary economic analysis sub-sample.

Table 1.

Participating family characteristics at baseline and six months post-baseline for the economic sub-sample.

	Baseline (N=38)				6 months post-baseline (N=38)			
	Intervention (n=28)		Control (n=10)		Intervention (n=28)		Control (n=10)	
Parent sex: Males	0	0%	0	0%	0	0%	0	0%
Females	28	100%	10	100%	28	100%	10	100%
Child sex: Males	17	60.7%	8	80%	17	60.7%	8	80%
Females	11	39.3%	2	20%	11	39.3%	2	20%
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Parents age (years)	30.1	(6.1)	28.8	(6.0)	30.1	(6.1)	28.8	(6.0)
Age of child (months)	19.7	(6.8)	22.0	(6.9)	19.7	(6.8)	22.0	(6.9)

Parental outcome measures

Figure 1 shows the mean total scores for the Beck Depression Inventory (BDI-II, Beck et al., 1966) at baseline (intervention $M = 10.32$, $SD = 9.28$, control $M = 14.20$, $SD = 8.15$) and six months post-baseline (intervention $M = 6.25$, $SD = 7.06$, control $M = 12.20$, $SD = 7.51$).

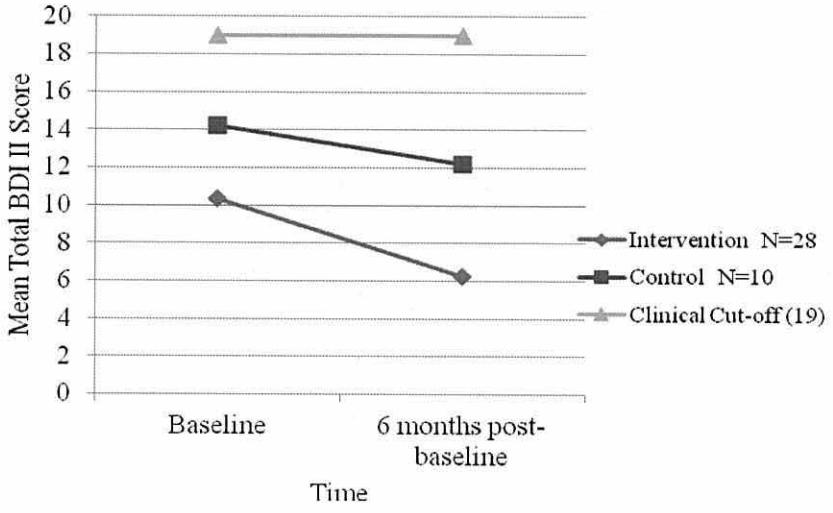

Figure 1. Mean total BDI II (Beck et al., 1996) score for intervention and control groups at baseline and six months post-baseline.

A one-way between-groups analysis of covariance was conducted to compare the effect of the Incredible Years Toddler parenting programme upon parent's self-reported depression. The independent variable was the experimental condition (intervention, control), and the dependent variable consisted of BDI II (Beck et al., 1996) total scores administered post-intervention. Participants' pre-intervention of BDI II (Beck et al., 1996) total scores were used as the covariate in this analysis. After adjusting for pre-intervention scores, there was a significant difference between the two condition groups on post-intervention BDI II (Beck et al., 1996) total scores F (1, 35) = 4.75, p = .04, partial eta squared = .12. There was a strong relationship between the pre-intervention and post-intervention BDI II (Beck et al., 1996) total scores, as indicated by a partial eta squared value of .39.

Table 2 shows the mean costs of health, social and hospital service use from the modified version of the Client Service Receipt Inventory (CSRI) Beecham & Knapp (1992) for parents during the six month period between baseline and six months post-baseline. Service use was categorised into primary care, social services and hospital services.

Table 2.

Mean frequencies and costs of parent service use.*

Services	Service use between baseline to 6 months post-baseline				Service use between 6 months and 12 months post-baseline			
	Intervention (n=28)		Control (n=10)		Intervention (n=28)		Control (n=10)	
	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)
Primary care	4 (3.91)	148 (186.60)	3 (3.05)	91 (91.55)	2 (2.84)	61 (65.44)	3 (2.29)	93 (69.47)
Social services	1 (0.31)	5 (14.68)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.26)	29 (84.75)
Hospital services	1 (1.35)	193 (318.01)	1 (0.52)	46 (57.42)	1 (1.00)	132 (274.33)	0 (0.00)	0 (0.00)
Total	5 (4.72)	347 (409.76)	3 (2.97)	137 (96.80)	3 (2.80)	148 (275.85)	4 (2.86)	122 (119.12)

* Costs were calculated from published national reference costs (Curtis 2008; Department of Health 2007/2008) and inflated to 2009/2010 costs using HCHS pay and prices index (Curtis, 2010). Costs were rounded up to the nearest pound, £.

A one-way between-groups analysis of covariance was conducted to compare the effect of the Incredible Years Toddler Parenting Programme upon the costs of parent's service use. After adjusting for service use in the six month period between baseline and six months post-baseline, there was no significant difference between the two condition groups on post-intervention costs of service use.

Child outcome measures

Figure 2 shows the mean total DQ score for the Schedule of Growing Skills (SGS II, Bellman et al., 1996) at baseline (intervention $M = 96.59$, $SD = 13.98$, control $M = 95.70$, $SD = 14.25$) and six months post-baseline (intervention $M = 104.00$, $SD = 19.89$, control $M = 96.80$, $SD = 13.27$).

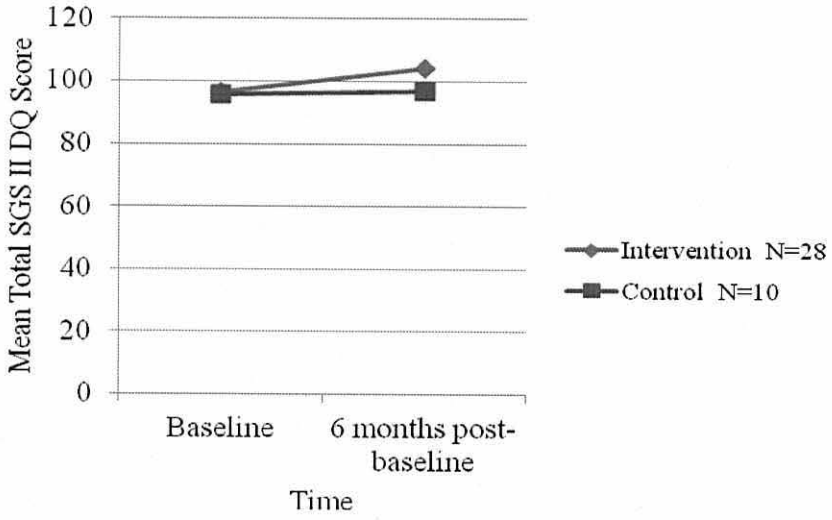

Figure 2. Mean total DQ SGS II (Bellman et al., 1996) score for intervention and control groups at baseline and 6 months post-baseline.

A one-way between-groups analysis of covariance was conducted to compare the effect of the Incredible Years Toddler Parenting Programme upon children's development. After adjusting for pre-intervention scores, there was no significant difference between the two condition groups on post-intervention SGS II (Bellman et al., 1996) DQ scores.

Table 3 shows the mean costs of health, social, educational and hospital service use from the modified version of the Client Service Receipt Inventory (CSRI) Beecham & Knapp (1992) for children during the six month period between baseline and six months post-baseline. Service use was categorised into primary care, social services, education services and hospital services.

Table 3.

Mean frequencies and costs of children's service use.*

	Service use between baseline to 6 months post-baseline				Service use between 6 months and 12 months post-baseline			
	Intervention (n=28)		Control (n=10)		Intervention (n=28)		Control (n=10)	
Services	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)	Mean Frequency (s.d)	Mean Cost, £ (s.d)
Primary care	4 (4.83)	163 (257.29)	3 (1.69)	117 (101.70)	4 (7.40)	119 (130.22)	3 (2.51)	114 (85.37)
Social services	1 (0.31)	15 (43.12)	1 (0.42)	44 (87.70)	1 (0.57)	8 (37.99)	1 (1.35)	52 (104.43)
Education services	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (3.13)	3 (5.33)
Hospital services	1 (3.01)	89 (535.62)	1 (0.48)	35 (53.57)	1 (1.53)	70 (223.41)	1 (0.42)	47 (113.19)
Total	4 (6.96)	231 (691.97)	3 (2.36)	194 (221.45)	6 (3.73)	197 (293.99)	6 (5.79)	216 (217.20)

* Costs were calculated from published national reference costs (Curtis 2008; Department of Health 2007/2008) and inflated to 2009/2010 costs using HCHS pay and prices index (Curtis, 2010). Costs were rounded up to the nearest pound, £.

A one-way between-groups analysis of covariance was conducted to compare the effect of the Incredible Years Toddler Parenting Programme upon the costs of children's service use. After adjusting for service use in the six month period between baseline and six months post-baseline, there was no significant difference between the two condition groups on post-intervention costs of service use.

Discussion

Summary of results from parental outcome measures

For the £1509.28 per child (cost year 2008/09) based on eight families per group to set up and deliver the IY Toddler Parenting Programme (Charles et al., 2011b), findings showed the IY Toddler Parenting Programme did not significantly affect parents' service use in this sub-sample; however, a significant difference was found between the BDI II (Beck et al., 1996) total scores of parents in the intervention, compared to parents in the control group, as reflected in the main RCT outcome paper (Hutchings et al., submitted). The results demonstrated in this sub-sample reflect previous findings that the IY series of parenting programmes reduce parental depression (Hutchings et al., 2007; Bywater et al., 2009; O'Neill et al., 2011).

Mean frequencies and costs of health and social service use decreased post-intervention for the intervention group over six months. For parents in the control group mean costs of health and social service use decreased at the six month follow-up; however, mean frequencies increased. This phenomenon could be explained by the lower cost per visit of service accessed by the control group during this time, for example multiple visits to nurses, which has a lower cost per consultation compared to GP consultations. Parents' mean total service use for the intervention and control groups between baseline and six months post-baseline was 5 and 3 respectively, and between six months post-baseline and twelve months post-baseline was 3 and 4 respectively.

Summary of results from children's outcome measures

For the £1509.28 per child (cost year 2008/09) to set up and deliver the IY Toddler Parenting Programme (Charles et al., 2011b), findings showed the IY Toddler Parenting Programme did not significantly affect children's' service use or development as measured by total DQ SGS II (Bellman et al. 1996) score at six months post-baseline. Children in the intervention group experienced a greater increase in mean total SGS II (Bellman et al., 1996) DQ score compared with children in the control group; however, this difference was not statistically significant. The increase in SGS II (Bellman et al., 1996) DQ score found in the intervention group supports previous research by Love et al. (2005), who also found a significant increase in cognitive and language development following participation in an early intervention programme.

Mean frequencies of service use decreased post-baseline for children in both the intervention and control groups. Mean costs of service use increased post-baseline for children in the control group; however, mean costs decreased for the intervention group. Children's mean total service use for the intervention and control groups between baseline and six months post-baseline was 4 and 3 respectively, and between six months post-baseline and twelve months post-baseline was 6 and 6 respectively, suggesting that the sample were not heavy service users. Previous research has found the IY Basic Parenting Programme to be effective at reducing children's service use (Bywater et al., 2009; Hutchings et al., 2007; O'Neill et al., 2011).

Comparisons to previous research

Previous studies have shown the potential of parenting programmes for very young children upon child behaviour, child development and parenting skills (Elliot et al., 2002; Love et al., 2005; McMenamy et al., 2011; Niccols, 2009). Love et al. (2005) explored similar outcomes of cognitive and language development using the Early Head Start Programme to those chosen in the main IY Toddler RCT (Hutchings et al., submitted), focusing upon children's cognitive,

language, and social and emotional development, rather than behaviour. In Love et al's (2005) study the programme was delivered when the children were less than 12 months old, and assessments undertaken when the children were three years old. Findings showed significant improvements in children's cognitive, language, and social and emotional development. In the main IY Toddler RCT children showed improvements in total DQ SGS II (Bellman et al. 1996) scores post-intervention; however, the improvements were not significant. The lack of significant findings in the sub-sample from the IY Toddler RCT could be attributed to the short follow up period of the RCT, which may not have given sufficient time in which to see significant benefits of parenting programmes upon children's development. Love et al., (2005) followed up their participants three years after initial intervention delivery. McMenamy et al., (2011) demonstrated the potential of the IY Basic Parenting Programme upon a targeted sample of toddlers, aged between two and three years old, diagnosed with early attention deficit hyperactivity disorder and oppositional defiance disorder in a non RCT design study. The sample families who took part in the IY Toddler main RCT were not targeted based upon children's clinical diagnosis, as they have been in previous evaluations (Bywater et al., 2009; Edwards et al., 2007; Hutchings et al., 2007). Instead, families were invited to take part in the research if they lived in a disadvantaged Flying Start area and had a child aged between 1-3 years.

Future Research

Children under go the greatest development between the ages of 0-3 years, which provides a window of opportunity for an intervention to have the greatest developmental impact (Regalado & Halfon, 2001). Though this is viewed as the optimal time for intervention impact, beneficial outcomes may not be seen immediately following the intervention. It is perhaps worthwhile for future researchers to consider a longitudinal approach when assessing outcomes for children under three years old.

Future research should also consider the appropriateness of the measures selected in order to assess potential outcomes for young children and the study design. Measures need to be sensitive and applicable to the population they are

testing; for example, using measures that test cognitive, language and other aspects of development, demonstrated by Love et al. (2001) and Hutchings et al. (submitted). The wider benefits of parenting programmes such as, the impact of a parenting programme upon parents and siblings, in addition to the child, needs to be addressed in future research. Although the IY Toddler RCT explored outcomes for parents in addition to child outcomes; sibling outcomes were not assessed in the RCT. These wider impacts are important to assess in order to provide service commissioner and policy makers with a comprehensive picture of all outcomes related to a parenting programme. Finally it is important that future research evaluates complex interventions to benefit children through rigorous RCT design, as this is considered the preferred method to eliminate bias created by the multi-faceted nature of complex interventions, such as parenting programmes (Kelly, McDaid, Ludbrook, Powell, 2005).

Early Intervention

There is limited economic evidence of parenting programmes especially for very young children (Charles et al., 2011a; Furlong et al., in press). A recent review found the majority of previous evidence into parent programmes for CD tended to be studies which only conducted cost-analysis, a technique that collects, categorizes and analyses the costs of a programme without comparison to its effects (Charles et al., 2011a). There is evidence of the cost-effectiveness and cost-benefits of the IY parenting programmes (Edwards et al., 2007; Muntz et al., 2004; McGilloway et al., 2009; Olchowski et al. 2007; O'Neill et al., 2011), but no specific cost-consequence analyses of the Incredible Years parent programmes had been conducted previously. As the programme is designed as a preventative intervention for parents of very young children results may not be seen until a number of years later; therefore, traditional methods of economic evaluation such as cost-effectiveness analysis and cost-utility analysis may not be as applicable as other methods such as cost-consequence analysis, cost-benefit analysis and return on investment analysis.

Government interest in preventative evidence based interventions needs to be well placed in programmes, which have a proven evidence base of both their

clinical and cost effectiveness. It is also worth noting that though early preventative programmes tend to be delivered between the ages of 0-3 years; in order to break the cycle of one disadvantaged generation rearing another, a longitudinal approach may be required. Allen (2011a) states that he does not accept the "false choice" between early interventions at the ages of 0-3 years or at the ages of 0-18 years. He states that "early intervention may be most effective before the age of 3 years, but we also need to address those aged 0–18 years so they can become the most effective parents possible for the next generation of 0–3s" (Allen, 2011a). Thus suggesting it is not enough to give children an intervention early in life and assume that the problem is solved. Further research should perhaps become more longitudinal in nature, rather than focusing between the choices of an upstream or downstream intervention.

Strengths of this study

The economic evaluation was conducted alongside a pragmatic RCT, which Kelly et al. (2005) consider to be the preferred method when evaluating complex interventions. The cost-consequence analysis conducted assessed outcomes for both parents and children. Previous research has shown a ripple effect of benefits accrued by wider family members such as, parents and siblings (Hutchings et al. 2007; Bywater et al. 2009; Furlong et al., in press). The assessment of multiple outcomes is particularly important for complex public health interventions such as, parenting programmes. The assessment of multiple outcomes provides service commissioners and policy makers with a comprehensive picture of the outcomes associated with the IY Toddler Parenting Programme. The outcome measures chosen for children in the IY Toddler RCT provided a comparison with findings of previous research. This is particularly important, as there is a lack of previous evidence exploring the effects of parenting programmes for children three years old and under. Findings of the IY Toddler RCT showed children in the intervention group experienced a greater increase in mean total SGS II (Bellman et al., 1996) DQ score compared with children in the control group. These findings support previous research by Love et al. (2005) who found a significant

increase in cognitive and language development following participation in an early intervention programme.

Limitations of this study and the challenges of public health research

As this trial was undertaken in disadvantaged Flying Start areas, families were already receiving additional support such as increased health visitor consultations, childcare, parenting programmes, and language and play sessions. Though these services are a valuable resource to families it can often make attributing cause and effect of interventions difficult. This is a common theme in public health research, whereby services already in place in a community may be contributing to effects found post-intervention. Kelly et al. (2005) state it is difficult to attribute behaviour change due to the multi-faceted nature of public health interventions. They argue using a RCT design is the preferred solution to eliminate biases created in public health interventions; however, the RCT needs to be pragmatic in order to be robust at eliminating bias (Kelly et al., 2005). The RCT used in this trial to evaluate the IY Toddler Parenting Programme was pragmatic as recommended by Kelly et al. (2005). The intervention was delivered within the community, and the battery of measures and observations were administered and conducted in the home of the participants. A high retention rate was reported for the main RCT evaluating the clinical effectiveness of IY Toddler Parenting Programme, of 100% from baseline to the six month follow up, and 75% from the six month follow up to the twelve month follow up. However, both clinical and economic data was only available from a small sub-sample (37% of the main RCT sample); therefore, results may not be generalisable to wider population. Another limitation of the study was clinical data was not collected from the control group at 12 months post-baseline as this was a waiting-list control; therefore, contrast and comparisons cannot be made between the intervention and control groups at this time point. Though the lack of data at the 12 month time-point is undesirable; it would be unethical to deny families in need access to the parenting programme.

Conclusions

For a cost of £1509.28 per child (cost year 2008/09) based on eight families per group, the IY Toddler Parenting Programme produced significant reductions in subsample parental self-reported depression as measured by the BDI II (Beck et al., 1996); however, no significant effect was found for children's development as measured by the SGS II (Bellman et al., 1996) or frequencies and costs of service use for both parents and children. The sample for the economic evaluation (N=38) was small compared to the sample in the main RCT (N=103); therefore, results may not be generalisable to a wider population and should be viewed with caution. Though no differences were found in demographic characteristics between the intervention and control groups at baseline using chi-square and independent samples t-tests; this study should be considered a pilot study with further investigation required with a larger sample.

By conducting a cost-consequence analysis multiple outcomes could be assessed, this is particularly useful for evaluating complex interventions such as parenting programmes. The analysis assessed outcomes for both children and parents, showing the outcomes for the sub-sample compared to the cost of the programme. The lack of assessment of wider outcomes could have implications for service commissioners and policy makers. If the majority of evidence is based on outcomes for children then service commissioners and policy makers could overlook programmes that have benefits for both parents and children, as parental outcomes were not included in the cost-effectiveness analysis. There is also the issue that an intervention cannot be deemed cost-effective unless it is effective; however, this does not necessarily mean that if a programme is not effective, it is not less costly than the current standard practice. This misconception could lead service commissioners to overlook programmes that may be a better use of resources.

This study was conducted as a pragmatic RCT evaluating both clinical and economic outcomes of an early intervention programme. The lack of significant differences found in outcomes may reflect the limited timescale in which they were administered and when dealing with a young age group perhaps a longitudinal approach would be more beneficial. The interest in early intervention is one that is designed to provide the largest impact upon an individual's life;

however, as Allen (2011a) suggests this is a long term process, which should perhaps take a cradle to grave approach rather than intervening only at certain stages during the child's life.

Key Messages of Chapter 4

1. Cost-consequence analysis collects, categorises and lists the cost components of a chosen intervention without making value judgements.

2. At a cost of £1509.28 per child, the IY Toddler Parenting Programme only produced significant reductions in parental self-reported depression for the outcomes tested.

3. It should be noted, results from this cost-consequence analysis should be viewed with caution, and as a pilot analysis due to a small sample size.

4. Cost-consequence analysis may be of particular relevance for service commissioners and policy makers for complex interventions such as parenting programmes, as a number of outcomes can be assessed.

5. Future research needs to explore the wider benefits of parenting programmes to family members such as siblings and parents and the long-term effects of parenting programmes delivered in the early years of a child's life.

Chapter 5: Parental Depression and Conduct Problems in Children: Evidence of Parental service use and costs after attending the Incredible Years Basic Parenting Programme

Summary

Background: There is co-morbidity between parental depression and childhood conduct disorder. The Incredible Years (IY) parenting programme reduces both conduct disorder in children and depression in their parents. Recent U.K. and Ireland trials of the effectiveness and cost-effectiveness of IY parenting programmes have assessed children's health and social care service use, but little is known about the programme's impact on parental service use.

Aims of the study: To explore the association between parental depression and parental health and social care service use in high-risk families receiving the IY Basic Programme.

Methods: Secondary analysis of a subsample (N=119) from the first U.K. community-based randomised controlled trial of the 12-week IY Basic Programme (N=153). Beck Depression Inventory (BDI II) total and clinical cut-off, scores were compared to frequencies and costs of parents' service use, at baseline and at six, twelve and eighteen months post-baseline, from a public sector, multi-agency (health and social care) perspective.

Results: Sub-sample analyses findings reflected the original trial results. A significant decrease was found in BDI II scores for the intervention group at six, twelve and eighteen months post-baseline. No significant decrease in BDI II scores was found for the control group between baseline and six-month follow-up. Additional analyses showed a significant reduction in service use frequencies for the intervention group from baseline to six and twelve months, but not at eighteen months. No significant reduction was found in control group service use frequencies from baseline to six-month follow-up. Parents in the intervention group who scored above the clinical cut-off on the BDI II at baseline used more health and social care services than those who scored below at baseline, six and eighteen months.

Discussion: This paper reports reduced parent service use costs associated with a parenting programme that reduced both child behaviour problems and parental depression. Traditionally research has focused upon outcomes for the referred child; however, more recently, studies have extended the range of secondary outcome measures to include parental mental health and parenting measures. This paper highlights a need for further exploration of high-risk parents' service use

and its cost implications for publicly funded health and social care services. The main limitation of the study is the lack of control data at twelve and eighteen months post-baseline to allow longer-term comparisons.

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Introduction

Conduct disorder (CD) is defined by a persistent pattern of aggressive and destructive behaviours (DSM-IV-TR; American Psychiatric Association, 2000). It is the most common psychiatric disorder in children, (Meltzer, Gatward, Goodman, Ford, 2000) and the most common reason for children and adolescents to be referred to mental health services (Audit Commission, 1999). Unipolar depression in adults, the most commonly occurring type of depression, is characterised by; enduring depressed mood, a loss of interest in activities previously enjoyed by the individual, disrupted sleep and/or appetite, feelings of guilt and/or low self-worth and poor concentration (World Health Organisation, [WHO] 2009). Unipolar depressive disorder is expected to become the leading cause of global disease burden to services by 2015 (WHO, 2009).

There is a high rate of co-morbidity between depression in parents and CD in children. Lahey et al. (1988) found that mothers of children with CD exhibited more symptoms of depression than mothers of children without CD. Alpern & Lyons-Ruth (1993) found 50% of mothers whose children were referred for treatment for behavioural difficulties demonstrated clinical levels of depression measured by the Centre for Epidemiologic Studies Depression Scale (CES-D, Radloff, 1977). Hutchings, Appleton, Smith, Lane, & Nash (2002) also found 50% of mothers whose children demonstrated problematic behaviour as measured by the Eyberg Child Behaviour Inventory (ECBI) (Eyberg 1980) were above the clinical cut-off for depression as measured by the Beck Depression Inventory (BDI) (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

There is a link between socio-economic status, depression and conduct problems. Parents in socially-disadvantaged areas have higher prevalence of parental depression (Farrington 1995) and children in those areas have higher levels of CD (Attride-Stirling, Davis, Day, & Selare, 2001). The lifetime estimated prevalence of depression is between 10-25% among women and between 5-12% among men in the general population Moore & Bona, (2001). Attride-Stirling et al. (2001) found 20% of children in socially disadvantaged areas in the U.K. are identified as having clinical levels of CD compared to 4.9% (6.9% of boys and 2.8% of girls) aged five to ten years old in the general

population in the U.K (National Institute for Health and Clinical Excellence [NICE], 2006).

Parenting interventions are the most effective method for improving negative or challenging child behaviour (NICE, 2006). These interventions are typically delivered in a group format, one session per week for 4-18 weeks, delivered by trained leaders with the focus on improving parenting skills to manage child behaviour (Hutchings & Lane, 2005). Effective, parenting interventions tend to be multi-faceted, comprising of group discussion, role-play, video-modelling and homework tasks and some have shown psychologically beneficial outcomes for parents (such as reductions in depression and stress levels) (Mihalic et al., 2002) and positive behavioural changes in children (Hutchings et al., 2007; Webster-Stratton & Hancock, 1998).

The following three sections outline study findings on parental depression following attendance on parenting programmes under three categories 1, parents attended a parent programme for their child's behaviour & their depression improved (along with child's behaviour). 2, parents attended a programme aimed at reducing depression and improving child behaviour. 3, mediator/moderator analyses conducted to demonstrate the effects of depression on child behaviour outcomes.

1. *Parents attending a parent programme for child behaviour with additional benefits to parental depression*

Barlow, Coren, & Stewart-Brown's (2009) Cochrane review assessed whether group based parenting programmes, developed to improve child behaviour, were also effective in improving secondary outcomes such as maternal psychosocial health including anxiety, depression and self-esteem. Meta-analysis conducted on the 26 eligible studies explored depression, anxiety, stress, self-esteem, guilt and social support, amongst other aspects of psychosocial functioning. Barlow et al. (2009) concluded that, in the short-term, parenting programmes are effective in improving parental psychosocial outcomes.

Barlow et al. (2009) identified four studies in their review. Sheeber and Johnson (1994) studied the impact of the seven-session Parent and Child Series

(PACS) Programme on depression for parents with children aged between 3-5 years old classed as having "difficult temperaments". They found a significant reduction in the levels of depression measured by the depression subscale of the Parenting Stress Index (PSI) (Abidin, 1983). Scott and Stradling (1987) demonstrated significant improvements in depression levels as measured by the Irritability, Depression and Anxiety Scale (IDA) (Snaith, Constantopoulos, Jardine, McGuffin, 1978) for mothers reporting child behaviour problems after a 7-session behavioural parent intervention aimed at 2-14 year olds. Taylor, Schmidt, Pepler, & Hodgins (1998) found significant improvements in depression as measured by the BDI (Beck et al., 1961) when using a video-tape modelling based intervention aimed at parents of children aged between 3-8 years diagnosed with CD. More recently, DeGarmo, Patterson and Forgatch, (2004) in a study of single and separated mothers and their sons' aged between 6-10 years found that changes in parenting behaviour led to reductions in their sons' behaviour problems. Reductions in sons' behaviour problems led to reductions in mothers' depressive symptoms over 2.5 years.

A randomised controlled trial (RCT) of the Incredible Years (IY) Basic Parenting Programme (Webster-Stratton & Hancock, 1998) conducted in Wales, U.K. produced reductions in parental depression six months post-baseline (Hutchings et al. 2007). Bywater et al. (2009) showed maintained reduced depression levels at eighteen months post-baseline in the same sample. Bywater et al. (2011), in a feasibility study of the IY parent programme with foster carers in Wales, UK, found a 40% reduction in mean self-reported depression levels at six months post-baseline for carers assigned to the intervention group.

O'Neill, McGilloway, Donnelly, Bywater and Kelly (2011) studied the effects of the IY Basic Parenting Programme on children's and parents' service use in Ireland, with a sample that participated in an RCT of the programme (McGilloway et al., in press). O'Neill et al (2011) studied a targeted sample of children who scored above the clinical cut-off on either the Intensity or Problem scales of the ECBI (Eyberg 1980) at baseline (McGilloway et al. in press). O'Neill et al (2011) reported a significant decrease in sixty-percent of the intervention group to below the clinical cut-off on the ECBI intensity scale (Eyberg 1980) score six months post-baseline; compared to 35% of the control group. O'Neill et al (2011) found a decline in service use by both parents and

children for both the intervention and control groups at six months post-baseline. This reduction in service use was more pronounced, although not significant, for the intervention group.

There are a number of possible interpretations of these findings. They could be attributable to an increased sense of self-efficacy resulting from improved parenting skills, improved parent/child relationships and reductions in negative child behaviour. They could be due to more confidence, and newly acquired skills to deal with challenging behaviour after participating in a parenting programme. Hutchings et al. submitted has argued that since the reduction in depression co-occurs with the reduction in child behaviour problems it is likely that the skills taught in the parent programme are also contributing to the improvements in depression, specifically accurate observation, behavioural rehearsal and problem solving skills all of which are also known to be deficits in people experiencing depression.

2. *Parents attending a parent programme aimed at reducing depression and improving child behaviour*

Sanders & McFarland (2000) combined an intervention to teach parenting skills and treat parental depression simultaneously. They randomised a small number of families with depressed mothers of children aged between three and nine years with behavioural problems to either a behavioural family intervention or a family intervention which integrated Cognitive Behavioural Therapy (CBT) strategies to treat depression. Both interventions reduced depression in the mothers and also reduced behaviour problems in the children when assessed immediately post-intervention. Six months post intervention a larger number of families who received the CBT integrated intervention maintained the reductions in depression and child behaviour problems compared to the families who received the intervention without a CBT element.

3. *Mediator/moderator analyses conducted to demonstrate the effects of depression on child behaviour outcomes*

Gardner, Hutchings and Bywater (2010) investigated the effects of depression on behavioural outcomes using a moderator analysis on the sample from the Hutchings et al. (2007) study. Surprisingly Gardner et al. (2010) found maternal depression to be a significant positive moderator of child behaviour in that children whose mothers were depressed showed a greater improvement in conduct problems post-intervention, compared with children in the control group who had poorer outcomes of conduct problems when their mothers were depressed, as assessed by self-report on the Beck Depression Inventory II (BDI II; Beck, Steer, & Brown, 1996). Previous studies have shown depression to be a significant moderator for poorer child behaviour outcomes using parenting programmes (Griest, Forehand, & Wells, 1981; Webster-Stratton & Hammond, 1990). Using the same Hutchings et al. (2007) study data, Hutchings, Bywater, Williams and Whitaker (submitted) conducted mediator analysis assessing whether changes in parental depression contributed to changes in child behaviour. Hutchings et al. (submitted) found parental depression partially mediated improvements in child behaviour, and argue that it is the collaborative nature of the IY programme, with its focus on empowering parents that makes it more effective in reducing both depression and child behavioural problems. Hutchings, Lane and Kelly (2004) also demonstrated that an intervention that improved both maternal depression and child behaviour during a parenting intervention were associated with long term, four-year maintenance of improvements in both, whereas a comparison intervention that improved child behaviour but not parental depression did not maintain the positive child outcomes.

Costs of child CD and behavioural problems

Previous research has explored the impact of child CD and behavioural problems on costs and frequency of health, social and education service use. Knapp, Scott and Davies (1999) found the costs for publicly resourced services to treat a child

with CD was £2457 (per child, per year in 1999) for the National Health Service (NHS), which equates to £3558.19 for the cost year 2009/10. Romeo, Knapp and Scott (2006) with a sample of 80 participants from a previous study (Scott, Knapp, Henderson, & Maughen, 2001a) evaluating parenting groups for childhood antisocial behaviour and found the mean cost of NHS, voluntary services and education services was £1,277 per child per annum (£1396.25 in 2009/10). Romeo et al. (2006) also found high frequencies of contact with health and education services. Seventy-one percent of children in the sample were taken to their GP for consultations relating to their behaviour. Forty percent were admitted to hospital as their reckless behaviour directly or indirectly led to accidents such as head injuries, scalds and burns. Sixty-seven percent of parents made additional use of nursery services because of their child's difficult behaviour and thirty-three percent of the children had been assessed by an educational psychologist.

There is some research reporting the service use of children displaying problem behaviour (Bywater et al. 2009; Bywater et al. 2011; Edwards, Ó Céilleachair, Bywater, & Hutchings, 2007). Using the Hutchings et al. (2007) sample, children's service use was shown to increase at six and twelve months post-intervention, compared with baseline (Edwards et al., 2007); however, the long-term follow up of the same sample (Bywater et al., (2009) showed children's service use decreased by eighteen months post-baseline. In contrast to assessments of child service use, little investigation has been conducted to assess parents' service use following participation in a parenting programme. Bywater et al. (2011) assessed the effects of foster carers' service use during six months as part of a feasibility study of the IY Basic Parenting Programme for foster carers in Wales. Bywater et al. (2011) showed the majority of health and social care service use costs for foster carers came from contacts with social workers, and the majority of service use costs for looked after children came from additional education services.

The costs of treating/alleviating depression in the NHS are high. Department of Health (2008/09) figures for the U.K. show the total investment in adult mental health services has increased from £5,530 billion a year in 2007/08 to £5,892 billion a year in 2008/09. Thomas and Morris (2003) calculated the total costs of depression in adults and young people over 15 years of age in England

during 2000 using recorded data on health service use by patients with depression and calculating the cost of treatment. Thomas and Morris (2003) estimated there were 2.6 million cases of depression in adults in England in 2000. In 72% of cases the patient was female, and twenty percent of cases occurred in patients aged between 35-44 years of age (Thomas and Morris, 2003). The total cost of depression was estimated to be over £9 billion. The direct cost of treating depression, which were predominately borne by the National Health Service were estimated to be around £370 million, including in-patient, day care and out-patient care, GP consultations and medication (Thomas and Morris, 2003). Thomas and Morris (2003) found 109.7 million working days were lost due to depression, with a total loss of earnings from depression estimated at over £8 billion. Previous research has also found individuals with high levels of depression use greater amounts of services than those with lower levels of depression (Herrman et al. 2002; Johnson, Weissman, & Klerman, 1992).

The aim of this paper is to explore whether there is an association between parental depression and frequency and cost of parents' health and social service use in a previously studied community sample of parents of children aged 3-4 years, (at baseline) with conduct problems who participated in a 12-week IY parenting programme reported in Hutchings et al. (2007).

Method

This is a secondary analysis of data gathered in a RCT of the IY Basic Parenting Programme (Hutchings et al., 2007).

Sample

The original RCT sample consisted of 153 parents and their children aged 3-4 years old (at baseline) living in 11 disadvantaged Sure Start Areas in North and Mid Wales (see Hutchings et al., 2007; Edwards et al., 2007; Bywater et al., 2009 for more information). This was a targeted sample; parents were eligible to take

part in the research if their child was 'at risk' of developing CD as defined by scoring above the clinical cut off on either the ECBI (Eyberg, 1980) Problem Scale or Intensity Scale (11 or 127 respectively). Parents were randomly assigned on a 2:1 ratio to an intervention or a six-month waiting list control group. Full sample results are available in three papers; the first outlines the clinical results for the whole sample baseline to six months post-baseline (Hutchings et al., 2007), the second outlines the cost-effectiveness results for a sub-sample (n=116) from baseline to six months post-baseline (Edwards et al., 2007), and the third outlines the clinical results and costs of services for children for the intervention group (n=104) baseline to eighteen months post-baseline (Bywater et al., 2009). This paper builds upon the long-term analysis set out in Bywater et al's (2009) study, (which explored child service use only), by focussing on parent service use. Complete parent service use and depression data was available for 119 (Intervention N=75, Control N=44) participants at baseline and six-month post-baseline follow-up, and 75 participants (Intervention N=75, Control N=0) at twelve months post-baseline, and 56 participants (Intervention N=56, Control N=0) at eighteen months post-baseline, see Figure 1 below.

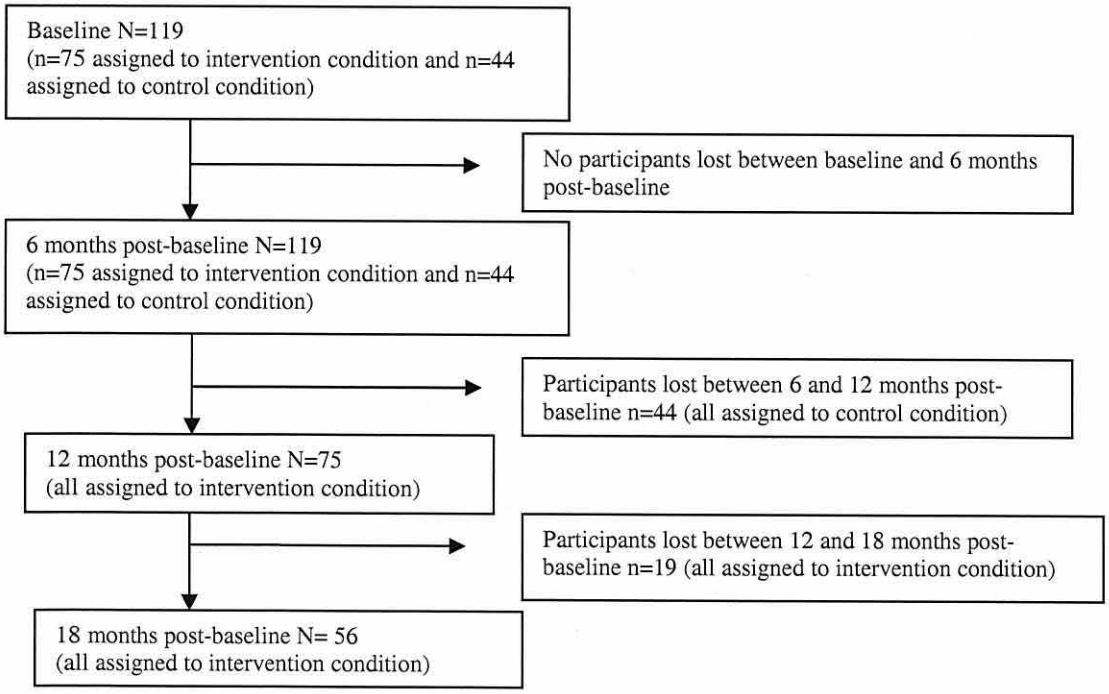

Figure 1. Flowchart of sample retention and participants lost to follow up for secondary sub-sample analysis.

Intervention

The IY Basic Parenting Programme is a 12-week group based programme (recently revised to a 14-18 week programme in 2008) designed to equip parents (12-14/group) with the skills to manage challenging child behaviour through role-play, group discussion, video-modelling and homework tasks (Webster-Stratton, 1984). The size of the intervention groups varied from 5 to 12 parents across areas, with an average of seven parents attending the two-hour weekly sessions (Hutchings et al., 2007).

Leaders

The sessions were facilitated by two group leaders who had attended the three-day basic leader training course. Group leaders were from varied backgrounds but in almost all cases were Sure Start local children's Centre staff in some cases supported by CAMHS primary care staff. All but one of the twenty-two group leaders received IY accreditation shortly after the trial.

Fidelity

Implementation fidelity refers to the extent to which an intervention is delivered as intended (Mihalic, 2004). Arthur & Blitz (2000) state that programmes must be implemented with fidelity to preserve any behaviour change resulting from an intervention. In accordance with the IY creator's policy on fidelity, as the trial was delivered by non-accredited, the programme facilitators received weekly supervision throughout programme delivery, by an IY accredited trainer (JH) for three hours each week (Webster-Stratton, 2004).

Measures

The standardised and validated measures of interest are a sub-set of measures administered in the original trial (Hutchings et al., 2007). The self (parent)-report measures include the Beck Depression Inventory II (BDI II; Beck et al., 1996), and the Client Service Receipt Inventory (CSRI; Beecham & Knapp, 1992).

The BDI II (Beck et al., 1996) (Appendix F) assesses parental depression. It yields sub-scales of depression from the total score of all 21 items; the minimal depression range is 0-13, mild depression 14-19, moderate depression 20-28 and severe depression 29-63. The clinical cut off point for the BDI II (Beck et al., 1996) is a score of 19 and over.

A modified version of the CSRI (Beecham & Knapp, 1992) (Appendix E) was administered to assess parents' and children's number of contacts with health, social care and education professionals in the six months prior to completion.

In addition to the standardised measures a Demographic Questionnaire, based on the Personal Development and Health Questionnaire (PDHQ, Hutchings, 1996) was used to attain basic socio-demographic and general health data on family members.

The three questionnaires were administered within a larger battery of measures at four time points; baseline, six, twelve and eighteen months post-baseline. The main demographics questionnaire was only administered at baseline with a reduced/modified questionnaire administered at follow-up.

Procedure

Intervention group parents attended the 12-week IY Basic Parenting Programme between baseline and the six-month follow-up. The waiting-list control group parents were offered the intervention after the six-month follow-up. Researchers conducted home visits to complete the demographic questionnaire and administer the questionnaires to the participants at baseline and the six, twelve and eighteen months post-baseline. Researchers were blind to allocation (Hutchings et al.

2007). Participants were block-randomised by area on a 2:1 ratio (intervention to waiting-list control), stratified by gender and age of index child.

Data Analytic Procedures

The secondary analysis assessing parental depression across all time points established if this sub-sample reflected the findings in the Hutchings et al. (2007) and Bywater et al. (2009) papers.

Analysis for this paper was performed for participants for whom complete data-sets of both the clinical and economic measures of interest were available across all time points. Participants were also included irrespective of uptake of the intervention providing the above criteria were met. Prior to main analyses normality tests were undertaken, using Kolmogorov-Smirnov statistic and inspection of the Q-Q plots as recommended by Field (2009), and differences between demographic characteristics of the intervention and control groups at baseline explored.

The normality tests showed a skewed distribution, therefore non-parametric Friedman tests command in SPSS version 16 for Windows were used to assess changes in depression scores within-participants over time for both the intervention and control groups. Follow-up pair-wise comparisons were performed using Wilcoxon Signed Rank tests. In order to control for Type 1 errors Bonferonni adjusted alpha was used to assess at which time points the differences occurred

Friedman tests were used to assess changes in frequency of service use measured by CSRI (Beecham & Knapp, 1992) within-participants over time for both the intervention and control groups. Service use costs were calculated from a multi-agency public sector perspective using national costs for all time-points (Curtis, 2009; Department of Health, 2008/2009) (Appendix L). Costs at eighteen months post-baseline were discounted at 3.5% in accordance with NICE guidelines (NICE, 2008b). Service use was divided into three categories; primary services consisting of GP, nurse and health visitor contacts, social services consisting of social worker, community psychiatric nurse, mediation service and counsellor contacts and hospital services consisting of outpatient, inpatient and

accident and emergency contacts. Costs of the IY Basic Parenting Programme were not included as a service use cost for the intervention group.

Mann-Whitney U tests were used to explore if an above or below clinical cut off score on the BDI II (Beck et al., 1996) was associated with the frequency of total service use for the intervention group at each time point, and for the control group at baseline and six months. The clinical cut-off point was determined by Beck et al. (1996) in their manual for the measure. Follow up pair-wise comparisons were conducted using Wilcoxon Signed Rank tests, using Bonferonni adjusted alpha to control for Type 1 errors to assess at which time points the differences occurred. A general linear repeated measures model was used to assess if an above or below clinical cut off score on the BDI II (Beck et al., 1996) at baseline was associated with frequencies of total service use for the intervention group throughout the trial and subsequent follow ups. The independent between-subjects variable for the model was the above or below clinical cut-off score on the BDI II (Beck et al., 1996), and the independent within-subjects variable was the total frequency of service use at each of the four time points. The general linear model was used as non-parametric tests did not allow for comparisons of service use between participants who scored above clinical cut-off on the BDI II (Beck et al., 1996), and those who scored below across all four time-points in the trial simultaneously.

Results

Table 1 below describes the characteristics of the participants in the secondary analysis sample. Parents in the sub-sample had similar demographic characteristics to parents in the main RCT sample, that is, there were more male children than female children and the mean age of the children in months was the same (Hutchings et al., 2007). No differences were found in demographic characteristics between the intervention and control group at baseline (N=119) using Mann-Whitney U tests prior to conducting analyses.

Normality tests revealed a skewed distribution; therefore, non-parametric tests have been used through the analysis; except in the case of the general linear model, where a logarithmic transformation was performed on service use data

using a small shift in the data to eliminate zero frequency counts. Service use data was closer to a normal distribution after transformation; following inspection of the Q-Q plots and on the basis on central limit theorem as participant numbers exceeded 30 at each time point (Field, 2009), the general linear model was performed.

Table 1.

Participating family characteristics at baseline, six, twelve and eighteen months post-baseline for the secondary analysis sample.

	Baseline (N=119)				6 months post-baseline (N=119)				12 months post-baseline (N=75)		18 months post-baseline (N=56)		Lost between 6 and 12 months post-baseline (N=44)		Lost between 12 and 18 months post-baseline (N=19)	
	Intervention (n=75)		Control (n=44)		Intervention (n=75)		Control (n=44)		Intervention (n=75)		Intervention (n=56)		Control (n=44)		Intervention (n=19)	
Parent sex: Males	1	(1.3%)	1	(2.3%)	1	(1.3%)	1	(2.3%)	1	(1.3%)	0	(0%)	1	(2.3%)	1	(5.3%)
Females	74	(98.7%)	43	(97.7%)	74	(98.7%)	43	(97.7%)	74	(98.7%)	56	(100%)	43	(97.7%)	18	(94.7)
Child sex: Males	42	(56%)	30	(68.2%)	42	(56%)	30	(68.2%)	42	(56%)	31	(55.4%)	30	(68.2%)	11	(57.9%)
Females	33	(44%)	14	(31.8%)	33	(44%)	14	(31.8%)	33	(44%)	25	(44.6)	14	(31.8%)	8	(42.1%)
No of single mothers living alone	29	(38.7%)	14	(31.8%)	29	(38.7%)	14	(31.8%)	29	(38.7%)	23	(41.1%)	14	(31.8%)		
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Parents age (years)	29.4	(7.05)	28.0	(5.07)	29.4	(7.05)	28.0	(5.07)	29.4	(7.05)	29.2	(6.81)	28.0	(5.07)	30.1	(7.89)
Age of child (months)	46.2	(6.58)	46.2	(6.35)	46.2	(6.58)	46.2	(6.35)	46.2	(6.58)	46.09	(6.77)	46.2	(6.35)	46.4	(6.16)

Depression over time

As expected this sub-sample reflected the main sample findings (Bywater et al., 2009) (see Table 2).

Table 2.

Parent BDI II (Beck et al., 1996) total scores (Mean, s.d.) for all families allocated to the intervention and control group for the secondary analysis.

	Baseline (N=119)		6 months post-baseline (N=119)		12 months post-baseline (N=75)	18 months post-baseline (N=56)
Parent outcome measure	Intervention (n=75)	Control (n=44)	Intervention (n=75)	Control (n=44)	Intervention (n=75)	Intervention (n=56)
	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)	Mean (s.d.)
BDI II total score	16.80 (10.55)	14.95 (9.62)	10.68 (9.98)	13.25 (10.49)	10.83 (9.61)	12.36 (10.80)

The results of the Friedman test indicated there was a statistically significant difference for the intervention group in BDI II (Beck et al., 1996) total score across the four time-points, baseline (Median = 15), six months post-baseline (Median = 8), twelve months post-baseline (Median = 8), and eighteen months post-baseline (Median = 9.5), χ^2 (3, N=56) = 25.72, $p < .05$.No statistically significant difference was found in BDI II (Beck et al., 1996) total scores for the control group across the two time-points baseline (Median = 14.50) to six months post-baseline (Median = 10.00).

Follow-up pair wise comparisons were conducted for the intervention group using Wilcoxon Signed Rank tests and controlling for the Type 1 errors across these comparisons at the 0.01 level (.05/7) using a Bonferonni adjusted alpha value revealed a statistically significant reduction in BDI II (Beck et al., 1996) total score between baseline and six months post-baseline, z = -4.78, $p <$ 0.01. A statistically significant reduction in BDI II (Beck et al., 1996) total score was found between baseline and twelve months post-baseline, z = -5.04, $p < 0.01$. A statistically significant reduction in BDI II (Beck et al., 1996) total score was also found between baseline and eighteen months post-baseline, z = -3.56, $p <$ 0.01.

Parent health and social care service use

Table 3 shows the total mean frequencies and associated costs of parent's service use over time. Costs of the IY Basic Parenting Programme were not included as a service use cost for the intervention group. Mean total frequencies of service use decreased from baseline at six months post-baseline for both the intervention and control group. Mean total costs of service use decreased from baseline at six months post-baseline for the control group; however, for the intervention group mean costs increased from baseline at six months post-baseline. For the intervention group mean total frequencies and costs of service use decreased at twelve months post-baseline from six months post-baseline; however, at eighteen months post-baseline mean total frequencies and costs of service use increased for the intervention group.

Table 3.

Frequencies and costs of health, social and hospital services used by parents in the sub-sample, intervention and control groups as measured by the CSRI (Beecham & Knapp, 1992) which records service use in the preceding six months at the time of administration (n=119).*

	Baseline (N=119)				6 months post-baseline (N=119)				12 months post-baseline (N=75)		18 months post-baseline† (N=56)	
	Intervention (n=75)		Control (n=44)		Intervention (n=75)		Control (n=44)		Intervention (n=75)		Intervention (n=56)	
Type of service	Mean Frequency (s.d)	Mean Cost £ (s.d)	Mean Frequency (s.d)	Mean Cost £ (s.d)	Mean Frequency (s.d)	Mean Cost £ (s.d)	Mean Frequency (s.d)	Mean Cost £ (s.d)	Mean Frequency (s.d)	Mean Cost £ (s.d)	Mean Frequency (s.d)	Mean Cost £ (s.d)
Primary services	3.7 (4.93)	118 (164.74)	4.0 (5.33)	126 (172.40)	3.4 (6.96)	106 (232.31)	3.1 (4.31)	101 (145.88)	3.3 (6.67)	96 (202.97)	4.9 (7.25)	132 (173.36)
Hospital services	0.5 (4.66)	57 (152.31)	0.2 (4.45)	16 (166.18)	1.2 (2.24)	119 (70.19)	0.3 (1.52)	26 (59.34)	0.6 (2.15)	62 (75.60)	1.8 (4.02)	205 (135.22)
Social services	1.4 (1.13)	47 (111.84)	1.6 (0.43)	55 (43.12)	0.6 (3.58)	20 (336.90)	0.3 (0.69)	12 (64.57)	0.8 (1.61)	28 (149.92)	1.2 (6.46)	41 (766.08)
Total	5.6 (7.42)	222 (283.47)	5.8 (6.65)	197 (231.97)	5.2 (10.31)	245 (532.90)	3.7 (5.56)	139 (203.37)	4.7 (7.49)	186 (278.48)	7.9 (12.66)	378 (842.42)

* Costs were calculated from published national reference costs (Curtis, 2009; Department of Health 2008/2009). Costs were rounded up to the nearest pound, £.

† Costs of services used between twelve and eighteen months post-baseline were discounted at 3.5%

The results of the Friedman test indicated there was no statistically significant difference in total frequency of service use for the intervention group across the four time-points, baseline (Median = 3), six months post-baseline (Median = 2), twelve months post-baseline (Median = 2) and eighteen months post-baseline (Median = 3). No statistically significant difference was found in total frequency of service use for the control group across the two time-points baseline (Median = 3.00) to six months post-baseline (Median = 2.00).

Effects of clinical levels of depression and service use for parents

Tables 4a and 4b show the mean frequencies and costs of service use for the sample depending upon whether parents scored above or below the clinical cut-off of 19 on the BDI II (Beck et al., 1996).

Table 4a.

*Parent mean total frequencies and costs of service use as measured by the CSRI (Beecham & Knapp, 1992) which records service use in the preceding six months at the time of administration for all families in the intervention group (n=75) split by whether parent's total BDI II (Beck et al., 1996) score was above or below the clinical cut-off *.*

CSRI service use categories	Baseline (n=75)				6 months post-baseline (n=75)				12 months post baseline (n=75)				18 months post-baseline† (n=56)			
	Below cut-off (n=46)		Above cut-off (n=29)		Below cut-off (n=62)		Above cut-off (n=13)		Below cut-off (n=59)		Above cut-off (n=16)		Below cut-off (n=42)		Above cut-off (n=14)	
	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)
Primary services	2.2 (2.25)	64 (68.53)	6.2 (6.76)	202 (228.07)	2.2 (2.94)	66 (89.34)	8.9 (14.63)	298 (508.53)	3.7 (7.36)	108 (223.80)	1.7 (2.55)	53 (83.69)	4.1 (6.64)	105 (140.95)	7.4 (8.64)	215 (232.20)
Hospital services	0.4 (1.90)	42 (104.41)	0.8 (1.29)	78 (121.24)	0.8 (1.80)	80 (164.44)	3.0 (7.65)	307 (720.80)	0.7 (1.58)	65 (146.97)	0.5 (1.75)	49 (184.84)	2.0 (7.41)	244 (879.06)	0.9 (1.56)	94 (164.29)
Social services	0.5 (1.31)	17 (45.70)	2.8 (7.15)	94 (232.73)	1.2 (0.81)	9 (28.46)	2.3 (4.89)	72 (150.68)	1.0 (2.38)	34 (83.84)	0.3 (0.69)	8 (21.19)	0.5 (1.37)	15 (48.13)	3.6 (7.39)	120 (246.35)
Total	3.1 (2.70)	123 (123.42)	9.8 (10.22)	374 (384.13)	4.2 (4.07)	155 (215.73)	14.2 (21.53)	677 (1130.64)	5.4 (8.17)	207 (294.11)	2.5 (3.47)	110 (200.93)	6.6 (12.64)	364 (950.19)	11.9 (12.33)	429 (388.68)

* Costs were calculated from published national reference costs (Curtis, 2009; Department of Health 2008/2009). Costs were rounded up to the nearest pound, £.

† Costs of services used between twelve and eighteen months post-baseline were discounted at 3.5%

Table 4b.

*Parent mean total frequencies and costs of service use as measured by the CSRI (Beecham & Knapp, 1992) which records service use in the preceding six months at the time of administration for all families in the control group (n=44) split by whether parent's total BDI II (Beck et al., 1996) score was above or below the clinical cut-off *.*

	Baseline (n=44)				6 months post-baseline (n=44)			
CSRI service use categories	Below cut-off (n=29)		Above cut-off (n=15)		Below cut-off (n=35)		Above cut-off (n=9)	
	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)	Mean Freq (s.d)	Mean Cost £ (s.d)
Primary Services	2.8 (3.21)	91 (110.42)	6.2 (7.64)	194 (243.81)	3.2 (4.66)	105 (158.61)	2.7 (2.69)	87 (84.67)
Hospital Services	0.1 (0.31)	10 (28.88)	0.3 (0.59)	28 (61.90)	0.2 (0.38)	16 (34.93)	0.7 (1.32)	63 (123.98)
Social Services	0.8 (1.70)	24 (54.44)	3.1 (7.14)	113 (270.85)	0.3 (1.69)	11 (65.92)	0.4 (0.53)	17 (20.55)
Total	3.7 (4.03)	125 (135.29)	9.6 (8.86)	335 (312.98)	3.7 (6.09)	132 (218.51)	3.8 (2.91)	167 (135.57)

* Costs were calculated from published national reference costs (Curtis, 2009; Department of Health 2008/2009). Costs were rounded up to the nearest pound, £.

A Mann-Whitney U test revealed a statistically significant difference at baseline in the total frequencies of services use of parents in the intervention group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n=46) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 7.00, n= 29), $U = 351$, z = -3.47, $p < .05$. A statistically significant difference was found at six months post-baseline in the total frequencies of services use of parents in the intervention group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n=62) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 3.00, n= 13), $U = 250$, z = -2.17, $p < .05$. A statistically significant difference was found at eighteen months post-baseline in the total frequencies of services use by parents in the intervention group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 3.00, n=42) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 6.50, n= 14), $U = 190$, z = -1.99, $p < .05$. No statistically significant differences were found at twelve months post-baseline in the total frequencies of services use for parents in the intervention group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n=59) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.50, n= 16).

No statistically significant difference was found at baseline in the total frequencies of services use of parents in the control group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n=29) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 7.00, n= 15). No statistically significant difference was found at six months in the total frequencies of services use of parents in the control group who scored below the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n=35) and parents who scored above the BDI II (Beck et al., 1996) clinical cut-off (Median = 2.00, n= 9).

A general linear repeated measures model was conducted to explore if a score above or below clinical cut off on the BDI II (Beck et al., 1996) at baseline is associated with frequencies of total service use for the intervention group throughout the trial and subsequent follow ups. There was a statistically significant effect for BDI II (Beck et al., 1996) clinical cut off, $F(1, 54) = 9.99$, $p < .05$.

Discussion

Changes in depression and service use over time

The sub-sample long-term depression results reported here reflect the findings in the main trial papers with a reduction in parental (self-report) depression levels after participation in the IY Basic Parenting Programme Hutchings et al. 2007 and Bywater et al. 2009. Total mean BDI II (Beck et al., 1996) depression scores decreased significantly at six, twelve and eighteen months post-baseline compared with baseline for the intervention group. A small, non-significant reduction in BDI II (Beck et al., 1996) mean total scores was shown between baseline and six months post-baseline for the control group. The larger, significant reduction in BDI II (Beck et al., 1996) mean total scores found in the intervention group at six months post-baseline, could be attributed to the parenting skills of observation, realistic goal setting and problem solving gained from participating in the IY programme, which also lead to improved parent/child relationships and reductions in negative child behaviour; which have all shown post-intervention improvements in previous RCTs of the IY parenting series (Webster-Stratton & Hancock, 1998; Hutchings et al., 2002; 2004; 2007).

There is little research on the frequencies and costs of parents' service use in contrast to the research conducted upon the frequencies of children's service use and associated costs (Knapp et al. 1999; Romeo et al. 2006; Scott et al. 2001). This paper is the first to explore the impact that a parent programme can have on the health and social care service use of biological parents. Results demonstrate that post-intervention total mean frequencies of service use for the intervention group decreased at six and twelve months post-baseline compared with baseline; however, at eighteen months post-baseline frequencies increased compared with baseline, six and twelve months post-baseline. Total mean costs of service use for the intervention group increased at six and eighteen months post-baseline compared with baseline; however, at twelve months post-baseline costs decreased compared with baseline. The increase in total service use frequencies at eighteen months post-baseline for the intervention group could be attributed to a change in circumstances, for example five participants reported pregnancy as their principal reason for contact with health services during this time-period. In order to explain

this finding further information is required, which wasn't within the scope of this secondary analysis. The reduction in service use at six and twelve months post-baseline compared with baseline may be because of fewer child behaviour problems leading to improvements in parental depression, which in turn led to less reliance upon health and social services. Mean total frequencies and costs of service use for the control group decreased from baseline at six months post-baseline; however, this was not found to be a significant decrease.

Parents accessed a high number of services, with primary health services accounting for the highest frequencies and costs. Further inspection of the data post-analysis showed GP consultations occurred at the highest frequencies and costs within the primary services category. Data from the Office for National Statistics (2009) suggests that the average number of GP consultations for one adult living in England is three per year (as data for Wales was unavailable). The participants in the sub-sample reported above the yearly average of GP visits for England within six-month periods. If mean frequencies were added together to give a picture of GP consultations over a year, the sub-sample used double the reported England average.

BDI II and service use

Findings demonstrate that a clinical level of self-reported parental depression affects the frequency and cost of health and social service use. Parents who scored above the clinical cut-off on the BDI II (Beck et al., 1996) accessed more health and social services than those who scored below at baseline, six and eighteen months post-baseline for the intervention group. Parents in the control group who scored above the clinical cut-off on the BDI II (Beck et al., 1996) also had higher mean frequencies and costs of service use than those who scored below at baseline and six months post-baseline. These findings support previous evidence reporting that high levels of depression lead to high service use (Herrman et al., 2002; Johnson et al., 1992). At twelve months post-baseline parents who scored below the clinical cut-off on the BDI II (Beck et al., 1996) had higher mean frequencies and costs of service use than those who scored above. This may be attributed to the fact that participants who reported pregnancies at this time-point

also scored below the clinical cut-off on the BDI II (Beck et al., 1996). A general linear repeated measures model revealed a significant effect for an above BDI II (Beck et al., 1996) clinical cut-off score at baseline and service use throughout the trial for the intervention group compared with parents who scored below the clinical cut-off. These findings suggest that reducing clinical levels of depression as early as possible could result in decreased service use.

Wider benefits of parenting programmes

Often, when evaluating interventions wider impacts are unexplored by researchers. In previous studies of parenting programmes the literature has presented outcomes directly linked to children, for example improvements in child behaviour and/or children's service use. Little attention has been given to other potential benefactors of parenting programmes such as parents, siblings, classmates, teachers and extended family. Many public health interventions have more than one primary outcome; some may even have a range of equally important outcomes. Analysis of the IY Basic programme illustrates that health economists must be prepared to explore multiple trial outcome; in this case child behaviour, parental depression and the use of public sector health and social care services. Previous cost-effectiveness analyses and cost-benefit analyses of the IY Basic Parenting Programme (Edwards et al., 2007; O'Neill et al., 2011) explored costs associated with child outcomes such as the ECBI (Eyberg 1980). Weatherly et al. (2009) suggest that when undertaking economic evaluations of public health interventions, such as parenting programmes, a cost-benefit approach should be taken in order to consider all costs and benefits, no matter to whom they accrue. This approach would enable researchers to assign a primary outcome measure such as child behaviour or service use, but also assign secondary outcome measures such as parental depression, parental service use, sibling behaviour or sibling service use. Hutchings et al. (2007) explored the impact of the IY Basic Parenting Programme upon siblings of the index child. Intervention group parents reported less severe intensity of problems in siblings measured by the ECBI (Eyberg, 1980) at follow-up, compared with parents in the control group.

Although clinical outcomes were measured for siblings, no assessment of sibling service use was undertaken.

Implications for health care provision and health policies

High levels of depression are associated with increased service use at baseline, six and eighteen months post-baseline. The IY Basic Parenting Programme was shown to reduce service use and depression post-intervention, suggesting the programme could have an additional useful application within the community, family or adult mental health services as a means to reduce depression in parents as well as improve child behaviour. The application of the programme in the community could ease the strain on limited healthcare resources, such as the National Health Service.

Limitations and future research

No data was gathered for the control group at twelve and eighteen months post-baseline therefore, contrast and comparisons cannot be made between the intervention and control groups long-term. Control families were offered the intervention after the six-month follow-up; as it is deemed unethical to deny families in need access to an intervention that already has a good evidence base. Barlow et al. (2009) concluded that, in the short-term, parenting programmes are effective in improving parental psychosocial outcomes, but the review did not find many long-term studies. One of the long-term studies identified in Barlow et al's (2009) review, DeGarmo, Patterson and Forgatch (2004) found that changes in parenting behaviour led to reductions in children's behaviour problems, which in turn led to reductions in mothers' depressive symptoms over 2.5 years. Bywater et al. (2009) also showed evidence of the longer-term benefits of parenting programmes. Bywater et al. (2009) found maintained reduced parental depression and stress and improvements in child behaviour eighteen months post-baseline. The findings from sub-sample analysis showed maintained reduced parental depression eighteen months post-baseline, and reduced total service use

frequencies and costs twelve months post-baseline. The lack of long-term studies needs to be addressed in order to build effective interventions that continue to prove beneficial to families as the child grows.

Conclusion

Parents are beneficiaries of parenting programmes, the skills they learn at the programme help them to interact more effectively with their child, and provide additional benefits such as reduced depression and stress (Hutchings et al., 2002, 2007; Bywater et al., 2009). However, measures relating to children's outcomes have been the primary focus in previous effectiveness studies. Unlike some other parenting programmes, in which parental depression is a moderator of poor outcomes, previous evaluations of the IY series have shown it to reduce parental depression, and to be effective and cost-effective in improving child behaviour and child service use (Hutchings et al., 2002, 2007; Edwards et al., 2007; Bywater et al. 2009).

This paper is the first to assess the impact of a parenting programme on frequencies and costs of parents' service use. Findings suggest the IY Basic Parenting Programme could be used to reduce frequencies of health and social service use and subsequent costs, as well as parental depression and child behaviour. Currently in the U.K. the IY parenting programmes are delivered in the community by local health and social services and voluntary organisations; however, given the benefits to depression these programmes could be delivered through a linking between family services and adult mental health services, reducing the burden upon community services. This paper also highlights the need for further exploration of the wider benefits of the IY parenting programme as suggested by Weatherly et al. (2009); as it was shown to reduce parental depression, service use and improve child behaviour. This paper also illustrates the methodological challenges of undertaking economic evaluations of public health interventions with more than one main trial outcome.

Key Messages of Chapter 5

1. There is evidence of a co-morbid link between parental depression and child CD. The Incredible Years Basic parent programme reduces child behaviour problems and self-reported parental depression.

2. Previous research has explored the impact of child CD upon the costs of publicly resourced services such as health and social care; however, there is a paucity of research into associated parental outcomes and costs such as health and social service use, following participation in a parenting programme.

3. Findings showed significant reductions in parental depression post-intervention at six, twelve and eighteen months, and reductions in health and social care service use at six and twelve months.

4. Levels of parental depression are related to service use; clinical levels of depression were associated with increased use and costs of health and social care service use.

5. The wider family health, behavioural and costs benefits e.g. outcomes for siblings, needs to be investigated as part of the assessment of impact in order to gauge the overall effectiveness of parenting programmes.

6. This paper illustrates the methodological challenge of undertaking economic evaluations of public health interventions with more that one main trial outcome.

Chapter 6: A methodological comparison of social return on investment analysis and cost-effectiveness analysis: how the two approaches could apply to the Incredible Years Basic Parenting Programme.

Summary

The National Institute for Health and Clinical Excellence (NICE), which provides guidance in the U.K. on health promotion and illness prevention, favours the use of a cost per Quality Adjusted Life Years gained (QALYs) in cost-effectiveness analyses. Recently, there has been increasing U.K. interest in Social Return on Investment (SROI) analysis, which is the preferred U.S. approach. This paper aims to model how the two approaches may be applied to an economic evaluation of early complex preventative interventions; in this case, the Incredible Years (IY) Basic Parenting Programme will be presented as a worked example. SROI analysis adopts a payer perspective to calculate the monetary return from an initial investment. Cost-effectiveness analysis adopts decision maker perspective to calculate the incremental costs of alternative interventions with their incremental health-related outcomes, usually expressed in natural units. Each approach has strengths and limitations; we suggest a complimentary approach to provide service commissioners and policy makers with a full and comprehensive snapshot of the current and potential future costs, benefits and savings of an intervention.

Charles, J.M., Bywater, T., Edwards, R.T. (2011e). *A methodological comparison of social return on investment analysis and cost-effectiveness analysis: how the two approaches could apply to the Incredible Years Basic Parenting Programme.*

Introduction

Cost-effectiveness analyses

Cost-effectiveness analysis is a method applied to analyse and define health outcomes. Cost-effectiveness analysis compares the costs of alternative procedures, services or interventions with their outcomes, usually expressed in natural units (Morris, Devlin & Parkin, 2007). A cost effectiveness ratio is used calculating the cost per unit of output or effect (Glick, Doshi, Sonnad, & Polsky, 2007). The cost-effectiveness ratio measures the incremental cost of an activity relative to its best alternative divided by the incremental effect (Glick et al., 2007). Maximising health outcomes is the implicit aim of health interventions; however, these could include intangible outcomes such as reduced anxiety or happiness which are difficult to quantify (Morris et al., 2007). The National Institute for Health and Clinical Excellence (NICE) is an independent organisation that provides national guidance on health promotion and illness prevention and advocates the use of cost per Quality-Adjusted Life Year gained approach (NICE, 2008a). QALYs are calculated by aggregating the number of years gained from a drug or health care intervention, weighted by the proportion that represents the relative value attached to a given health state (Robinson, 1993c). The cost per QALY gained is calculated as the difference in mean cost divided by the difference in mean QALYs, of one strategy compared with the next most effective alternative strategy (Robinson, 1993c). This approach requires a threshold to assess cost-effectiveness. The consensus among economic advisers to NICE is that NICE should; generally, accept as cost effective interventions with an incremental cost-effectiveness ratio ranging between £20,000 to £30,000 per QALY (NICE, 2008b). Guidelines encourage that a cost-effectiveness analysis be modelled around a randomised controlled trial (RCT) or modelled using decision-analytical techniques with cost and health outcome data coming from a variety of sources (NICE, 2008b). The 'Guide to the Methods of Technology Appraisal' (NICE, 2008b) supports the use of a reference case alongside the cost-effectiveness analysis with the following assumptions; all health effects on individuals are included, costs are measured from the perspective of the U.K. tax funded health care system of the National Health Service (NHS) and personal

social services, costs and health outcomes are discounted at 3.5%, health-related quality of life is valued using choice-based elicitation methods, a representative sample of the general population and validated generic health-state instruments. Equity weightings are not applied to QALYs, but this notion has been discussed in the literature for example the fair innings argument (Williams, 1997) and the fact that NICE consider a higher threshold for end of life care (NICE, 2008b). NICE (2008b) advocate the time horizon chosen should be adequate to sufficiently incorporate all important costs and effects. Another approach, which is becoming of interest to U.K. policy makers and service commissioners, is social return on investment analysis (SROI).

Social Return on Investment analyses

SROI has gained a following in the U.S. Previous SROI analyses have shown the potential cost-savings from school-based interventions (Masse & Barnett, 2002; Olds, Henderson, Phelps, Kitzman, & Hanks, 1993; Reynolds, Temple, Robertson, & Mann, 2001; Schweinhart, Barnes, & Weikart, 1993; Schweinhart et al., 2005). The Washington State Institute for Public Policy (WSIPP), have conducted a number of SROI analyses from the perspective of the taxpayer and state on issues of legislative interest, for example, crime, prevention and intervention programmes to inform the Washington State Government (Aos 2009; 2010; Aos et al., 2011). U.K. interest in SROI is increasing, for example, Birmingham City Council is restructuring its children's and families' services piloting three different evidence based intervention programmes by RCT; two parent programmes and one school-based programme to reduce conduct problems and increase social and emotional competences in children, (Prevention Action, 2008). These RCTs will also assess potential return on investment to inform the decision of roll out across the city. SROI is the ratio of money saved to money invested (Stone, 2005). SROI is calculated by first producing estimates of what works and what does not for key topics of legislative interest. Once this average effect is estimated, costs and benefits are inserted into the analysis to answer two questions; how much does it cost to produce the effect found in the initial estimates and how much is it worth (e.g. in terms of a cash equivalent, expended

resources and beneficial outcomes) to people in a certain location to achieve the outcome? (Aos 2009; 2010; Aos et al., 2011). The Cabinet Office (2009) recently published 'A Guide to Social Return on Investment'. This guide provides step by step instructions on how to conduct an accurate SROI. It was produced to help third sector organisations better communicate their impact to the public, funders and the Government. The steps are; firstly stakeholders need to be identified. Second, the inputs contributed by the stakeholders need to be identified and given a financial value. Third, outputs related to the intervention for each stakeholder need to be identified and described in terms of the change expected from participating in the programme. Fourth, outcomes then need to be assigned an indicator, source, quantity and given a financial proxy and value. Finally, to assess the impact of the intervention calculations need to be made based on what would have happened to the outcomes identified without the intervention, who else contributed to the changes in the outcomes expected and do the outcomes drop off in future years.

If an evaluation was being conducted rather than a forecast the following three steps would follow. First, the present value would need to be calculated by collecting the costs of the total impact of the intervention. The total present value would be calculated by summing all the present values of the intervention now and in future years, subtracting any drop off costs identified in the previous stage for future years and discounting future costs at 3.5% (to reflect a positive social time preference and the concept of opportunity cost). Second, the net present value would be calculated by deducting the value of inputs (value of investment) from the present value previously calculated. Third, the social return on investment ratio would be calculated by dividing the present value by the value of inputs (value of investment) or the net social return on investment can be calculated by dividing the net present value by the value of inputs (value of investment).

Stone (2005) noted the increasing interest of health care executives and decision makers in economic evaluations in the U.S. Stone (2005) proposes that SROI is an appropriate economic tool under circumstances in which there are budgetary constraints or limited funds. This is an advantage of SROI as the outcomes are valued strictly in monetary terms; a council, policy maker or government official does not need to understand economic terminology in order to

understand the relevancy of results to them and the services they provide. Though the U.S. and U.K. have different health care systems, the current economic climate in both the U.S. and U.K. has led to funders not only wanting to invest in programmes that are evidence based and good value for money, but also provide some monetary return to the investors as budgets become more constrained.

Comparisons of the two approaches

SROI analysis and cost-effectiveness analysis are two approaches, with differing principles, that can be applied in health economics. Cost-effectiveness analysis expresses results as a ratio of a cost per unit of health outcome. This health outcome is usually expressed in 'natural units'. Whilst SROI provides a quantitative approach to understanding, managing and measuring the value, impacts and benefits of a project, an organisation or a policy. They are contrasting approaches that use; different methods, timescales, perspectives, units of measurements and formulas. Cost-effectiveness analysis calculates the difference in mean cost per one unit of health outcome divided by the difference in mean cost per one unit of health outcome, of one strategy compared with the next most effective alternative strategy. It adopts a decision maker, payer perspective, maximising health gains across a population subject to restricted resources. SROI uses a quantitative method to calculate benefits minus the costs to derive if £Xs are put in, how many £Xs are returned (benefits-costs/costs x 100). Adopting a payer perspective, the units of measurements are always expressed in monetary values whether it be £s, $s, or €s. Timescale can be anything from a year to a decade (Schweinhart et al., 2005). Table 1 provides a summary of the two approaches.

Table 1.

Summary table of cost-effectiveness analysis and SROI analysis

	Cost-effectiveness analysis	Social Return on Investment analysis
Conceptual Basis, what is maximised?	Roots in Welfarist and Extra Welfarist principles as it tries to maximise health gains per pounds spent.	Business case tries to maximise return from initial investment
Perspective	Decision maker sometimes payer perspective	Payer perspective
Informs	Service commissioners, policy makers The NHS and the Government	Service commissioners, policy makers and the Government
Outcomes assessed by	Effectiveness is assessed through a quantified measured of utility e.g., QALY	Outcomes are valued and expressed in monetary terms
Costs measured in	Monetary terms	Monetary terms
Timescale	If effectiveness is measure by outcomes from an RCT. The timescale is connected to the timescale of the trial. However, modelling can be applied to extrapolate beyond the trial.	Can be calculated for anything from one year to ten, providing on data available to inform the analysis.
Calculated by	Difference in mean cost per one unit of health outcome divided by the difference in mean cost per one unit of health outcome of one strategy compared with the next most effective alternative strategy. Cost-effectiveness analysis is based on a ratio of mean incremental costs and effects. Cost-Effectiveness ratio = $\frac{\text{Difference in Cost}}{\text{Difference in Effect}}$	Benefits minus costs to derive if £Xs are put in, how many £Xs are returned. SROI analysis is based on average effects. SROI ratio = $\frac{\text{Present value}}{\text{Value of inputs}}$
Discount rate chosen	NICE (2008b) recommends a discount rate of 3.5%	The Social Return on Investment Guide by the Cabinet Office (2009) recommends a discount rate of 3.5% for the public sector.
Other costs considered in analysis such as opportunity cost	Yes an alternative is compared during the analysis	Yes looks at what would happen without the intervention in the analysis
Used by	Health Economists	Charities, Governments and Public Sector decision makers

The use of cost-effectiveness and Social Return on Investment in the U.K.

NICE (2008a) advocates the use of QALYs; stating that due to the substantial costs involved in the NHS, choices have to be made; therefore, it makes sense to focus on treatments that improve the quality and/or length of someone's life and are an effective use of NHS resources. QALYs are underpinned by equity; a QALY is QALY regardless of who gains or loses it (Williams, 2001). However, Broome (1993) argues restoring an elderly person to full health produces fewer QALYs than restoring a young person to health, because the elderly person has fewer years to live. Williams (1997) would argue that age should not be considered as an equity issue. Williams (1997) states that being old may reduce the number of years gained from an intervention; however, this may affect the value an individual gives to each life year gained.

When considering the use of SROI we need to be conscious of the question "whose pound is it?" For example, when calculating the SROI of preschool programs for young children living in poverty Schweinhart et al. (1993, 2005) calculated the long-term SROI of the High/Scope Perry Preschool Programme (Weikart, 1966) in terms of return to the education system, taxes, welfare and judicial system after the intervention was delivered to children at preschool age 3-5 years. These systems were chosen as they incur the majority of costs through the investment of time and resources. The total SROI at aged 27 years was $7.16 per $1 invested and at the age of 40 years the total SROI was $16.14 per $1 invested.

The IY Basic Parenting Programme will be used as a working example to explore how the two different approaches of economic analysis could be applied to such a complex intervention. The IY Basic Parenting Programme is a 12-week, 2-2.5 hours/week group based programme (revised to a 14-18 week programme in 2008) designed to equip parents with the skills to manage challenging behaviour in children aged 3-6 years.

Method

The IY Basic randomised controlled clinical trial conducted in Wales, U.K.

Sample

One hundred and fifty three parents of children aged between 36-59 months old at risk of conduct disorder defined by scoring over the clinical cut off on the Eyberg Child Behaviour Inventory (Eyberg, 1980) and living in disadvantaged Sure Start areas in Wales, U.K. Families were randomised to the intervention or a six month waiting list control group, allocated on a 2:1 ratio, (Hutchings et al., 2007).

Outcome measures

The participants completed a battery of measures including demographics, measures of parental competence, measures of parental depression and stress, measures of child behaviour reported by parents, measures of parent and child interaction through observation at baseline, six and twelve months post-baseline. For the results of the clinical trial, results from the cost-effectiveness analysis and a full list of measures used see Hutchings et al. (2007) and Edwards et al. (2007). For the results of the long-term (18 month post-baseline) clinical and cost-effectiveness analyses see Bywater et al. (2009).

Costs of the intervention

Intervention groups varied in size, with an average of seven parents per group. The total programme set-up and delivery costs were £1933.56 per child, based on eight parents per group (Edwards et al., 2007). The costs of the intervention were inflated to give a cost of £2373.94 for the cost year 2010/11, using the Hospital & Community Health Services (HCHS) pay and prices index (Curtis, 2011).

Social Return on Investment Analysis

Three family scenarios were constructed to assess the impact of the IY Basic Parenting Programme, based on familial information from participants in the above-mentioned research trial (Hutchings et al., 2007; Edwards et al., 2007; Bywater et al., 2009). The hypothetical pathways assess the impact for the child, family, school, healthcare services, social care services and wider society from ages 0-18 years old, without and with the IY Parenting Programme. The timeframe for the SROI analyses, assessing the impact between the ages of 0-18 years, was chosen due to the majority of research and estimations of costs available for this time-period.

The stakeholders were chosen as follows; 1) the family who receive the intervention invest their time to attend the parenting programme and put into action the techniques they have learned, 2) Children who have their behaviour and family life altered as a result of their parents attending the programme, 3) Health and social care services who provide additional support to the families (e.g., contacts with specialist clinicians for children and support for parents, as previous research has shown a co-morbidity of raising a child with conduct problems and depression (Alpern & Lyons-Ruth 1993; Lahey et al., 1988), 4) Schools and pre-schools who provide additional support to the family (e.g. learning support) and 5) Wider society.

The impact upon wider society is also considered, as the cost of not intervening in child problem behaviour is high. It is estimated that around 80% of all criminal activity is attributable to individuals who had conduct problems either as children or adolescents (Sainsbury's Centre for Mental Health, 2009). The total cost of all crime committed by individuals who experienced conduct problems in childhood is estimated at £60 billion a year in England and Wales (Sainsbury's Centre for Mental Health, 2009).

To illustrate how the SROI frameworks may be applied practically and compared to a cost-effectiveness analysis, examples of costs associated with particular stakeholder results were taken from previous published evidence of the IY Basic Parenting Programme (Bonin et al., 2011; Bywater et al., 2009; Charles,

Bywater, Edwards & Hutchings, 2011d; Edwards et al., 2007) and national data (Curtis, 2010; Curtis 2011; DirectGov, 2011a; DirectGov, 2011b). Costs extracted from previous studies (Bonin et al., 2011; Bywater et al., 2009; Charles et al., 2011d; Edwards et al., 2007) were inflated using the HCHS pay and prices index (Curtis, 2011) to provide costs for the year 2010/11. The frameworks presented use the cost year of 2010/11 as the base year, when the children were four years old. Costs occurring beyond twelve months (from the age of 5 years and onwards) were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Using previous participants' experiences and aliases to protect the participants identities, the three scenarios constructed and arranged in rising level of potential cost are;

1. Peter (4 years old) shows signs of poor concentration and is slow to read. Access to IY helps Peter and his family reduce the need for wider support services such as special educational services.

2. Olivia (4 years old) is prone to temper tantrums and aggressive behaviour towards her parents and siblings. Access to IY helps Olivia and her family to reduce Olivia's aggressive behaviour.

3. Mrs Smith (29 years old) cannot return to her full-time job as she feels her son, Jacob is too aggressive to be taken by the local Preschool. Access to IY helps Mrs Smith to reduce her son's aggression and she returns to full time work

Cost-Effectiveness Analysis

Using standardised methods (Glick et al., 2007; Drummond & McGuire, 2007) and previous cost-effectiveness analyses conducted on IY Parenting Programmes (Edwards et al., 2007; Bywater et al., 2009; O'Neill et al., 2011) example incremental cost-effectiveness ratios were constructed, as follows. The children in the sample were under five years old; therefore, QALYs could not be calculated for the children, only for parents. Instead to construct hypothetical incremental

cost-effectiveness ratios, the difference in mean total Eyberg intensity scores (Eyberg, 1980) (Appendix H) were used as the measure of effect for child behaviour in this case study. Based on previous research that demonstrates a co-morbid link between parenting a child with behavioural problems and depression (Alpern & Lyons-Ruth, 1993; Lahey et al., 1988), mean Beck Depression Inventory II (BDI II; Beck et al., 1996) (Appendix F) scores were chosen as the primary measure of effect for parents. Service use costs were gathered, using a multi-agency public sector perspective, spanning the NHS (primary and secondary care), social and educational services. Costs of service use were inflated using the HCHS pay and prices index (Curtis, 2011) to provide costs for the year 2010/11. The incremental cost-effectiveness ratios were expressed as the difference in cost measured by the mean cost of total service use measured by the Client Service Receipt Inventory (Beecham & Knapp, 1999) (plus the cost of the IY Basic Parenting Programme for the intervention group) divided by the difference in effect as measured by the BDI II (BDI II; Beck et al., 1996) for parents and the Eyberg intensity scores (Eyberg, 1980) for children.

Results from Social Return on Investment Analysis example frameworks of the IY Basic Parenting Programme

Tables 2a and 2b outline the pathways without and with IY for scenario one. In the "without IY" pathway Peter is shown to have continued poor concentration and reading skills, leading to additional support from his family, school, health care services and social care services. Using a combination of data from previous RCTs of the IY Basic Programme (Bywater et al. 2009; Charles et al., 2011d) and national data (Curtis, 2010; Direct Gov U.K., 2011a) to provide an estimation of associated costs. The cost of the additional support given to Peter from aged 4 to 18 years could be estimated at £30,700. In the "with IY" pathway Peter is shown to improve his concentration and reading, thus reducing his need for additional support from his family, school, health care services and social care services. The cost, including the cost of the IY Basic Parenting Programme from aged 4 to 18

years could be estimated at £9,500. Tables 2a and 2b show how the SROI framework could be applied to scenario one and highlights the potential reduction in expenditure for additional services from the investment in the IY Basic Programme (£2,373.94).

Table 2a.

Pathway without IY for Peter (4 years old) who shows signs of poor concentration and is slow to read.*

	0-4	5-16	17-18	Cost
Impact on child		Peter struggles in his studies and feels embarrassed around his peers	Peter leaves school at 16	Peter claims Job seekers allowance of £5464.81 for the 2 years after school where he struggles to find full-time employment.
Impact on family	Family give additional time and support to assist with school work that may not be structured specifically to their needs and may meet with school to discuss their child's progress. Parents may also be stressed.		Family give additional financial support to Peter	
Impact on school	Nursery staff may implement one to one help or small group work	School staff implements additional education support (Individual Education Plan, IEP) to improve Peter's reading.		Bonin et al. (2011) estimated from results presented by previous studies the costs to the education department for children between the ages of 5-16 were £10,244.25 per child.
Impact on Health and Social Care Services	Initial routine health and social consultations from GP, Nurse and Health Visitor, plus consultations to discuss poor reading and concentration	Further consultations with GP or specialist practitioners about poor reading and concentration.		Results from Bywater et al (2009) showed 6 months of child health and social service use amounted to £370. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £10,106.46. Charles et al. (2011d) showed 6 months of parental health and social service costs amounted to £200 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,928.90.
Total				£30,744.42

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Table 2b.

Pathway with IY for Peter (4 years old) who shows signs of poor concentration and is slow to read.*

	0-4	5-16	17-18	Cost
Impact on child		Does not receive any specialist support in school	Pursues further education such as 6th form or college	
Impact on family	Family give additional time and support to assist with school work such as school readiness, problem solving and supporting your child's education from skills learned from the IY programme. Parents may also meet with school to discuss their child's progress and feel less stressed.			
Impact on school		Little additional education support required for Peter allows the school to use the resources and staff for other children		
Impact on Health and Social Care Services	Initial routine health and social consultations from GP, Nurse and Health Visitor	No specialist consultations with GP or referrals to specialist practitioners for problems relating to poor concentration.		Results from Bywater et al. (2009) showed after the IY Basic Parenting Programme 6 months of child health and social service use amounted to £90. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £2,458.25 Charles et al. (2011d) showed 6 months of parental health and social service costs amounted to £190 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,682.38.
IY Basic Parenting Programme				£2373.94 per child, based on 8 per group
Total				£9,514.57

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Tables 3a and 3b outline the pathways without and with IY for scenario two. In the "without IY" pathway Olivia is shown to continue her behaviour problems from nursery to school, leading to additional support from her family, school, health care services and social care services. Using a combination of data from previous RCTs of the IY Basic Programme (Bywater et al. 2009; Charles et al., 2011d) and national data (Curtis 2010; Direct Gov U.K., 2011a) to provide an estimation of associated costs. The cost of the additional support given to Olivia from aged 4 to 18 years could be estimated at £251,780. In the "with IY" pathway Olivia is shown to improve her tantrums and aggressive behaviour, thus reducing her need for additional support from her family, nursery and school, health services and social care services. In the "with IY" pathway Olivia's behaviour is shown to improve, thus reducing her need for additional support from her family, school, health care services and social care services. The cost, including the cost of the IY Basic Parenting Programme from aged 4 to 18 years could be estimated at £9,500. Tables 3a and 3b show how the SROI framework could be applied to scenario two and highlights the potential reduction in expenditure for additional services from the investment in the IY Basic Programme (£2,373.94).

Table 3a.

Pathway without IY for Olivia (4 years old) prone to temper tantrums and aggressive behaviour towards her parents and siblings.*

	0-4	5-16	17-18	Cost
Impact on child	Problems at Nursery relating to other children	Problem behaviour continues, Olivia finds it difficult to relate to peers and has many conflicts with peers and teachers. School finds her a problem case	Olivia leaves school at 16	Olivia claims Job seekers allowance of £5,464.81 for the 2 years after school where he struggles to find full-time employment.
Impact on family	Olivia continues to behave aggressively towards siblings and defies parents causing a breakdown in family relationships and stress to parents		Family give additional financial support to Olivia	
Impact on school	Additional time is required by staff to stop Olivia's tantrums	Additional support from school required such as meetings with Olivia's parents and teachers, exclusion from main-stream lessons and salaries for support staff (IEP)		Bonin et al. (2011) estimated from results presented by previous studies the costs to the education department for children between the ages of 5-16 were £10,244.25 per child.
Impact on Health and Social service use	Initial routine health and social consultations from GP, Nurse and Health Visitor plus additional consultations about tantrums and aggression and parental depression	Further consultations with GP or specialist practitioners about tantrums and aggression, family relationship completely breaks down resulting in Olivia being sent to a care home for 6 months.		Results from Bywater et al (2009) showed 6 months of child health and social service use amounted to £370. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £10,106.46. Charles et al. (2011d) showed 6 months of parental health and social service costs amounted to £200 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,928.90. Curtis (2010) showed the average cost of local authority foster care for children was £676 per week, per child. It would cost £16,670.98 for 6 months in local authority foster care.

0-4	5-16	17-18	Cost
Impact on wider society (Crime)	Olivia begins to engage in anti-social and criminal activities		Bonin et al. (2011) estimated the average cost for criminal justice for children with conduct disorder, between the ages of 10-18 years was £204,360.09 per child.
Total			£251,775.50

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Table 3b.

Pathway with IY for Olivia (4 years old) prone to temper tantrums and aggressive behaviour towards her parents and siblings.*

	0-4	5-16	17-18	Costs
Impact on child	Problems at Nursery relating to other children	Behaviour improves allowing Olivia to relate better to peers and not become a problem case for the school	Pursues further education such as 6th form or college	
Impact on family	Taught how to manage problematic behaviour and effectively discipline Olivia, improving relationships within the family			
Impact on school	Extra time with staff in Nursery to manage Olivia's behaviour	Little additional support needed from school to manage Olivia's behaviour such as exclusion from lessons or learning support staff		
Impact on Health and Social Care service use	Initial routine health and social consultations from GP, Nurse and Health Visitor plus additional consultations about tantrums and aggression and parental depression	No specialist consultations with GP or referrals to specialist practitioners for aggression.		Results from Bywater et al. (2009) showed after the IY Basic Parenting Programme 6 months of child health and social service use amounted to £90. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £2,458.25. Charles et al. (2011d) showed 6 months of parental health and social service costs amounted to £190 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,682.38.
Impact on wider society (Crime)		Olivia does not begin to engage in anti-social and criminal activities		
IY Basic Parenting Programme				£2373.94 per child, based on 8 per group
Total				£9,514.57

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Tables 4a and 4b outline the pathways without and IY for scenario three. In the "without IY" pathway Mrs Smith's son continues his aggressive behaviour prohibiting her from returning to work as soon as she would like to, leading to Mrs Smith needing to claim benefits (e.g., income support allowance). Using a combination of data from previous RCTs of the IY Basic Programme (Bywater et al., 2009; Charles et al., 2011d) and national data (Curtis 2010; Direct Gov U.K., 2011a; 2011b) to provide an estimation of associated costs. The cost of the additional support given to Mrs Smith and her son Jacob, while Jacob is between the ages of 4 to 18 years could be estimated at £276,900. In the "with IY" pathway Jacob's behaviour is shown to improve, thus permitting him to attend the local pre-school and allow Mrs Smith to return to full-time employment, reducing their need for additional support from their family, school, health care services and social care services. The cost, including the cost of the IY Basic Parenting Programme while Jacob is between the ages of 4 to 18 years could be estimated at £22,900. Tables 4a and 4b show how the SROI framework could be applied to scenario three and highlights the potential reduction in expenditure for additional services from the investment in the IY Basic Programme (£2,373.94). Mrs Smith could be entitled to other benefits for example, tax credits, local housing allowance and pension credits. However, these benefits are income-based; therefore, they have not been included in the example SROI frameworks for Mrs Smith and Jacob.

Table 4a.

Pathway without IY for Mrs Smith (29 years old) who cannot return to her full-time job as she feels her son, Jacob is too aggressive to be taken by the local Preschool.*

	0-4	5-16	17-18	Costs
Impact on child	Jacob is restricted from playing with others as his mother fears he will play too rough with other children	Problem behaviour continues, Jacob finds it difficult to relate to peers and has many conflicts in school with peers and teachers. School finds him a problem case	Jacob leaves school at 16	Jacob claims Job seekers allowance of £5,464.81 for the 2 years after school where he struggles to find full-time employment.
Impact on family	Jacob continues to behave aggressively and defies parents causing a breakdown in family relationships and stress to parent		Family give additional financial support to Jacob	
Impact on school	Additional time is required by staff to manage Jacob's aggressive behaviour	Additional support from school required such as meetings with Jacobs parents and teachers, exclusion from main-stream lessons and salaries for support staff.		Bonin et al. (2011) estimated from results presented by previous studies the costs to the education department for children between the ages of 5-16 were £10,244.25 per child.
Impact on Health and Social care service use	Initial routine health and social consultations from GP, Nurse and Health Visitor plus additional consultations about aggression. Mrs Smith also has additional consultations for depression	Further consultations with GP or specialist practitioners regarding Jacob's aggression.		Results from Bywater et al. (2009) showed 6 months of child health and social service use amounted to £370. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £10,106.46. Charles et al. (2011d) showed 6 months of parental health and social service costs amounted to £200 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,928.90.

	0-4	5-16	17-18	Costs
Impact on Society	Mrs Smith claimed benefits for the past three years she was unable to work due to Jacob's behaviour	Mrs Smith loses confidence in her ability in the four years was unable to work; she finds it difficult to find full time employment.		Information from Direct Gov states the maximum weekly payment of income support allowance for a lone parent aged over 18 years is £67.50. If Mrs Smith received income support for 15 years, while Jacob was in full time education, the total cost would equal £41, 841.03.
Impact on wider society (Crime)		Jacob's aggressive behaviour leads him to engage in anti-social and criminal activities		Bonin et al. (2011) estimated the average cost for criminal justice for children with conduct disorder, between the ages of 10-18 years was £204,360.10 per child.
Total				£276,945.50

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Table 4b.

Pathway with IY for Mrs Smith (29 years old) who cannot return to her full-time job as she feels her son, Jacob is too aggressive to be taken by the local Preschool.*

	0-4	5-16	17-18	Cost
Impact on child	Jacob is restricted from playing with others as his mother fears he will play too rough with other children	Behaviour improves allowing Jacob to relate better to peers and not become a problem case for the school	Pursues further education such as 6th form or college	
Impact on family	Mrs Smith is taught how to manage problematic behaviour which improves family relationships and builds Mrs Smith's confidence			
Impact on school	Extra time with staff in Pre School to manage Jacob's behaviour	Little additional support needed from school to manage Jacob's behaviour such as exclusion from lessons or learning support staff		
Impact on Health and Social Care service use	Initial routine health and social consultations from GP, Nurse and Health Visitor plus additional consultations about tantrums and aggression and parental depression	No specialist consultations with GP or referrals to specialist practitioners for aggression		Results from Bywater et al. (2009) showed after the IY Basic Parenting Programme 6 months of child health and social service use amounted to £90. If the current pattern of service use continued to the age of 18 years, it could result in a cost of £2,458.25 Charles et al. (2011d) showed after the IY Basic Parenting Programme 6 months of parental health and social service costs amounted to £190 per parent. If the current pattern of service use continued, for another 14 years it could result in a cost of £4,682.38.

	0-4	5-16	17-18	Cost
Impact on Society	Mrs Smith claimed benefits for the past four years she was unable to work due to Jacob's behaviour.	Mrs Smith returns to full time employment and no longer claims benefits.		Information from Direct Gov states the maximum weekly payment of income support allowance for a lone parent aged over 18 years is £67.50. If Mrs Smith received income support allowance for 4 years the total cost would equal £13,343.75.
Impact on wider society (Crime)		Jacob does not begin to engage in anti-social and criminal activities		
IY Basic Parenting Programme				£2373.94 per child, based on 8 per group
Total				£22,858.32

*Costs from previous RCTs and evaluations were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011) and costs beyond 12 months were discounted at a rate of 3.5% per year (Cabinet Office, 2009; NICE, 2008b).

Cost-Effectiveness Analysis example incremental cost-effectiveness ratios of the IY Basic Parenting Programme

Cost-effectiveness ratio for parental outcomes

Using previous examples of cost-effectiveness analyses (Edwards et al., 2007; Bywater et al 2009; O'Neill et al., 2011) of IY parenting programmes, measures of effect were chosen based on outcomes from the main RCT, rather than QALYs. Figure 1 outlines the point estimate incremental cost-effectiveness ratio (ICER) for the parental outcome, showing a cost per point change in BDI II (Beck et al., 1996) score of £517.40 (see below). The point estimate ICER does not adjust for BDI II (Beck et al., 1996) scores at baseline. The scoring system within the BDI II (Beck et al., 1996) denotes a low score as demonstrating minimal depression and a high score demonstrates major depression; therefore, a low score is preferable.

The maximum score on the BDI II (Beck et al., 1996) is 63 and the minimum score is 0. The ICER is indicative to service commissioners and policy makers to decide whether it is worth spending £500 per point change on the BDI II (Beck et al., 1996).

$$\frac{\text{Cost A} - \text{Cost B}}{\text{Effect A} - \text{Effect B}} = \frac{\text{Mean total cost of parental CRSI for the intervention group post-intervention (including cost per parent of the intervention)} - \text{Mean total cost of parental CRSI for the control group}}{\text{Mean BDI II total score at baseline minus mean BDI II total score post-intervention for the intervention group} - \text{Mean BDI II total score at baseline minus mean BDI II total score post-intervention for the control group}} = 517.40$$

$$\frac{2627.20 - 143.69}{17.1\text{-}11.0 = 6.1 - 15.2\text{-}13.9 = 1.3} = 517.40$$

Figure 1. Point estimate incremental cost-effectiveness ratio equation for parental outcomes of the IY Basic Parenting Programme. Costs were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011).

Cost-effectiveness ratio for child outcomes

Using previous examples of cost-effectiveness analyses (Edwards et al., 2007; Bywater et al 2009; O'Neill et al., 2011) of IY parenting programmes, measures of effect were chosen based on outcomes from the main RCT, rather than QALYs. Figure 2 outlines the point estimate ICER for the child outcome, showing a cost per point change in Eyberg Intensity (Eyberg, 1980) score of £106.43 (see below). The point estimate ICER does not adjust for Eyberg Intensity (Eyberg, 1980) scores at baseline. The scoring system within the Eyberg Child Behaviour Inventory (Eyberg, 1980) denotes a low score as demonstrating a lower level of conduct-disordered behaviour and a high score demonstrates a greater level of conduct-disordered behaviour; therefore, a low score is preferable. The maximum score on the Eyberg Child Behaviour Inventory, Intensity Scale (Eyberg, 1980) is 252 and the minimum score is 36. The ICER is indicative to service

commissioners and policy makers to decide whether it is worth spending £100 per point change on the Eyberg Child Behaviour Inventory (Eyberg, 1980).

$$\frac{\text{Cost A} - \text{Cost B}}{\text{Effect A} - \text{Effect B}} = \frac{\text{Mean total cost of children's CRSI for the intervention group post-intervention (including cost per parent of the intervention)} - \text{Mean total cost of children's CRSI for the control group post-intervention}}{\text{Mean Eyberg Intensity total score at baseline minus mean total Eyberg Intensity score post-intervention for the intervention group} - \text{Mean Eyberg Intensity total score at baseline minus total Eyberg Intensity score post-intervention for the control group}} = 106.43$$

$$\frac{3537.13 - 642.23}{146.8\text{-}122.3 = 24.5 - 141.3\text{-}144.0 = \text{-}2.7} = 106.43$$

Figure 2. Point estimate incremental cost-effectiveness ratio equation for child outcomes of the IY Basic Parenting Programme. Costs were inflated to 2010/11 costs using the HCHS pay and prices index (Curtis, 2011).

Discussion

The SROI frameworks highlighted the differences in the costs of additional support required without and with the IY Basic Parenting Programme. For scenario one a difference of £21,230 was found between the two pathways described in Tables 2a and 2b. For scenario two a difference of £242,261 was found between the two pathways described in Tables 3a and 3b. For scenario three a difference of £254,090 was found between the two pathways described in Tables 4a and 4b. As mentioned previously for Tables 4a and 4b Mrs Smith could be entitled to further benefits than the income support calculated in the example. The further benefits are income-based; therefore, they were not included in the example frameworks. However, it is worth noting that the inclusion of further benefits would result in higher expenditure from society in Table 4a. The SROI

frameworks also demonstrated the escalating additional support costs to publically funded services (e.g., health and social care, education and criminal justice), associated with problematic childhood behaviour progressing into adolescence and adulthood. In contrast, the cost-effectiveness analysis showed a cost of £517.40 per point change in BDI II (Beck et al., 1996) score, demonstrated in the RCT. For children it cost £106.43 per point change in Eyberg Intensity (Eyberg, 1980) score, demonstrated in the RCT. When conducting economic evaluations of complex interventions such as parenting programmes, health economists face many challenges. For example, health economists need to determine which approach to apply, what outcome measures will be included in the analysis and what measures will be excluded and whether wider outcomes for family members will be also be assessed. Evidence from economic evaluations informs service commissioners and policy makers; therefore, analyses must be meaningful and applicable to their local settings. For example, choosing analyses such as SROI analyses in which outcomes are expressed in monetary terms, or cost-effectiveness analyses that uses evidence from RCTs that were conducted in similar geographical locations or with families of a similar characteristics e.g., socio-economic status.

SROI analysis

The main challenge faced when conducting SROI analysis is defining the parameters of the SROI framework. Complex interventions such as parenting programmes contain many components (e.g., managing problematic behaviour, promoting social and emotional competence and improving parent-child interactions) and cost savings can be accrued by multiple agencies (e.g., school, health and social services and criminal justice systems). It is therefore difficult to ascertain which stakeholders, inputs and outcomes should be included and which should be omitted in a SROI analysis. It also may not be possible to include all agencies, inputs and outputs associated with the intervention in the analysis. From building the SROI pathways described in our paper, we offer a number of suggestions to researchers planning a SROI analysis.

When conducting an SROI analysis it is difficult to decide where to draw the line when choosing the number of stakeholders to include. A literature search of previous published evidence relating to the intervention should be conducted to identify key stakeholders or outcomes. This literature review may assist in defining their parameters for analysis. In conducting our SROI pathways we took advice from previous RCTs and economic evaluations of IY parenting programmes to identify the key stakeholders (e.g., child, family, school, healthcare and social care services) with and without the IY parenting programmes. In order to conduct a full SROI analysis as described by the Cabinet Office (2009), researchers should consider what data will be required to populate the framework, and how will the data be collected. This is important to consider early on, as any gaps in the research or knowledge could lead to a lack of sufficient data required to provide cost estimates for the inputs and outcomes related to the intervention. When conducting our SROI frameworks we found a lack of long-term data available for health and social care costs for children and for wider family members such as parents. Researchers should also be cautious when choosing their stakeholders, for example wider society. In order to show the cost savings to larger organisations, such as the NHS or criminal justice system, detailed information is required. This information can be obtained from report or national statistics which can then be applied and calculated to give values for a particular cost year, as outlined by Bonin et al. (2011). In our SROI analysis frameworks we followed the initial steps, one to five, outlined in the Cabinet Office (2009) guide; however, we did not conduct a full SROI evaluation. We view our frameworks as example forecasts, demonstrating the how this approach could be applied to a complex intervention such as a parenting programme, compared with cost-effectiveness analysis.

Strengths of SROI analysis

SROI is valued strictly in monetary terms e.g. you put £X into an intervention and from that investment you get an output of £X. This is especially useful when budgets directly influence decisions. The results of SROI are instantly understandable to those with limited understanding of economic terms such as

QALYs and incremental cost-effectiveness ratios. This is an advantage of this approach and may attribute for the increasing interest of health care executives and decision makers in this approach (Stone, 2005). SROI can adopt a multi-agency perspective when calculating the benefits and costs accrued by many different sectors and sources for example, the individual, society, the economy, the government. Though SROI analysis has strengths such as the ones listed above, the methods used in SROI analysis are more susceptible to criticism, than cost-effectiveness analysis.

Limitations of SROI analysis

SROI is relatively new to the economic field in the U.K., with limited guidance on the methods of SROI and previous research conducted, compared to the U.S. where this method is more established. Though methodological guidance and research conducted on SROI is prevalent in the U.S., when applying these methods in the U.K., context may be an issue. This is particularly relevant for public health interventions, which are mainly publically funded in the U.K. through community services. Documents such as the Cabinet Office (2009) guide are important and needed in the U.K. to provide guidance and establish methods of SROI analyses within a U.K. context. It could be argued that any intervention could be considered to have a positive return on investment if given enough time for cost savings to come into fruition. For example an intervention for early on-set dementia, could be considered a cost-saving intervention if delivered early enough. Another potential issue of using SROI analyses is the potential for an intervention to be cost-saving in one area, but not in others. A key example of this principle would be interventions for smoking cessation. A SROI analysis of a smoking cessation intervention may find cost-savings for the NHS in reductions in care for cancers related to smoking and heart disease; however, as this group are no longer at a higher risk of smoking related illness and diseases, the analysis could highlight increased expenditure in other areas for example, healthcare for the elderly. Barendregt et al. (1997) found initial cost savings from smoking cessation programmes. However, after 15 years costs increased, resulting in higher expenditure than when the sample population were smoking. In order to

give as robust analysis as possible researchers should consider these potential wider implications in their SROI analyses.

Cost-effectiveness analysis

The biggest challenge faced when conducting a cost-effectiveness analysis is choosing outcomes for the cost-effectiveness ratio that are meaningful to service commissioners and policy makers. Weatherly et al. (2009) advocate using RCTs to evaluate public health interventions such as, parenting programmes; however, researchers should keep in mind the extrapolation of outcomes beyond the end of the trial. The QALY has been highlighted by NICE as a standardised method to value outcomes; however, would service commissioners and policy makers prefer another measure of outcome. In our example ICERS we used a measure of child behaviour and a measure of self-reported parental depression. These measures were chosen, as the literature indicated high costs to society with persisting conduct problem behaviour (e.g., health and social care service, education support and criminal justice system costs) and a co-morbid link between raising a child with conduct problem behaviour and parental depression. However, the examples illustrate the difficulty of comparability of results. How do you relate the cost of £500 per point change on the BDI II (Beck et al., 1996) to a cost of £100 per point change in Eyberg Intensity (Eyberg, 1980)? Researchers should look to previous economic evaluations to ascertain what outcomes were chosen in previous economic evaluations, whether these outcomes were directly linked to a trial (e.g., measures of assessment administered in a RCT), and did the previous research assess the impact upon wider outcomes (e.g., family members, wider society or longer-term implications).

When using cost-effectiveness analyses in pragmatic clinical RCTs researchers need to choose appropriate outcome measures that translate beyond the research so service commissioners and policy makers can ascertain if findings are applicable to their local settings. Researchers also need to keep in mind the implications of choosing sensitive measures and an adequate time horizon. When choosing measures they need to have a strong evidence base for their inclusion, and they need to be sensitive to detect changes resulting from the intervention. If

the time horizon is inadequate, then results from the intervention may not have been given sufficient time to culminate.

Strengths of cost-effectiveness analysis

Cost-effectiveness analysis is an established, standardised method, recognised by the field and NICE. NICE (2008a) states that with the enormous costs involved in the NHS choices have to be made; therefore, it makes sense to focus on treatments that improve the quality and/or length of someone's life and are an effective use of NHS resources. Cost-effectiveness analysis is concerned with maximising benefits for pounds spent. In particular, NICE (2008a) views the QALY as the best available tool to link the benefits to the costs of the drug/intervention/service. It is not always possible to use QALYs within a cost-effectiveness analysis; however, outcomes from an RCT can be used to calculate cost-effectiveness, as our analysis of the IY Basic Parenting Programme demonstrates. However, researchers need to be cautious when choosing their outcome measures.

Limitations of cost-effectiveness analysis

If the cost-effectiveness analysis is tied to a RCT, and the intervention is shown to be ineffective, then the intervention cannot be cost-effective. The use of outcomes from the trial may be more appropriate to service commissioner's and policy maker's needs as opposed to the QALY; however, outcomes should be chosen carefully. Cost-effectiveness evidence from a RCT needs to be appropriate for extrapolation outside of the trial and applicable to local settings. Cost-effectiveness analysis may be limited when an intervention is complex, containing multiple interacting components with possible multiple outcomes. The cost-effectiveness ratio requires a measure of effect, however, when evaluating a complex intervention, multiple cost-effectiveness analyses may need to be conducted. This may have its own limitations and implications, for example the difficulty in comparing the results from one cost-effectiveness ratio to the results of another, as highlighted in our example.

Possibility of combining the two approaches

Cost-effectiveness analysis is concerned with maximising the benefits for pounds spent, adopting a decision maker perspective to calculate incremental cost over mean incremental benefit. In contrast, SROI is concerned with the potential of future gains from the initial investment in an intervention, adopting a payer perspective to calculate average costs and cost savings. As the two approaches use different time-frames, cost-effectiveness is typically conducted within 12-18 months, unless economic modelling is applied, whilst SROI analysis can estimate future gains, 10 years or more into the future, it may not be possible to completely combine the two methods. However, the two approaches could be conducted on the same data as demonstrated in our example analysis and by O'Neill et al. (2010). When the two approaches are performed simultaneously they provide a complimentary overview of an intervention. By running a cost-effectiveness analysis from data obtained during a RCT, a clear picture emerges of the cost required to gain the benefit demonstrated by the intervention. By running a SROI analysis using both data from previous and current (if applicable) RCTs and national data, a clear picture emerges of the potential long-term gains from an intervention. Using both analyses provides service commissioners and policy makers with a full picture of all costs and benefits that may be associated with an intervention.

Conclusion

As demonstrated throughout the worked example both cost-effectiveness analysis and SROI analysis could be applied to the IY Basic Parenting Programme. Though the two approaches use different methods, one maximises benefits gained within a certain time-period the other forecasts the potential future gains. Each approach has its own strengths and limitations. SROI analysis can assess wider implications and is valued strictly in monetary terms, which can help the research translate to those unfamiliar with economic terms. However, it can be difficult to

ascertain whose pound is it, and the method is more susceptible to criticism. Cost-effectiveness analysis is an established, standardised method that can assess outcomes directly linked to a RCT. However, outcomes need to be chosen carefully, and applicable to local settings beyond the research. Taking into account each approaches' strengths and limitations, when applied together they can provide service commissioners and policy makers with a full picture of the current and possible future costs and benefits of the intervention.

Key Messages of Chapter 6

1. There is growing interest in Social Return on Investment (SROI) analysis, a method more commonly used in the U.S. from policy makers and service commissioners in the U.K. In the U.K. the preferred method of economic evaluation is cost-effectiveness analysis.

2. A worked example using the IY Basic parenting Programme showed how SROI and cost-effectiveness analyses could be applied practically.

3. Each approach has strengths and limitations, and distinctive methods. Cost-effectiveness analysis maximises benefits gained per pounds spent. SROI analysis maximise return from an initial investment.

4. It may; therefore, not be possible to combine the two approaches. Instead it may be more suitable to perform both analyses in conjunction to give a full picture of current and potential future benefits of a programme or intervention.

Chapter 7: Discussion

"...What has happened to our young people? They disrespect their elders; they disobey their parents. They ignore the law. They riot in the streets inflamed with wild notions. Their morals are decaying? What is to become of them?..."

Plato (4th century B.C.)

Discussion

This thesis is the first to explore the newly developed Incredible Years (IY) Toddler Parenting Programme from an economic perspective. Previous research has focused upon parenting programmes as a treatment for child behavioural problems rather than as a preventative intervention. Recently there has been increasing interest from Government officials and policy makers in a preventative approach. In order to invest wisely in upstream, public health interventions such as, parenting programmes, there needs to be a strong evidence base of both clinical and economic evidence. This chapter synthesises the findings of the current economic evaluations in Chapter 2-6, in relation to existing literature, and will also assess the practical implications of the evaluation, methodological considerations and directions for future research.

Welfarism, Extra welfarism and the need for economic evaluation

Welfarism and Extra Welfarism can be interpreted as judgements of states of the world (Culyer, 1989). In the case of health economics, these states of the world refer to the different allocations of scarce health care resources. By performing economic evaluations health economists seek to rank these states of the world, in order to compare if a certain state of the world is better than, worse than or equal to other states of the world (McIntosh, Clarke, Frew & Louviere, 2010). The methods currently available in the economic "toolbox" such as cost-effectiveness and cost-utility analyses are based upon allocative efficiency and QALY maximisation (a Welfarist approach). In general the methods in the current economic "toolbox" calculate cost effectiveness, benefits, utility and savings, in terms of the inputs and outputs required to produce the estimates in that particular calculation, without considering wider criteria (e.g., a ripple effect of benefits to others such as wider family members). Given the complex nature of public health interventions the current economic "toolbox" is not sufficient and an Extra Welfarist approach is needed to take account of wider implications within the social welfare function, using methods such as cost-consequence analysis, modelling, SROI analysis and MCDA.

This thesis explored how the economic "toolbox" may be applied to a complex parenting programme intervention for parents of children three years old and under. By including wider implications of parenting programmes in the economic evaluation, judgements about the states of the world were based not only on outcomes for children, but also for wider family members such as parents. However, this raises more general questions such as how do you weight these multiple outcomes, what approach should be taken to conduct the evaluation and how do results from economic evaluations affect the trade off between efficiency and equity with public health comprising of such a board number of sectors.

A range of approaches were used in the thesis such as, cost-consequence analysis, cost-effectiveness analysis and Social Return on Investment (SROI) analysis. From conducting these analyses, it was clear that no approach was superior to another. Instead when performed in conjunction, they provided a complimentary picture of the costs, benefits and potential cost-savings associated with the IY Toddler and Basic Parenting Programmes, with wider lessons for other preventative public health interventions.

Discussion of findings in relation to each research question

1. What evidence exists about the cost-effectiveness of parenting programmes? How can future research into this field be improved?

A systematic review of the literature (Charles, Bywater & Edwards, 2011a, Chapter 2) highlighted the lack of full economic evaluations conducted upon parenting programmes. The review identified only six studies that met the inclusion criteria, with varying and inconsistent methods. The review appraised the identified studies in comparison to Drummond et al's 1997 checklist of elements present in a well-executed economic evaluation. Findings showed that all the studies reviewed, with the exception of one, did not include all elements as listed by Drummond et al. (1997). The review also highlighted the lack of guidance on the application of methods of economic evaluations to specific challenges of complex public health interventions, such as parenting programmes (Kelly et al. 2005; Weatherly et al. 2009). The lack of guidance provides

researchers with an ideal opportunity to make recommendations. Future economic evaluations should consider the following issues; parenting programmes as complex interventions, wider societal benefits, applicability of QALYs, economic modelling, statistical issues, equity implications and lessons learnt from previous evaluations (see Chapter 2). The review undertaken is the first (to our knowledge) to focus specifically upon previous economic evidence of parenting programmes. The review was a narrative review of the previous methods used in the economic evaluation of parenting programmes. The Cochrane guidelines were used to inform the methodological approach for the review and the PRISMA checklist (PRISMA, 2009) was used in the reporting of the results. As there was a limited evidence base the first author conducted the search and screened the abstracts. In order to maximise internal validity quality appraisals were conducted by the second and third authors. The data extraction was carried out by the first author; following this, the results of the review were discussed with the second and third authors. The first author prepared the first draft of the review with contributions from the second and third authors.

The review was specific to parenting programmes for children with or "at risk" of conduct disorder (CD); therefore, the inclusion criteria could be considered by some as narrow. Recently (October, 2011) an additional search was conducted over a 2 week period from the 3rd to the 17th of October 2011, updating the previous search and broadening the search criteria to economic evaluations of parenting programmes for child behaviour problems. This search yielded two additional, more recent trials (O' Neill et al. 2011; McGilloway et al. in press) and a Cochrane review (Furlong et al., in press) that were not present in the original review. These two trials and the review were not included in the published review (Charles et al., 2011a), as they were published after the review search was conducted. Thus providing support that the inclusion criteria was broad enough to capture the scope of previous research conducted in this field and highlighting the lack of evidence base for the economic evidence of parenting programmes. Some of the recommendations posed by the review have been addressed by McGilloway et al. (in press) and O' Neill et al. (2011). McGilloway et al. (in press) and O' Neill et al. (2011) conducted cost-effectiveness analysis and cost-benefit analysis to assess the impact of the Incredible Years Basic Parenting Programme on imprisonment, unemployment and education in Ireland to reduce long-term

inequality (O'Neill et al. 2011). The aim of the review was to conduct a specific systematic review of the published economic evidence of parenting programmes as a means to support families with children with or at risk of developing CD. The hope is that future researchers will take note of the issues and recommendations highlighted in the review to provide strong economic evidence for parenting programmes.

2. How much does it cost to set up and deliver the Incredible Years Toddler Parenting Programme in the contexts of normal service delivery and as part of a research trial?

A micro-costing analysis of the IY Toddler Parenting Programme (Charles, Edwards, Bywater, & Hutchings, 2011b, Chapter 3) using cost diaries completed by group leaders delivering the programme and the IY Wales Centre revealed that the total cost to set up and deliver the programme to a group of eight parents was £1165.84 per child under normal service delivery. When initial training and initial set-up costs (e.g., materials) were excluded the costs reduced to £752.63 per child, based on eight parents per group. Within a research context, the total costs for a group consisting of eight parents including initial training, recruitment and group running costs were £1509.28 per child. The costs of the programme without initial training and initial set-up costs (e.g., materials) were £1096.07 per child, based on eight parents per group.

Before conducting the micro-costing analysis we looked to previous examples of micro-costing performed on the IY programmes. During this review, a common theme emerged. Previous researchers used cost diaries completed by group leaders delivering the programme as their main method to obtain group delivery costs. Though the review showed previous examples of micro-costing with regard to the IY series of parenting programmes used similar methods to obtain group delivery costs. The authors were surprised to find such a lack of guidance and standardisation of the methods of micro-costing. This lack of specific guidance led to a lack of detail in the reporting of the technique used by researchers to conduct their micro-costing. Previous micro-costing exercises of

parenting programmes, rarely reported their decision making of process, namely why certain elements of costs were included and others excluded or why costs were divided into the categories presented in the published paper (see Chapter 3).

Due to the lack of standardised guidance for micro-costing; Charles et al presented a framework for micro-costing analyses of parenting programmes, using the IY Toddler Parenting Programme as a worked example (see Chapter 3). Accurate intervention/programme costs are essential to performing further economic analyses such as, cost-effectiveness and cost-benefit analyses. As interest has grown in parenting programmes used as preventative interventions by service commissioners and policy makers, there is a need for "evidence based commissioning". If programmes are to be rolled out in local settings following promising results from RCTs and economic evaluations, then programme costs need to be accurate, transparent and as generalisable as possible so that the economic analysis remains informative. Without accurate costs service managers may discover additional unexpected costs, because costs such as initial training were excluded in the micro-costing analysis. The micro-costing analysis showed the potential implications a lack of guidance can have and the caution service commissioners and policy makers should take when applying research evidence practically in their local settings.

3. What are the costs and consequences of participating in the Incredible Years Toddler Parenting Programme for parents and children?

Previous research conducted upon the clinical effectiveness of parenting programmes for children under three years old showed improved child behaviour and cognitive and language development (Elliot et al., 2002; Love et al., 2005; McMenamy et al., 2011; Niccols 2009). McMenamy et al., (2011) and Niccols (2009) assessed the wider benefits of parenting programmes, exploring not only the effect of the programme upon outcomes for children, but also outcomes for parents. Findings showed the potential of the parenting programmes under examination in the two trials at reducing parental depression, stress and over-activity (McMenamy et al., 2011; Niccols 2009).

The first cost-consequence analysis of the IY Toddler Parenting Programme (Charles, Bywater, & Edwards, 2011c, Chapter 4) showed at a cost of £1509.28 per child to set up and deliver the programme, only a statistically significant decrease in Beck Depression Inventory II (BDI II, Beck et al., 1966) total score was found for parents in the intervention group post-baseline compared to parents in the control group. No statistically significant differences were found in costs of service for parents in the intervention group post intervention compared to the control group. No statistically significant differences were found in total Schedule of Growing Skills (SGS II, Bellman et al., 1996) Developmental Quotient (DQ) score and costs of service use for children in the intervention group post-baseline compared to the control group. However, the cost-consequence analysis should be considered cautiously due to the small sample size available (N=38), which was 37% of the sample available for main RCT of the clinical effectiveness (N=103).

There is little evidence as yet of the effects of the newly developed parenting programmes aimed at parents of children three years and under. Previous studies identified (Elliot et al., 2002; Love et al., 2005; McMenamy et al., 2011; Niccols, 2009), showed positive outcomes for children after their parents attended a parenting programme; however, each study used different methods and measures of outcome, thereby making comparisons difficult. Love et al. (2005) used child development as their main outcome measure; the same measure of outcome was used in the main RCT assessing the clinical effectiveness of the IY Toddler Parenting Programme. An increase in SGS II (Bellman et al., 1996) DQ score was found post-intervention; however, the increase was not statistically significant. The lack of results demonstrated in the outcome measures chosen for children is surprising. Previous research supported changes in children's cognitive and language development immediately after intervention, six months post-intervention and two years post-intervention (Elliot et al., 2002; Love et al., 2005). The lack of significant findings may be attributed to the measures chosen; perhaps the SGS II (Bellman et al., 1996) was not sensitive enough in such a small sample to detect changes in children's cognitive development.

Though there is little evidence of parenting programmes for children under three years old, the IY programmes have an evidence base spanning 30 years for programmes aimed at parents of children four years old and above. The newly

developed infant and baby programmes aimed at parents of children three years old and younger need further evaluation in a range of settings from both a clinical and economic perspective in order to build upon the existing evidence base. By conducting research upon these newly developed programmes researchers will refine the methods used to assess outcomes for very young children, which may need to be applied with ingenuity. For health economists this may mean conducting economic analysis using outcome measures from the RCT such as, child development rather than the current standard of QALYs. It is difficult to standardise and develop measures for children, especially in such a young age young group, for example for children who are under three years old.

By conducting cost-consequence analysis a range of outcomes can be assessed in comparison to the costs of the intervention. This is an advantage in public health economics. Public health interventions tend to be complex interventions, comprising of many factors (Medical Research Council [MRC], 2008). By assessing a broad range of outcomes using cost-consequence analysis rather than choosing primary outcomes to conduct for example, cost-effectiveness service commissioners and policy makers are provided with all the evidence. Also with the increased interest from Government officials in a preventative approach the research conducted will provide service commissioners and policy makers with the evidence required to commission effective and cost-effective programmes.

4. Do parents of children with challenging behaviour utilise more health, social services and does the frequency of utilisation decrease after participation in an IY programme?

Previous research into parenting programmes has focused upon outcomes for children only, despite the impact a parenting programme can have upon parents and wider family members such as siblings (Hutchings et al., 2007). Secondary analysis of a sub-sample from a previous RCT assessing the clinical effectiveness and cost-effectiveness of the IY Basic Parenting Programme was used to answer the fourth research question of this thesis. This was a targeted sample, parents

were invited to participate in the RCT as their children demonstrated conduct problem behaviour and they lived in a disadvantaged area.

This secondary analysis (Charles, Bywater, Edwards & Hutchings, 2011d, Chapter 5) showed a significant decrease in BDI II (Beck et al., 1996) scores for the intervention group at six, twelve and eighteen months. No significant decrease was found in BDI II (Beck et al., 1996) scores for the control group between baseline and six-months post-baseline. Non-significant reductions in service use frequencies were found for the intervention group from baseline to six and twelve months, but not at eighteen months. Non-significant reductions were found in control group service use frequencies from baseline to six-months. Results in the secondary analysis sub-sample reflected previous findings that the IY Basic is proven to reduce parental depression (Hutchings et al., 2007; Bywater et al., 2009; Bywater et al 2010). Service use results showed both parents in the intervention and control group showed reduced service use frequencies six months post-baseline, suggesting that the IY Basic Parenting Programme was not effective at reducing health and social care service use. However, results at twelve months post-baseline showed the intervention group's service use reduced below the frequencies at baseline, suggesting a maintained effect for the intervention group. The sample reported the highest frequencies of service use for GP consultations. When compared to the national average GP consultations for England of three consultations per year (as data for Wales was unavailable); the sample used twice the average GP consultations per year (Office for National Statistics, 2009).

The effects of scoring above the clinical cut-off were also assessed and findings showed parents in the intervention group who scored above the clinical cut-off on the BDI II (Beck et al., 1996) at baseline used more health and social care services than those who scored below at baseline, six and eighteen months, but not at twelve months. The findings at twelve months post-baseline may be attributed the fact that a number of parents reported pregnancies during this period of follow-up. Parents in the control group who scored above the clinical cut-off on the BDI II (Beck et al., 1996) at baseline used more health and social care services than those who scored below at baseline and six months.

In previous evaluations of the IY parenting programmes outcomes for children have been the main focus. The findings of this secondary analysis sub-sample demonstrate that health economists must be prepared to assess multiple

outcomes of a parenting programmes, including wider benefits not only accrued by children, but parents and perhaps also siblings and other family members. Weatherly et al. (2009) suggest using a cost-benefit approach in order to consider all costs and benefits, no matter to whom they accrue, thus allowing researchers to assess multiple outcomes. However, if costs and benefits are valued in monetary terms this can raise its own challenges (discussed further in Chapter 6).

Though both the intervention and control group's service use was shown to decrease after six months, the intervention group maintained the reduction at twelve months post-baseline. However, without a control group at twelve and eighteen months post-baseline to allow for comparison, it is difficult to attribute the maintained decrease in service use at twelve months post-baseline for the intervention group to the IY Basic Parenting Programme. Findings showed high levels of depression were associated with increased health and social service use, suggesting there is a need to explore the service use of "high risk" parents for example, parents who are raising children with problem behaviours and live in disadvantaged areas. The implications of these findings are also important for publically funded health and social care such as the NHS in the U.K. If the IY Basic Parenting Programme is effective in reducing parental depression and improving child behaviour it could also have applications within the community, family or adult mental health services in order to reduce the burden upon the NHS. Recently the U.K. Government has announced plans to appoint "trouble shooters", who will provide one to one support for "troubled families" (BBC, 2011). Under the Government's plans "trouble shooters" will identify families in need, making sure they get access to the right services and ensuring that action is taken (BBC, 2011).

5. How could researchers apply Social Return on Investment analysis and cost-effectiveness analysis to the Incredible Years Parenting Programmes?

The National Institute for Health and Clinical Excellence (NICE), an independent organisation that provides national guidance on health promotion and illness prevention in the U.K. favour a cost-effectiveness or cost-utility approach, using Quality Adjusted Life Years (QALYs). In recent years a form of analysis called

Social Return on Investment (SROI) analysis, which is preferred in the U.S., has become of interest to service commissioners and policy makers in the U.K. Both methods have previously been applied to public health interventions such as school and parenting programmes (Schweinhart et al., 1993; Schweinhart et al., 2005; Edwards et al., 2007; O'Neill et al. 2011); however, no specific SROI analysis has been conducted on the IY Parenting Programmes.

In order to compare in principle how the two approaches could be applied to a complex intervention (MRC, 2008) the two approaches were applied to a worked example of the IY Basic Parenting Programme (Charles, Edwards & Bywater, 2011e, Chapter 6). SROI frameworks were conducted to show pathways undertaken by families with children from four years old to eighteen years old without and with the IY Basic Parenting Programme. The frameworks used national unit cost data (Curtis 2011; DirectGov, 2011a; 2011b) and data from previous RCTs (Bywater et al. 2010; Bonin et al., 2001: Charles et al., 2011c) of the IY Basic Parenting Programme, applying a discounting rate of 3.5% per year for costs over 12 months. Findings showed that total costs of the without IY pathways for all three scenarios outweighed the total costs of the with IY pathways, even with the cost of the parenting programme included. Example cost-effectiveness ratios were calculated to show the costs of the improvements seen on the BDI II (Beck e al., 1996) for parents from pre-intervention to post-intervention and costs of the improvements seen on the Eyberg Child Behavioural Inventory (ECBI) (Eyberg, 1980) for children from pre-intervention to post-intervention, to demonstrate how cost-effectiveness analysis can be applied to the IY Basic Parenting Programme.

This comparison of approaches raised a number of challenges. When conducting SROI analysis it is difficult to define the parameters of framework, particularly with complex interventions as they contain multiple components and benefits could be accrued by multiple agencies. Another challenge facing researchers who wish to conduct SROI analysis is the availability of data to populate the framework. Researchers would be advised to conduct a literature search before conducting SROI analysis to identify key stakeholders and assess the availability of data. From conducting the example cost-effectiveness analysis the biggest challenge faced was choosing outcomes for the cost-effectiveness ratio that are meaningful to service commissioners and policy makers. Weatherly et al.

(2009) advocate using RCTs to evaluate public health interventions such as, parenting programmes; however, researchers should keep in mind the extrapolation of outcomes beyond the end of the trial (e.g., using economic modelling). Researchers need to be mindful to choose sensitive measures and an adequate time horizon.

Both approaches have strengths and weaknesses. SROI analysis is valued in strictly monetary terms; results of SROI are instantly understandable to those with limited understanding of economic terms. SROI can adopt a multi-agency perspective calculating the benefits and costs accrued by many different sectors. However, SROI is relatively new to the field in the U.K, with limited guidance on the methods of SROI and previous research conducted. Cost-effectiveness analysis is an established, standardised method, recognised by NICE (2008b). NICE (2008a) states that with the enormous costs involved in the NHS, choices have to be made; therefore, it makes sense to focus on treatments that improve the quality and/or length of someone's life and, are an effective use of NHS resources. However, researchers need to be cautious when choosing their outcome measures. Cost-effectiveness evidence from a RCT needs to be appropriate for extrapolation outside of the trial and applicable to local settings. Researchers also need to be aware of the comparability of results from multiple cost-effectiveness ratios.

As the two approaches used different methods, timescales and perspectives it may not be possible to combine the two. However, the two approaches could be used in conjunction on the same data as demonstrated in our example analysis. When the two methods are performed simultaneously they provide a complimentary overview of an intervention over different time horizons, perspectives and using a different range of outcomes. This overview is of specific importance to service commissioners and policy makers who will need to know the full extent of a programme before roll-out. Thus allowing them to consider the current, potential future and potential wider benefits of parenting programmes and conduct a comprehensive analysis of multiple outcomes. As the budget for such programmes usually comes from the Government, if a parent programme can cause a ripple effect of benefits and less expenditure in other services (e.g., education and health and social care services). Then the programme would be considered a good use of public resources.

Practical implications of findings

The main implication of this thesis is how evidence from economic evaluations can support service commissioners and policy makers to make decisions about which public health interventions and programmes to incorporate into their menu of services, particularly in times of economic recession. This is of particular importance given the recent interest from the U.K. government in preventative interventions. The interest has already been incorporated into policy through documents such as, Every Child Matters (2003) and Early Intervention: The Next Steps (Allen 2011a) and Early Intervention Smart Investment, Massive Savings Allen (2011b), and initiatives such as Sure Start, Flying Start (Welsh Assembly Government 2005a; 2005b), and Family Nurse Partnership (Department for Children, Schools and Families, 2008).

Although guidelines such as NICE, (2006) advocate using parenting programmes such as the IY series to treat and manage CD, there is limited evidence of these interventions for children three years old and under. A strong evidence base is needed to provide effective interventions that not only serve families, but are also considered a good use of resources. Previous research has highlighted the potential high costs to society without such programmes (Knapp et al., 1999; National Audit Office, 2010; Romeo et al., 2006; Sainsbury's Centre for Mental Health, 2009; Scott et al., 2001a) Allen (2011b), states that without the provision of parenting programmes a vicious cycle can begin of future generations who are not equipped with the parenting skills needed to raise their families; resulting in high costs to society such as unemployment and anti-social behaviour. Allen's (2011b) concerns were demonstrated recently in the summer riots of 2011.

Methodological considerations – challenges of conducting economic evaluations of public health interventions.

Weatherly et al. (2009) state 4 key challenges of conducting economic evaluations of public health interventions. With regards to the attribution of effects, the

economic evaluations conducted in Chapters 4-6 were based on previous pragmatic RCTs of the IY Basic and Toddler Parenting Programmes conducted in community settings in Flying Start and Sure Start areas (Bywater et al., 2009; Hutchings et al., 2007; 2011). These evaluations followed the recommendations proposed by Weatherly et al., (2009) by; 1) assessing multiple outcomes such as outcomes for parents as well as children who participated in the programme. 2) assessing long-term outcomes for parents through a secondary sub-sample analysis of parental depression and service use outcome, and 3) assessing long-term outcomes for children by creating SROI frameworks showing the impact on services without and with the IY Basic Parenting Programme for children between the ages of 4-18 years.

Using the economic "toolbox", health economists should incorporate detailed micro-costing analyses of the programme in their reporting of the economic evaluation. Health economists should also perform sensitivity analyses detailing the differences in cost (and outcome, if applicable) (Drummond et al., 2007) of a programme with varying group numbers, whilst keeping group numbers to those recommended by the programme developer to maintain fidelity (Charles et al., 2011b). Health economists need to consider the wider benefits of participating in a public health intervention. Public health interventions tend to be complex and multi-faceted, resulting in a ripple effect of potential benefits that could be accrued by wider family members (Weatherly et al., 2009). In the case of parenting programmes, previous research has tended to focus on the behaviour or social and emotional development of the referred child. However, Chapters 4 and 5 showed additional benefits to parents, supporting previous research (Alpern & Lyons-Ruth, 1993; Hutchings et al., 2007; Lahey et al., 1988). Hutchings et al. (2007) also showed improved behaviour of siblings of the referred child in their RCT evaluating the clinical effectiveness of the IY Basic Parenting Programme. In order to assess the wider implications of public health interventions, health economists may take advice from Kelly et al. (2005) who suggest the QALY may be too narrow to capture all the benefits from public health interventions. Due to the young age of the children within the sample (the sample consisted of children under 4 years old), non health outcomes were assessed rather than using the NICE standard of QALYs (NICE, 2008a). The literature review highlighted that the use of non health outcomes was common in economic evaluations of parenting

programmes (Charles et al., 2011a). Previous economic evaluations used clinical outcomes measures from the RCT to inform estimates of cost-effectiveness (Charles et al., 2011a). Health economists may also take advice from Weatherly et al. (2009) who suggest using cost-consequence or a cost-benefit approach alongside other forms of economic evaluation, in order to consider all costs and benefits, no matter to whom they accrue, which would allow researchers to assess multiple outcomes. It is also worth considering the longer-term benefits of programmes delivered as early preventative interventions. Schweinhart et al. (1993; 2005) demonstrated the growing return on investment at ages 27 and 40 years, from a programme delivered at four years old. As children under go the greatest development between the ages of 0-3 years, this provides a window of opportunity for an intervention to have the greatest impact upon a child's development (Regalado & Halfon, 2001). However, RCTs of parenting programmes have a short follow-up period. Kadzin (1993) found a median follow-up period of 5 months in a large number of studies assessing CD, which does not provide evidence of the long-term benefits of parenting programmes. A long-term follow-up of families who participated in the evaluation of the IY Basic Parenting Programme showed maintained reduced parental depression at 18 months post-baseline (Bywater et al., 2009). Long-term benefits of early preventative interventions need to be assessed in future research and incorporated into the evidence base for parenting programmes. This will help service commissioners and policy makers invest in the future of young children.

The multi-faceted nature of public health interventions also pose implications for how programmes are funded and delivered. Chapters 4 and 5 support previous research (Alpern & Lyons-Ruth, 1993; Hutchings et al., 2007; Lahey et al., 1988) that there is a ripple effect of benefits accrued by additional family members. This ripple effect of benefits could alter the delivery of parenting programmes. Parenting programmes are currently delivered in the community; however, the benefits to wider family members and particularly the benefits shown in parental depression could result in parenting programmes being delivered through a combination of community, family and adult mental health services. Weatherly et al., (2009) state the impact of public health interventions can be wide reaching and costs and benefits can fall within many sectors. In Chapter 6, the SROI framework illustrated the costs to multiple publically funded

agencies without and with the IY Basic Parenting Programme. The frameworks also demonstrated that expenditure by certain agencies such as local authorities to provide parenting programmes resulted in less expenditure by other agencies for example, education services, health services and social care services. Demonstrating that funding for public health interventions is often interwoven with other publically funded services, which has implications for equity and the potential for trade-offs to occur between efficiency and equity (Weatherly et al., 2009). In light of this fact Governments could consider resource transfers. Health economists need to consider wider implications of interventions, in order to see the big picture.

Methodological considerations - quantitative and qualitative research

In the main RCT evaluating the clinical effectiveness of the IY Toddler Parenting Programme, and the additional economic evaluation of the programme the main methods used were quantitative. This provided empirical research whereby researchers could assess relationships between the programme and outcomes such as child development, the child and parent relationship, parental depression, stress and costs. These factors could potentially inform service commissioners and policy makers of the value of the programme, in terms of its benefits to families and in terms of whether or not the programme is deemed a good use of resources. As there is a lack of evidence for parenting programmes aimed at children three years old and younger, this is a good time for researchers to further explore quantitative research, but also qualitative research. Health economists are beginning to recognise the value of qualitative research alongside quantitative research (Coast, 1999). The UK Centre for Reviews and Dissemination (CRD, 2009) and the Evidence for Policy and Practice Information Centre (EPPI-Centre, 2010) have developed their evidence synthesis methodologies to include mixed method approaches in order to address broader public health and social care questions (Noyes, 2010). The Cochrane handbook for systematic reviews has recently been revised, highlighting the use of qualitative evidence in systematic reviews. The handbook acknowledges that the inclusion of qualitative evidence in

reviews can potentially reveal reasons for trial variation in effect (Candy, King, Jones & Oliver, 2011; Noyes, Popay, Pearson, Hannes, & Booth, 2009). Qualitative methods may be particularly useful when evaluating complex health and social care interventions as these can comprise of social or behavioural processes that are difficult to explore or capture using only quantitative methods (Campbell et al., 2000). Lewin, Glenton, & Oxman (2009) define a number of ways qualitative methods can contribute to each stage of the evaluation of complex interventions for example, before a trial they can assist the researcher to; explore issues related to the research question or the context of the research, develop and enhance the intervention and develop or select outcome measures. During a trial qualitative methods can assist the researcher to; examine whether the intervention was delivered as intended, unpack processes of implementation and change and explore deliverers' and recipients' responses to the intervention. After a trial qualitative methods can assist the researcher to; explore reasons for trial findings, explain variation within the sample, examine the appropriateness of the background theory and generate further questions. When visiting the families who took part in the research, they were keen to share their experiences of raising their children and also of the programme during the final 12 month follow-up visit. The experiences shared could provide insight into the families' views of the programme and its impact upon daily life. Previously, service commissioners have been interested in outcomes gained from quantitative methods, and in particular evidence of effectiveness and cost-effectiveness. However, qualitative methods may provide greater insight and answers to important questions in complex interventions (Farquhar, Ewing, & Booth, 2011). Patient and service user opinion and experience is becoming of increased interest to policy makers and service commissioners (Farquhar, Ewing, & Booth, 2011). The Welsh Assembly Government (2010) recently conducted an interim evaluation of the Flying Start initiative exploring families' experiences of; childcare, parenting programmes, language and play. Showing there is an interest from service commissioners and policy makers in the experiences of families to inform and improve their services.

The issue of qualitative methods is under researched in terms of the IY parenting programmes. Though mediator and moderator analyses have been conducted upon the IY Programmes previously (Gardner, Hutchings, & Bywater, 2010), the IY evidence base could benefit from a qualitative approach. This added

element could ascertain what elements families and service commissioners believe to be most effective? What aspects of parenting are not addressed by the interventions? Are there aspects of the programme that could be improved? Why did families adapt their parenting after participating in the programme? What do the families feel they gain from the programme? What do service commissioners feel they gain from rolling out the programme?

Furlong & McGilloway (2011) have recently published results from a qualitative analysis of parents' experiences of the IY Basic Parenting Programme within disadvantaged areas in Ireland. Semi-structure interviews of the experiences of 33 parents were conducted to understand how and why the programme works, or does not work in disadvantaged settings. Analysis using constructivist grounded theory revealed 3 main themes; 'perceived mechanisms of change', 'trials of parenting' and 'failure to launch'. Parents attributed the key mechanisms of change to the acquisition of positive parenting strategies (e.g., positive attention, praise and problem-solving techniques) and an increased sense of personal confidence from gaining non-judgemental support from the group. Parents experience trials of parenting through cultural, social and personal challenges in developing their new skills. Parents also experienced potential barriers to the programme's success through living in an area with high levels of anti-social behaviour and difficulties with the principle of positive attention and praise. Parents also experienced disagreements with their partners in implementing their new skills. Many parents feared they would not be able to continue to implement their new skills, without the support of the group. The main reason parents left the group prematurely (after less than 5 sessions) was due to changes in circumstances (e.g., starting a new job, illness or caring for a family member). The authors conclude that these findings should help the future implementation of IY Parenting Programmes in disadvantages areas in Ireland and other countries.

Limitations of the thesis

In considering the findings of the thesis, it is important to acknowledge the limitations of the study. Firstly, the sample for the economic evaluation (Chapter

4) was small compared to the sample for the main RCT. As a result findings from the cost-consequence analysis should be viewed with caution. The sample also consisted mainly of families living is disadvantaged areas in rural Wales; therefore, results may not be generalisable to a wider population. However, by conducting the evaluation many lessons were learned; providing the researchers the opportunity to share their experiences, make suggestions and recommendations for future research.

Families who were offered the IY Toddler Parenting Programme in the RCT were also eligible for additional support and services for example, enhanced health visiting services, childcare, parenting and basic skills services for the most disadvantaged children (Welsh Assembly Government, 2005b). These additional services were not measured separately in the RCT. If the evaluation was to be repeated then these additional services would need to be counted separately in order to determine whether the results seen in the intervention and control groups were a result of the parenting programme or a result of the additional services accessed by the families.

Finally, the timeline used in the RCT was limited to a twelve month follow-up, which does not give an indication of the potential long-term benefits of the parenting programme. Given the vast development that children undergo during the ages of 0-3 years, a longitudinal study would be useful to assess the impacts of the parenting programme over time.

Directions for future research

There is a lack of evidence for parenting programmes of children three years and younger; therefore, future research needs to build a strong evidence base. The majority of limitations raised could be addressed in future research. Future research needs to be conducted on larger samples, and extended to different geographical regions. Funding councils should encourage future research into the wider implications of parenting programmes for example, benefits accrued by wider family members and longitudinal research. The extrapolation of effects beyond the end of the trial has been suggested previously (Weatherly et al., 2009). Techniques such as economic modelling could be used to achieve this. These

methods may be particularly useful for early preventative complex public health interventions such as early years parenting interventions. As stated previously choosing appropriate and sensitive outcome measures of clinical effect for this young age group is particularly problematic. Measures may not be sensitive enough to capture benefits gained from participating in the intervention and the timescale of the RCT may not be sufficient for benefits to culminate in a manner that is measurable on a scale. By using economic modelling, estimates could be calculated for outcomes such as the probability and/or prevalence of outcomes associated with persistent childhood behavioural problems for example, anti-social behaviour, crime, failure at school, unemployment, failure in relationships and financial dependency upon the state (Fergusson et al., 2004; Farrington et al., in press; Robins, 1996; Rutter & Giller, 1983; Simonoff et al., 2004). The issue of modelling is of particular importance given the interest of the Government to provide these programmes as early years preventative interventions with the intent of developing upstream approach to tackling problematic child behaviour with potential cost-savings in the future (Allen, 2011a, 2011b).

Measures chosen to evaluate interventions and programmes need to be appropriate for the target sample. Of the studies found evaluating the impact of parenting programmes for children three years old and younger, a variety of outcome measures were chosen (see Chapter 4). The different outcomes assessed can make additional economic evaluations difficult, leading health economists to use outcomes from the RCT in their analyses.

This economic evaluation has provided a starting point for further research into parenting programmes for children three years and younger. The literature review (Chapter 2) highlighted the lack of economic evidence specifically related to parenting programmes and a lack of guidance for conducting economic evaluations of public health interventions in particular parenting programmes. The lack of evidence and guidance led the authors to make recommendations for future research within this chapter. Chapter 3 highlighted the lack of detail in the reporting of the costs of parenting programmes, and the lack of standardisation in the methods of micro-costing. By providing the steps and framework of the micro-costing performed on the IY Toddler Parenting Programmes, it is hoped that it will ignite a debate in the methods of micro-costing and provide a framework that can be adapted or improved upon by future researchers. Chapters

4, 5 and 6 took on board the suggestion by Weatherly et al., (2009) and conducted analyses that explored the wider implications of parenting programmes for example, impacts upon parents as well as children and the long-term implications of the parenting programmes using SROI frameworks. Though the study has attempted to answer questions raised at the beginning of the thesis and suggested ways in which unanswered questions could be addressed in future research, more research is required. The high interest in early preventative interventions should lead to further research within the field. This further research will provide insight and lessons learned, improving the evidence base.

Conclusion

The current economic "toolbox" is not sufficient for the evaluation of complex public health interventions. There is a lack of research and guidance within the field of public health, in particular for parenting programmes. This thesis has applied the recommendations outlined in the systematic review and by Weatherly et al., (2009), in order to conduct the economic evaluation. The thesis answered a range of questions including what economic evidence exists for parenting programmes, what are the costs and consequences of the IY Toddler Parenting Programme, and what are the wider and long-term implications of parenting programmes. Each chapter has outlined its limitations and directions for future research, in order to build a strong economic evidence base for public health interventions, such as parenting programmes. Health economists need to be mindful of the audience their research will serve, for example, the majority of economic evaluations are used to help service commissioners and policy makers allocate resources effectively. As a result health economists need to conduct analyses that are meaningful and relevant to local settings. This may result in using outcomes from RCTs rather the NICE advocated method of using QALYs. Of particular importance is the direction of future research. Future research needs to take a comprehensive approach, assessing a wide range of outcomes, not only for the referred individual, but also wider family members and society. Future research also needs to explore the potential usefulness and acceptability of new methods such as, SROI analysis, modelling and MCDA. This will enable health

economists, service commissioners and policy makers to see the big picture and invest in programmes with a strong clinical and economic evidence base, providing families with the best support possible.

KEY MESSAGES OF THE THESIS

1. This thesis is the first to apply health economics to a newly developed parenting programme for children three years and under, in a climate where early intervention programmes are of great interest to decision makers. This thesis not only explored standardised economic methods such as cost-consequence and cost-effectiveness analysis, but also explored long-term benefits using Social Return on Investment (SROI) analysis. This thesis looked to the future with regards to benefits throughout life such as reduced crime, unemployment and anti-social behaviour.

2. This thesis not only assesses the benefits to children gained from parenting programmes, but also considers the wider benefits of parenting programmes, such as those accrued by parents. This thesis studied the impact of parenting programmes upon parental health and social service use, which previously has not been studied. It is difficult to show the benefits of such programmes to very young children over a short period such as a year; therefore, it may be more worthwhile to assess the impact of programmes upon parents or wider family members such as siblings.

3. The economic "toolbox" needs applying with ingenuity when evaluating complex public health interventions. Previous economic evaluations of parenting programmes (Edwards et al., 2007; O'Neill et al., 2011) have utilised clinical measures from RCTs such as Eyberg Intensity scores (Eyberg, 1980) to assess outcomes. Appropriate measures and methods of evaluation need to be chosen, such as costing to bring scores under a clinical cut-off point or a 10% shift in scores of the sample who scored in the highest percentile on a measure.

4. Economic exercises such as micro-costing are important in order to assess if a programme/intervention is good value for money. Without accurate costs, researchers may apply analyses such as cost-effectiveness analysis and calculate incorrect ICERs. We must first know the costs of a programme/intervention in order to find out if it is good value for money. However, there was a lack of detail given when reporting the previous micro-costing analyses of parenting programmes.

5. It may be worthwhile to consider other methods of analysis such as social return on investment analysis when dealing with young age groups, as the impact of such programmes may not come into fruition until a few years later. Longitudinal studies such as Olds et al., (1993), Reynolds et al., (2001) and Schweinhart (1993; 2005) have shown the potential long-term return on investment of school-based programmes upon crime and unemployment in the U.S. following delivery of the programme at three years old.

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Appendix A: NHS Ethical Approval Letter

Pwyllgor Moeseg Ymchwil Gogledd Orllewin Cymru
North West Wales Research Ethics Committee
North West Wales NHS Trust, Ysbyty Gwynedd
Clinical Academic Office
North Wales Clinical School
Bangor, Gwynedd
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20 February 2009

Miss Nia Griffith
PhD Student
Incredible Years Wales
Nantlle Building
Normal Site, Bangor University
LL572PZ

Dear Miss Griffith

Study title: **Evaluating the Incredible Years toddler parenting programme for children ages 1-3 years.**
REC reference: **08/WNo01/43**
Amendment number: **AM01**
Amendment date: **02 February 2009**

The above amendment was reviewed at the meeting of the Sub-Committee of the REC held on 19 February 2009.

Ethical opinion

The Sub-Committee reviewed the amendment. No ethical issues were raised.

The members of the Committee present gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

Document	Version	Date
Questionnaire		
Questionnaire	EQ-5D v.1	
Protocol	Addition of economic evaluation v.1	20 January 2009
Participant Information Sheet	Economic Evaluation v.1	20 January 2009
Participant Consent Form	Economic Evaluation v.1	20 January 2009
Cost diary for group leaders	1	20 January 2009
Notice of Substantial Amendment		02 February 2009
CV of co-investigator	No version	

Membership of the Committee

The members of the Committee who were present at the meeting are listed on the attached sheet.

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

08/WNo01/43:	**Please quote this number on all correspondence**

Yours sincerely

Rossela Roberts

Dr. Rossela Roberts
Committee Co-ordinator

E-mail: Rossela.Roberts@nww-tr.wales.nhs.uk

Enclosures — List of names and professions of members who were present at the meeting and those who submitted written comments

Copy to: — *Sponsor's representative - Professor Oliver Turnbull, Bangor University*
R&D North West Wales NHS Trust

Chairman/Cadeirydd - Mr David Owen, CBE, QPM

Appendix B: Participant Information Sheet

Additional economic evaluation participant information form

Ysgol Seicoleg
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Additional Information Sheet
20/01/09

Version 1

Participant Information Sheet

Research Title: Economic Evaluation of Child Study for Parents Attending the Incredible Years Toddler Parenting Programme.

Investigator: Joanna Charles (PhD Student)
Supervisors: Dr. Rhiannon Tudor-Edwards
Dr. Tracey Bywater

We would like to invite you to take part in a research study. We would like you to take your time to read this participant information sheet. The sheet will tell you what the research is about, and what we would need you to do if you take part.

What is the purpose of this study?
The aim of the study is to find out the cost-effectiveness of the parenting programme, whether the programme represents good value for money in terms of government spending.

Additional economic evaluation participant information form

Why have I been asked to take part?
You have been asked to take part because you are already taking part in the evaluation of the Incredible Years Toddler Parenting Programme.

What do I have to do?
If you take part you will be asked at your 6 and 12 month follow up visit for Incredible Years Toddler Parenting Programme study to complete 2 additional questionnaires asking about your general health and your contacts with healthcare, social and education services. Both questionnaires will take approximately 10-15 minutes to complete.

All the information you give us will be kept in our research office at Bangor University. The information will be kept in a way that it will not be possible to identify you or your child. When we write up the findings of this study we will write about the group as a whole, not individuals.

Why are we asking you about your recent contacts with healthcare, social care and educational services?
One of our questionnaires asks you about the number of times you and your child have had contact with health services e.g. your GP, Social Services and local education services. From this information we will be able to see, for each group, whether the parenting programme affects the number of contacts parents and children have with these services.

What are the possible benefits of taking part in this research study?
By providing us with information we can assess the cost-effectiveness of the programme and hopefully if proven to be good value for government spending many more parents and children can gain access to similar parenting courses.

What are the possible risks of taking part in this study?
We have done everything we can to make sure that no harm will come to you or your child during the course of the study. All members of the research team have had thorough criminal checks. Researchers are experienced in using all measures, and are trained observers.

What are the procedures in place to ensure confidentially?
To ensure confidentially and data protection, the contact details and identity of participants will not be disclosed to anyone other than the

main research team. When we write up the findings we will only be reporting the information for the group as a whole. All information relating to you and your family i.e. consent forms and contact details will be kept in a locked filing cabinet in Bangor University. Your data will be entered into the database using an identification number and not your name.

Will I be paid for helping the research team?
An additional £5 will be paid to you at the 6 and 12 month follow up visit, for completing the additional questionnaires about your health and contacts with healthcare, social care and educational services, to enable our economic analysis.

What information will I get after the study?
After you have taken part in the study, you will be sent a short report. This report will explain what we expected to find when we started the study.

We will give you the names and contact details of the main researchers so that if you have any questions after the study has ended, you will know whom to contact. The main researchers will be more than happy to answer any questions.

What will happen if I don't want to complete the additional measures?
Taking part in this research is entirely voluntary and you can stop taking part at any time without penalty. If you withdraw from the research you can still take part in the evaluation of the Incredible Years Toddler Parenting Programme. If you move from the area we still would like you to continue to assist the researcher during her scheduled visits if you can.

If you withdraw from any part of this study it will not affect your access to other health and social care services or Flying Start services for you or your child.

If any child protection issues arise, or any other issues that require that research team to share information with other services, you will be

main research team. When we write up the findings we will only be reporting the information for the group as a whole. All information relating to you and your family i.e. consent forms and contact details will be kept in a locked filing cabinet in Bangor University. Your data will be entered into the database using an identification number and not your name.

Will I be paid for helping the research team?
An additional £5 will be paid to you at the 6 and 12 month follow up visit, for completing the additional questionnaires about your health and contacts with healthcare, social care and educational services, to enable our economic analysis.

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If you withdraw from any part of this study it will not affect your access to other health and social care services or Flying Start services for you or your child.

If any child protection issues arise, or any other issues that require that research team to share information with other services, you will be

informed and the relevant information will be passed on to the appropriate authorities.

If you would still like to take part in this study then you will be given this information sheet to keep and be asked to sign a consent form.

If you have any queries about this research please contact Joanna Charles, Nantlle Building, Normal Site, Bangor University, LL57 2PZ.

I can be contacted on this telephone number 01248 383956. If I am unable to answer your call, please leave a message and you will be called back as soon as possible.

Thank you. We look forward to working with you

Yours sincerely
Joanna Charles

If you have any complaints about this research, please contact the following people:

Bangor University, School of Psychology
Professor Oliver Turnbull, Head of the School of Psychology, Bangor University, Bangor, Gwynedd, LL55 2DG.

North West Wales NHS Trust
Mr Martin Jones, Chief Executive, Ysbyty Gwynedd, Penrhosgarnedd, Bangor, Gwynedd, LL57 2PW.

Appendix C: Participant Consent Form

Additional economic evaluation consent form

Ysgol Seicoleg
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Additional Consent form 20/01/09

Version I

Consent Form

Economic Evaluation of Child Study for Parents Attending the Incredible Years Toddler Parenting Programme.

I (name)_____ have read and understood the information sheet dated 20/01/09 Version I for the above study and have had the opportunity to ask questions.

I understand that this consent form consents for my child and me to participate in the research study.

I understand that I can withdraw from the study at any time and that my withdrawal will not affect my access to any current or future health or Flying Start services.

I agree to provide information to the researcher for use in this study.

☐ I consent to giving information about the recent contacts I and my child have had with health services, social services and educational services, for which I will receive an additional £5.

Additional economic evaluation consent form

Signature of participant _____

Relationship to child _____

Name of child _____

Date _____

Name of researcher _____

Signature of researcher _____

Date _____

Researcher: Joanna Charles

Address: Nantlle Building, Normal Site, Bangor University, Gwynedd, LL57 2PZ

Email: j.charles@bangor.ac.uk Telephone: 01248 383956

Appendix D: Sample Questions from EQ-5D Questionnaire. The questionnaire is not reproduced in its entirety due to copyright. The questionnaire can be found/purchased at http://www.euroqol.org/eq-5d/how-to-obtain-eq-5d.html

Sample Questions

Self-Care

I have no problems with self-care
I have some problems with self-care
I am unable to wash or dress myself

Pain/Discomfort

I have no pain or discomfort
I have moderate pain or discomfort
I have extreme pain or discomfort

VAS scale

Requires the participant to indicate on a visual scale from 0-100 their health state as of today. An indication of 0 refers to worst possible health state and 100 refers to best possible health state.

Appendix E: Client Service Receipt Inventory Questionnaire (modified from Beecham & Knapp, 1993)

Version 1 ID ( ) ( ) ( )

Service Utilisation Questionnaire

We would like to improve the services available to your child. It would be helpful if you could tell us how many times **in the last six months** your child has had contact with the following list of health, educational and social service professionals. Please include any contacts which *you yourself* have had with any of these people in regard to your child. We are also interested in *where* the service was provided: at home, at nursery or playgroup, at the GP surgery, at hospital, at the health clinic or at another place.

HEALTH AND SOCIAL SERVICE CONTACTS

Over the **last six months** how many contacts has your child had with the following health and social care professionals and where were they seen?

	Number of contacts					
Health or social care professional	**GP surgery**	**Home**	**Health Clinic**	**School/ nursery**	**Else-where (Please specify)**	**Notes**
GP						
Nurse						
Health visitor						
Speech therapist						
Physiotherapist						
Social worker						
Sessional worker						
CAMHS team member						
Community paediatrician						
Homestart						
Other – Please specify.....						

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OTHER SERVICES AT PLAYGROUP OR NURSERY
Does your child attend a playgroup ❑ or nursery ❑?

Name of playgroup/nursery……..

If yes, in the **last 6 months** how many times have you or your child seen the following people?

	No. of times
Extra parent consultation with nursery nurse	
Extra parent consultation with head of nursery or playgroup	
Other-Please Specify :……	

Over the **last six months** how many hours per week has your child received the following help at school or nursery?

	Hours per week	**For whole six-month period? If no, record dates or number of weeks**
One-to-one help		YES/NO
Small group work		YES/NO
Special teaching		YES/NO
Other - Please specify:……..		YES/NO

Has your child been in respite foster care over the last six months? YES/NO
If yes, how many days or weeks in the last six months has your child been in respite foster care?.....weeks.....days

Version 1 ID ( ) ( ) ( )

AT HOSPTIAL

Over the **last six months**, how many times has your child visited the following people at a hospital?

	No. of times	**Type of consultant /department visited**	**Reason**
Casualty department			
Did they travel by ambulance?	YES/NO		
Outpatient consultant appointment			
Overnight stay in hospital	No. of times: No. of nights:		
Other - Please specify:……..			

NOTES

JMC RTE 20.01.09 3

Version 1 ID ( ) ( ) ( )

PARENT or PRIMARY CARER'S SERVICE
We would like to find out about *your* personal use of services over the **last six months.** How many times have you had contact with the following service professionals regarding your own health and well being?

	Number of contacts					
Health or social care professional	**GP surgery**	**Home**	**Health Clinic**	**School/ nursery**	**Else-where (Please specify)**	**Notes**
GP						
Nurse						
Health visitor						
Social worker						
Community Psychiatric Nurse						
Mediation service e.g. Relate						
Counsellor						
Hospital consultant			No. outpatient visits: Department No. nights spent as inpatient: Department:			Reason:
Casualty			No. of visits:			Reason:
Other – Please specify……						

In the last six months have you experienced any health problems including post natal depression? YES/NO

If yes, have these problems persisted longer than the last six months? YES/NO

If yes, how much longer? ……..

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Version 1 ID ( ) ( ) ( )

Did you see a healthcare professional about your health problem? YES/NO

If yes, who did you see? .....

Did you receive treatment such as medication, therapy? YES/NO

What was/is the treatment?.....

In the last six months, because of your child's health or behaviour have you had to:

- take time off paid employment? ☐
- reduce your hours of paid work? ☐
- give up your job? ☐

If yes, please estimate how much income you have lost over the last six months as a result of this? £.....

Appendix F: Sample Questions from Beck Depression Inventory II (BDI II; Beck et al., 1996) questionnaire. The questionnaire is not reproduced in its entirety due to copyright. The questionnaire can be found/purchased at http://www.psychcorp.co.uk/Psychology/AdultMentalHealth/AdultMentalHealth/BeckDepressionInventory-II%28BDI-II%29/BeckDepressionInventory-II%28BDI-II%29.aspx?gclid=CO-EpOKJ660CFQELfAodJArR7Q

Sample Questions

8. Self-Criticalness

0 I don't criticize or blame myself more than usual

1 I am more critical of myself than I used to be

2 I criticize myself for all of my faults

3 I blame myself for everything bad that happens

15. Loss of Energy

0 I have as much energy as ever

1 I have less energy than I used to have

2 I don't have enough energy to do very much

3 I don't have enough energy to do anything

17. Irritability

0 I am no more irritable than usual

1 I am more irritable than usual

2 I am much more irritable than usual

3 I am irritable all the time

Appendix G: Sample Questions from Schedule of Growing Skills II (SGS II; Bellman et al., 1996) questionnaire. The questionnaire is not reproduced in its entirety due to copyright. The questionnaire can be found/purchased at http://shop.gl-assessment.co.uk/home.php?cat=360

Locomotor skills

Movement and Balance

33. Hops on one foot for 3 steps

34. Heel-to-toe walking forwards (for a minimum of 4 steps)

35. Stands on each foot separately for a count of 8 seconds

Stairs

39. Walks alone upstairs (with alternating feet) and downstairs (two feet to a step)

40. Walks alone upstairs and downstairs – one foot per step (adult fashion)

41. Runs upstairs

Speech and Language Skills

Expressive Language

119. Uses several words with meaning (at least 4)

120. Uses more than 7 words with meaning

121. Attempts to repeat words when used by others

Appendix H: Sample Questions from Eyberg Child Behaviour Inventory questionnaire. The questionnaire is not reproduced in its entirety due to copyright. The questionnaire can be found/purchased at https://shop.psych.acer.edu.au/acer-shop/group/EYB

		Is this a Problem Now?
1. Dawdles in getting dressed	1 2 3 4 5 6 7	Yes No
4. Refuses to eat food presented	1 2 3 4 5 6 7	Yes No
7. Refuses to go to bed on time	1 2 3 4 5 6 7	Yes No
12. Gets angry when doesn't get own way	1 2 3 4 5 6 7	Yes No
17. Yells or screams	1 2 3 4 5 6 7	Yes No
19. Destroys toys or other objects	1 2 3 4 5 6 7	Yes No
23. Teases or provokes other children	1 2 3 4 5 6 7	Yes No
27. Physically fights with brothers and sisters	1 2 3 4 5 6 7	Yes No
28. Constantly seeks attention	1 2 3 4 5 6 7	Yes No
32. Fails to finish tasks or projects	1 2 3 4 5 6 7	Yes No
33. Has difficulty entertaining himself alone	1 2 3 4 5 6 7	Yes No
35. Is overactive or restless	1 2 3 4 5 6 7	Yes No

Appendix I: Group Leader Cost Diary

Cost diary for group leaders - Toddler Trial

GROUP VENUE:

Pre-Group	
Initial home visit to families Include number of families and time spent	
Group Leader Travel to initial visits (include time/mileage	
Initial telephone call time	
Admin time - sending out initial letters etc	
Pre-group supervision time	
Group Leader Travel to pre-group supervision: time/mileage	

WEEK :	1	2	3	4	5	6	7	8	9	10	11	12
Room preparation time												
Session preparation time Include personal time & planning with co-leaders												
Group time include travel time to group												
Catch up/home visits sessions include number of visits & time taken												
Weekly telephone time - parent/buddy calls etc.												
Travel to home visits: time/mileage												
Weekly supervision time												
Travel to weekly supervision: time/mileage												
Other extra time commitments (details please)												
Direct wages (hourly rate and hours worked)												
Other costs incurred: Provision of Creche facilities Taxis Rental of halls Food + Catering Admin costs directly related to the project e.g. photocopying, purchase of raffle prizes, pens and paper (please specify in each case)												
Other costs or comments: Group materials pack Recurrent group running costs Training course fee Training time Travel to training: time/mileage												

Appendix J: Total programme costs from previous micro-costing exercises of parenting programmes Costs are presented in their original published form and as costs in Pounds Sterling inflated to 2008/09 costs.

Author	Publication Date	Cost year in original paper	Intervention	Total costs as presented in original paper	Total costs in Pounds Sterling and inflated to 2008/09 costs
Olchowski et al.	2007	2003/04	Single-component Incredible Years (IY) child training	$1164.00 (cost per child, including training)	£747.17
			Stacked combination of IY child and IY teacher training	$1454.00 (cost per child, including training)	£933.31
			Single component IY parent training	$1579.00(cost per child, including training)	£1013.55
			Stacked combination of IY parent training and IY teacher training	$1868.00(cost per child, including training)	£1199.06
			Stacked combination IY child training and IY parent training	$2713.00(cost per child including training)	£1741.46
			All interventions (child, parent and teacher) delivered in stacked combination	$3003.00(cost per child, including training)	£1927.61
Edwards et al.	2007	2003/04	12-week IY Basic Parenting Programme	£1933.56 (cost per child, including training, and based on eight families per group)	£2310.29
				£1289.04 (cost per child, including training, and based on twelve families per group)	£1540.20
				£1595.46 (cost per child, excluding training, and based on eight families per group)	£1906.32
				£1063.64 (cost per child, excluding training, and based on twelve families per group)	£1270.88
O'Neill et al.	2011	2008/09	12-14 week IY Basic Parenting Programme	€1463 (cost per child, excluding training, and based on eleven families per group)	£1357.71

Appendix K: Unit cost tables applied to the sample participating in the economic evaluation of the Incredible Years Toddler Parenting Programme.

Healthcare Resource	Unit	Unit Cost	Details
GP (surgery)	Visit	36.00	Per consultation lasting 17.2 minutes (Curtis 2008)
GP (home visit)	Visit	58.00	Per consultation lasting 23.4 minutes inclusive of travel time (Curtis 2008)
Practice nurse (surgery/clinic)	Visit	11.00	Per consultation lasting 20 minutes (Curtis 2008)
Practice Nurse (home)	Visit	18.00	Per home visit including travel [4]
Health Visitor (clinic)	Visit	79.00	Per consultation lasting 1 hour (Curtis 2008)
Health visitor (home)	Visit	39.00	Per home visit INCLUDING TRAVEL (Curtis 2008)
Community Speech Therapist or Physiotherapist	Visit	34.00	Per consultation lasting 1 hour (Curtis 2008)
Community speech therapist or physiotherapist per home visit	Visit	44.00	Per consultation lasting 1 hour (Curtis 2008)

Social Care Resource	Unit	Unit Cost	Details
Social Worker	Office	37.00	Per hour of client related work
Social Worker	Home	67.00	Per hour home visit[2]
Sessional worker	Office	32.00	Per hour of client related work[2]
Sessional worker	Home	57.00	Per hour home visit[2]
Homestart	Home	17.00	Per hour (Netten & Curtis 2004)[3]
Community Paediatrician	Clinic/Hospital	208.00	Per consultation NHS reference costs TCLFASFF
Generic Multidisciplinary CAMHS team	Clinic/Hospital	84.00	Per consultation lasting 1 hour (10.7 Curtis 2008)
Fostering respite care		538.00	Per week [2]
Community Psychiatric Nurse	Per hour	27.00	Curtis 2008
Counsellor (in primary medical setting)	Per hour	31.00	Curtis 2008

[2] Costs extracted from Curtis 2007 inflated from cost year 2006/07 to 2007/08 using Hospital & Community Health Service (HCHS) inflation indices Curtis 2008, p.165
[3] Costs extracted from Edwards et al., (2007) inflated from cost year 2001/02 to 2007/08 using Hospital & Community Health Service (HCHS) inflation indices Curtis 2008, p.165
[4] Costs extracted from Edwards et al., (2007) inflated from cost year 2003/04 to 2007/08 using Hospital & Community Health Service (HCHS) inflation indices Curtis 2008, p.165

Educational Resource	Unit	Unit Cost	Details
Head of Nursery	Flying Start Nursery Manager	7.89	Per hour at a Flying Start Nursery[5]
Nursery Nurse	Flying Start Nursery	6.30	Per hour of childcare provided at a Flying Start Nursery[5]
Educational Psychologist	School	52.00	Per hour per patient related activity[2]
One-to-one classroom assistance	Flying Start Teacher	14.55	Per hour provided at a Flying Start Nursery[5]

[2] Costs extracted from Curtis 2007 inflated from cost year 2006/07 to 2007/08 using Hospital & Community Health Service (HCHS) inflation indices Curtis 2008, p.165
[5] Provided by a Flying Start Centre Cymru manager.

Secondary care/Hospital Resource costs (DH_NHS Reference costs 2007-08	Unit Cost
A&E consultation, fall	117.00
A&E consultation, broken arm	155.00
A&E consultation, heart problems	179.00
A&E consultation, high temperature	79.00
A&E consultation, varnish in eye	79.00
A&E consultation, cut eye	79.00
A&E consultation, water infection	79.00
A&E consultation, temperature and flu symptoms	79.00
A&E consultation, dislocated elbow	117.00
A&E consultation, bronchitis	79.00
A&E consultation, infected post-op scar	79.00
OP paediatric ophthalmology consultation	97.00
OP paediatric ENT consultation	87.00
OP paediatric physiotherapy consultation	50.00
OP general paediatrics consultation	173.00
OP cystic fibrosis consultation	357.00
OP paediatric cardiology consultation	157.00
In patient consultation, stomach or duodenum disorders without CC for 1 night	867.00
In patient consultation, minor throat procedures without CC for 1 night	755.00
In patient consultation, head injury without CC for 1 night	719.00
Ambulance travel, fall	196.00
Ambulance travel, heart problems	224.00
A&E consultation, fractured ankle	79.00
A&E consultation, hurt knee	79.00
A&E consultation, difficulty breathing	112.00
A&E consultation, eye problem	79.00
A&E consultation, pregnancy complications	112.00
A&E consultation, migraine	79.00
A&E consultation, jard back	79.00

Secondary care/Hospital Resource costs (DH_NHS Reference costs 2007-08	Unit Cost
OP ENT consultation	105.00
OP physiotherapy total attendance 19 years & above	45.00
OP orthopaedics non trauma follow up consultation	81.00
OP gynaecology consultation	116.00
OP obstetrics consultation	94.00
OP ophthalmology consultation	118.00
OP dermatology consultation	222.00
OP general surgery consultation	89.00
OP endoscopic intermediate general abdominal procedures 19 years & above	192.00
OP clinical oncology consultation	121.00
OP gynaecology oncology consultation	86.00
OP consultation, MHST - other Mental Health Specialist Teams	132.00
OP consultation, Medical Gastroenterology	110.50
OP consultation, Clinical Haematology	136.50
OP consultation, Minor arm procedure non-trauma, category 1 without CC	853.00
In patient clinical contact with investigation 19 years & above	634.00
In patient clinical contact with observation 19 years & above	465.00
In patient caesarean section 19 years & above	1,605.00
In patient tonsillectomy 19 years & above without CC	1,149.00
In patient dilation + extraction less than 20 weeks	911.00
In patient endoscopic large intestine procedure	1,287.00
In patient normal delivery 19 years above without CC	1,168.00

Appendix L: Unit cost tables applied to the sample for the secondary sub-sample analysis of the Incredible Years Basic Parenting Programme and parental depression.

Healthcare Resource	Unit	Unit Cost	Details
GP (surgery)	Visit	35.00	Per consultation lasting 11.7 minutes (Curtis 2009)
Practice nurse (surgery/clinic)	Visit	10.00	Per consultation (Curtis 2009)
Health Visitor (clinic)	Visit	34.00	Per consultation (Curtis 2009)

Social Care Resource	Unit	Unit Cost	Details
Social Worker	Office	39.00	Per hour of client related work (Curtis, 2009)
Community Psychiatric Nurse	Per hour	28.00	Curtis 2009
Counsellor (in primary medical setting)	Per hour	32.00	Curtis 2009

Secondary care/Hospital Resource costs (DH_NHS Reference costs 2008-09	Unit Cost
A&E consultation, car accident	112.00
A&E consultation, damaged foot	79.00
A&E consultation, dehydration	79.00
A&E consultation, broken leg	112.00
A&E consultation, spiked drink	79.00
A&E consultation, fall	79.00
A&E consultation, glass in eye	79.00
A&E consultation, adverse drug reaction	79.00
OP ENT consultation	105.00
OP orthopaedics non trauma follow up consultation	81.00
OP gynaecology consultation	116.00
OP obstetrics consultation	94.00
OP endoscopic intermediate general abdominal procedures 19 years & above	192.00
OP consultation, Medical Gastroenterology	110.50