Costs and savings of parenting interventions: results of a systematic review

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Costs and Savings of Parenting Interventions: Results of a Systematic Review

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Abbreviations

ABC	Carolina Abecedarian Project
CPC	Child Parent Centre Program
PPP	High/Scope Perry Preschool Project
QALY	Quality Adjusted Life Years
RCT	Randomised Controlled Trial

Abstract

Background: This systematic review of economic evaluations of universal preventative or targeted treatment parenting interventions that aim to enhance parent-infant interaction is primarily intended to inform decision makers who have to make difficult spending decisions, especially at a time of reduced spending allocations. A synthesis of available costs and savings about parenting interventions that set out to enhance parent-infant interaction are presented. This topic is important specifically in view of the UK Governments' emphasis on the equalities agenda and the early years. The benefits of positive early life experiences, which include good parent-infant interaction, are far reaching and may be positively correlated with improved educational, health and well-being outcomes and reduced criminality. **Methods:** A literature search was undertaken using on-line indexing databases between 2004 and 2014 that included the search terms "parent", "infant", "interaction", "cost benefit analysis" and their synonyms. **Results:** Despite existing economic studies generally focusing upon targeted short-run outcomes significant savings were observed in the included studies. Parenting interventions could save the health service around £2.5k per family over 25 years and could save the criminal justice system over £145k per person over the life course. In

light of the escalating costs of remedial services these potential savings may provide the UK and other governments with a robust incentive to invest in early years parenting interventions.

Conclusions: Parenting interventions can be economically efficient and return savings on investment. Moreover, and one might argue as a moral imperative of democratic societies, population health can be improved and health inequalities reduced. An important debate is needed about early years policy, to include acknowledgement of the differences between UK and international healthcare systems and the potential savings from the synergistic and spin-off effects of early years interventions to inform decision making to fund and implement appropriate action.

1. Introduction

The desired outcomes of early years policy interventions include improving population health, reducing health and social inequalities and supporting children and their parents to escape from an observed cycle of deprivation, anti-social behaviour and crime over the life course (Allen and Duncan Smith, 2008; The Scottish Government (SG), 2009a; Her Majesty's (HM) Government, 2010; Heckman, 2011; SG, 2011; Public Health England (PHE), 2014; Department of Health (DH), 2016; PHE 2016a). This may result in substantial societal savings. Health inequalities cannot be attributed to a single clinical or behavioural risk factor (Friedli, 2012). They are widely accepted as the result of social circumstances and reflect the underlying distribution of power and resources in the population. Consequently the fundamental causes of health inequalities are affected by the allocation of wider environmental influences. Poverty is accepted as a significant risk factor for poor health and lower life expectancy, compounding the impact of health inequalities. This is not a new policy goal; The Black Report (Department of Health and Social Security (DHSS), 1980) and The Acheson Report (DH, 1998) highlighted health inequalities.

High quality parent-infant interaction positively correlates with infants' neurological development and the associated outcomes of IQ, academic achievement and comprehension (Ranson and Urichuk, 2008; Sutton, 2014). Similarly, Barlow et al. (2010) demonstrated potential to contribute to reduced health inequalities and enable children to achieve higher standards of living as well as lower levels of criminality throughout the life course,. HM Government (2010) reported savings of around £16B from a reduction in alcohol abuse and drug related criminality. It must

be borne in mind benefits can only achieved by promoting and sustaining parental engagement (Whittaker and Cowley 2012). The effectiveness of parenting interventions to enable parents to meet their infants' needs is widely reported (Bunting, 2004; Barlow et al, 2005; Patterson et al, 2005; Bloomfield and Kendall, 2007; Niccols, 2008; Zeedyk et al, 2008; Bayer et al, 2009; Barlow et al, 2010).

All children have a right to opportunity, safety and a nurturing loving home. Sophia's story (see box 1) provides an insight into her particular environment, which illustrates the layered nature of risk factors that can result in poor outcomes for children. To ensure all children have a voice, Sophia's story emphasises the need for decision makers to deliver evidence based early years universal and targeted parenting interventions to ensure all children are given the best possible start.

Box 1 Sophia's Story

Sophia was a 12 months old baby girl who had lived in an economically deprived area with her parents, both with long histories of substance misuse and long term physical and mental health conditions. Three elder siblings, who had a history of criminality and substance misuse and the eldest daughter was a teen parent. Violence and aggression were normalised by the parents to ensure that Sophia was "prepared for their environment". Interaction in mainstream society was limited. The health visitor had serious concerns regarding Sophia's safety and age and stage development. Historically her elder siblings on several occasions had been removed from the household and placed in care. When the social worker and health visitor had carried out a visit together, the parents displayed threatening and aggressive behaviour towards them.

To support families to overcome the impact of intergenerational social inequalities, access to universal and targeted parenting interventions can be important to improve health (Department for Education (DE), 2011; PHE, 2016a). With twenty percent of parents in the UK known to have taken part in parenting groups (Zeedyk et al, 2008), Bunting (2004) projected increasing demand although Zeedyk et al. (2008) opined that groups do not work for everyone. There is a role for health visitors to assess and reach the most vulnerable and excluded hard to reach families (The Scottish Government (SG), 2009b). They are one of the universal and targeted service providers for preschool children and their assessment of families' needs forms an important part of preventative work that can highlight children at risk. This assessment may make the difference between a situation escalating to safeguarding or a family receiving timely support (Keys, 2007).

To inform decisions, high quality analysis of the economic efficiency of interventions is vital (The National Institute for Health and Clinical Excellence (NICE), 2006; Centre for Reviews and Dissemination (CRD), 2009; Heckman, 2011; (The Chartered Institute of Public Finance and Accountability (CIPFA), 2015). Decision-makers can utilise the evaluative concept of 'economic efficiency' to maximise societal benefit by directing resources to the best intervention (Mays et al, 2005; Dukhovny and Zupancic, 2011). It would not be ethical, nor in alignment with human rights and social justice, to apply a simple costs and savings based economic model without encapsulating, as DH (2009) suggest, the complex relationship between spending and outcomes. As Barlow et al. (2010) found that intervention cost data were limited, this paper describes a systematic review that examined economic efficiency of parenting interventions.

1.1 Aims of the systematic review

Unifying available academic evidence to inform future decision making by:

- Synthesising current economic efficiency evidence to identify the existing knowledge base
- Identifying which economic efficiency variables are affected by parenting interventions
- Reporting the potential societal savings from investment in parenting interventions
- Providing research methods evidence to inform a future economic efficiency study of parenting interventions aiming to improve parent-infant interaction.

1.2. Review questions

1) What are the costs of delivering parenting interventions which target vulnerable families in comparison to universal health visitor service provision?

2) What are the savings of delivering parenting interventions which target vulnerable families in comparison to universal health visitor service provision?

2. Material and methods

Methods were predefined in a written protocol. See table 1 for includion and exclusion criteria.

2.1. Search methods for identification of studies

The search strategy was designed to capture health economic data. Electronic databases and the grey literature were then searched.

2.1.1. Electronic searches

Traditional databases and those that focus on economic studies interrogated. CINAHL, Medline and Embase were queried using the full search strategy from 2004 to August 2014. Specific searches were constructed using medical subject headings (MeSH). The Centre for Reviews and Dissemination's NHS Economic Evaluation Database (NHS EED) was accessed online; this database included summaries of all Cochrane systematic reviews and protocols (CRD, 2014). The NHS EDD search was limited to 'assessed economic evaluations'.

2.1.2. Searching other resources

The grey literature searched included academic liaison and conferences, and hand searching was conducted of specialist health economics journals. Reference lists of included studies were reviewed to ensure that all available studies were identified. Academics and public health professionals were consulted.

2.2. Selection of studies

Titles and abstracts were screened and studies excluded where exclusion criteria were clear. Full texts were then retrieved and assessed in the same way, finally included studies were analysed.

2.3. Data extraction and management

Data were extracted and tabulated from included studies (see table 2). .

2.4. Assessment of quality in included studies

The economic study assessment protocols developed by Drummond and Jefferson (1996) and The Cochrane Collaboration (2011) were adapted and used to conduct the quality assessment of included studies (see table 3).

2.5. Measures of effect

To enable meaningful comparisons, the available costs and savings data were converted into 2013 pounds Sterling rates.

2.6. Dealing with missing data / currency conversions

Currency calculations were carried out using available web resources (Bank of England (2015) Inflation Calculator, Euros were converted using the Online Calculator for German and Family Law (2015), US dollars were converted using the US Inflation Calculator (2015) currencies were converted using The Royal Bank of Scotland (2015) Currency Converter).

3. Results

Fig. 1 outlines the process of screening and selection studies for inclusion. The search retrieved 21,101 publications. Following appraisal of all titles, and abstracts and full-text versions as needed, ten studies were identified that had sufficient evidence to inform economic analyses and were included. It should be noted that Barlow et al. (2007) and McIntosh et al. (2009) were based on one study and Atherton (2007) and Edwards et al. (2007) were based on another study.

Insert Figure 1 here

3.1. Study characteristics

Variation between extracted data precluded the possibility of meta-analysis (see table 2). The ten studies included were from a heterogeneous range of study types including: seven RCTs (Muntz et al, 2004; Atherton, 2007; Barlow et al, 2007; Edwards et al, 2007; M^{c}Intosh et al, 2009; Charles et al, 2013; M^{c}Gilloway et al, 2013; O'Neill et al, 2013;

Simkiss, 2013); two long term economic analyses (Reynolds and Temple, 2008; Reynolds et al, 2011); and one review to develop an economic model in order to identify long term savings (Bonin et al, 2011). Five of the seven RCTs contained a cost-effectiveness evaluation (Muntz et al, 2004; Atherton, 2007; Barlow et al, 2007; Edwards et al, 2007; McIntosh et al, 2009; O'Neill et al, 2013; Simkiss, 2013). Of the two remaining RCTs, one (Charles et al, 2013) reported the cost of the intervention and the other (McGilloway et al, 2013) reported the cost of service use.

3.1.1. Population

The age range of children participating in all of the ten studies included in this systematic review ranged from birth to ten years. The studies took place predominantly in deprived areas of Wales (4 studies) (Muntz et al, 2004; Atherton, 2007; Edwards et al, 2007; Charles et al, 2013; Simkiss, 2013). Two were conducted in England (Barlow et al, 2007; McIntosh et al, 2009; Bonin et al, 2011) and two each in Ireland (McGilloway et al, 2013; O'Neill et al, 2013) and the USA (Reynolds and Temple, 2008; Reynolds et al, 2011).

3.1.2. Intervention type, delivery and follow-up

Nine of the ten studies reported on targeted parenting interventions whilst the study by Simkiss et al. (2013) reported on universal service provision. Delivery time varied from 10 weeks to 18 months.

3.2. Quality appraisal

The studies by Barlow et al. (2007), McIntosh et al. (2009) and Simkiss et al. (2013) were robust (table 3).

3.3 Costs of investment in parenting interventions

Costs are summarised in tables 4 to 5. Four of the studies reported total costs per support service. The most expensive targeted support service, based on a study sample size of 149

participants, cost around of £1,200 per participant (11 participants in a group) and had a total intervention cost of around £115,000 was reported by O'Neill et al. (2013). The least expensive targeted intervention, based on a study sample size of 89 participants cost around £770 per participant (8 participants in a group) and had a total intervention cost of approximately £11,000 was reported by Charles et al. (2013). The total cost of the only included universal intervention reported by Simkiss et al. (2013) was just over £6,000, based on 58 courses being run at a cost of around £760 per participant. This was the least expensive intervention amongst all the studies reviewed. A further two studies used universal service provision costs per participant as a comparator therefore the difference in costs between universal and targeted interventions were available (range from around £290 to £3,900 for universal to £1,400 – 9,500 for targeted interventions).

3.4 Savings from investment in parenting interventions

The savings are summarised in tables 6 to 7. These were examined to identify the health service, special education, the only type of educational saving reported, criminal justice system and social savings. Savings were sub-divided into universal and targeted interventions. One study, Simkiss et al. (2013) reported universal health service savings of almost £41,000 for an adult QALY over five years and over £2,000 over ten years. Potential savings resulting from the targeted interventions were considered by three of the UK / Ireland based studies (Bonin et al, 2011; McGilloway et al, 2013; O'Neill et al, 2013) and the two USA based studies (Reynolds and Temple 2008; Reynolds et al. 2011). The potential savings from special education ranged from around £30 at 12 months follow up to around £3,500 over one year. Criminal justice savings were reported in 3 studies, ranging from around £16,000 over a 5 year period to £145,000 over a lifetime for those with the highest tariff conduct disorder (Bonin et al, 2011; Reynolds et al, 2011; O'Neill et al, 2013). Social

savings ranging from around £1.60 per person at 12 months follow up to £92,000 total net benefit over a lifetime for the PPP intervention.

4. Discussion

The economic impact of parenting interventions reaches well beyond the health service, to include education, criminal justice and society (Allen and Duncan Smith, 2008; Frick, 2009; New Economics Foundation, 2009; Heckman, 2011; Washington State Institute for Public Policy, 2014). The Marmot Team (2010) report parenting interventions can affect public health indicators and budgets in many different ways, including criminality, antisocial behaviour, unemployment, tax receipts, special educational support, welfare payments, child protection services, under achievement at school, mental health difficulties, marriage breakdown, alcohol and substance abuse and self-harm. Referring back to Sophia's experience in the case example, these indicators, when present, are widely accepted as being indicative of a poor environment for child development. Poor beginnings equate to poor outcomes in terms of health, educational attainment and likelihood to perpetuate into cycles of criminality and generational deprivation, which in turn result in costs to the economy.

4.1. Costs and savings of parenting interventions

In this review data were analysed from included studies to understand the economic efficiency of parenting interventions. Weaknesses in study design and inconsistent reporting hampered our analyses. Further, we found that only one study had "nurturing the parent infant-interaction" as the primary aim (Barlow et al, 2007; M^{c}Intosh et al, 2009). The primary aim of seven of the included studies was to prevent or treat conduct disorder in children (Muntz et al, 2004; Atherton, 2007; Edwards et al, 2007; Bonin et al, 2011; Charles et al, 2013; M^{c}Gilloway et al, 2013; O'Neill et al, 2013; Simkiss et al, 2013). Two studies had school readiness as the overarching aim (Reynolds, and Temple 2008; Reynolds et al,

2011). This perhaps reflects the greater focus, and mirroring of practice, that researchers and service providers placed on lifestyle modification and promoting corrective behaviour as opposed to a universal preventative / upstream approach that could promote long term population health. However, we can surmise that although not explicitly cited, all programmes could potentially improve parent-infant interaction as they involved nurturing parents to become more responsive and authoritative parents.

Despite the difficulty of being able to link outcomes to parenting interventions, this review has identified the potential for significant savings over the long term particularly for criminal justice and social budgets. As a result of spending approximately £1,200 to deliver the group based Incredible Years intervention, O'Neill et al. (2013) identified significant savings of over £145,000 for the criminal justice system for those individuals with the highest tariff conduct disorder over their lifetime as well as savings of around £5,000 per person from social welfare payments by the time a person was thirty years old. A group based family support intervention identified that around £28,000 can be saved by diverting an adult from a criminal career at a cost of around £5,500 per participant (Reynolds et al, 2011). This intervention can also save an estimated £3,500 on special education costs per year and accrue an economic return to society of around £60,000. Further projected criminal justice system savings of £15,500 over a 25 year period per family and £19,000 to society over the same period at a cost of £1,000 per person for an intensive group intervention to prevent conduct disorder (Bonin et al, 2011). Some of the economic analyses for longer term benefits included estimates of psychological distress suffered by those upon which criminal activities were perpetrated. It is extremely difficult to measure psychological distress, and estimates that include this cost may inflate cost savings. Participation on the Chicago Child-Parent intervention resulted in a total net benefit over the life course of around £92,500 at a cost of approximately £3,000 per participant (Reynolds, and Temple, 2008). The only included

group universal service intervention, costing around £760 per person, reportedly saved approximately £41,000 (QALY gained over 5 years) (Simkiss et al, 2013).

Home based (one to one) and group based delivery methods were found to affect costs and savings. Data from the included studies enabled some analyses of the costs and savings of home based versus group based interventions. An intensive home based intervention cost around £9,500 per person delivered over an 18 month period (Barlow et al, 2007; M^{c}Intosh et al, 2009) versus a group-based cost of around £1,200 per person delivered over 12-14 weeks (O'Neill et al, 2013). Despite the group based intervention costing less to deliver than the home based intervention, the savings data were not available and thus it is not possible to draw conclusions about the long term economic efficiency of home based versus group based interventions. What is known is that in order to achieve successful group programme delivery, additional activities external to the group are required to ensure attendance and engagement with the material (Whittaker and Cowley 2012). Barlow et al. (2008) recommended that many parenting interventions can be provided as a part of preventative universal service provision with minimal cost when group/community based methods were used together with careful targeting of intensive home based parenting interventions.

4.2. Implications for decision-makers

Investment in early years parenting interventions that aim to promote parent-infant interaction can improve population health, reduce inequalities in health and save money. However, a dearth of economic evidence, for example, the time lag between investments, the realisation of benefits (Frick, 2009), and the results of which programmes work most effectively and efficiently can preclude early years spending resulting in funding being cut in favour of short term priorities. An economic perspective is therefore a fundamental

requirement for decision-makers to consider and compare the interventions presented and determine best use of scarce resources. Various commentators including Allen and Duncan Smith (2008), Heckman (2011) and PHE (2016b) reinforced the importance of economic literacy upon which to base healthcare spending decisions. Decision-makers therefore require comprehensive evidence of both the clinical effectiveness and the economic efficiency of the intervention to justify their decision making.

In economic terms parenting interventions represent an upstream investment in human capital. This refers to the personal, cognitive and vocational skills that people acquire throughout their lives that enables productivity in the workplace (Kilburn and Karoly, 2008; Reynolds and Temple, 2008; DE, 2010; The Marmot Team, 2010; Reynolds et al, 2011). It has been suggested previously that investment in the US targeted home visiting support service, The Nurse Family Partnership (known as Family Nurse Partnership (FNP) in the UK), developed to redress the poor birth outcomes amongst first time teen parents and their infants has the potential to generate much higher returns on investment than investment in human capital at later stages, give better value for money, provide bigger overall benefits and reduces health inequalities (Olds et al, 2011). In America, these returns were observed in two main areas 1) higher lifetime earnings for adults who participated in the intervention as children and 2) lower rates of problematic behaviour, particularly teenage pregnancy and criminality in adolescence and adulthood. Evidence from the US studies included in this review also found that rates of return on investment in parenting interventions accrued over the long term. It seems that improved parent and child health will reap some short-term economic benefits, for example, from lower use of health services, but most economic returns can take up to thirty years to accrue. This was corroborated by studies carried out by Washington State Institute for Public Policy (2014) and Heckman (2011). Differences between health care systems make it difficult to generalise across countries, which is why it is

important to understand the costs and savings of parenting interventions within the UK. The publicly funded UK healthcare system, unlike the largely privately funded US system (OECD, 2016), aims to be an upstream preventative healthcare system, with a primary care and public health care system accessible to all. Preliminary results would suggest that FNP in the UK, due to the aforementioned differences, has not delivered expected short-term improvements in health outcomes when compared with current services (Robling et al, 2016).

One of the greatest health and social care challenges is the rising health and social inequalities and high mortality rates (The Marmot Team, 2010; NHS, 2014; CIPFA 2015). The provision of high quality universal services is recommended, in particular for the most economically and socially deprived people and vulnerable families, such as, young parents and those living in poverty (DE, 2011, Beeston et al, 2013; Parkes et al, 2014; PHE, 2014). Parkes et al, (2014) stated that interventions aimed specifically to improve parent-infant interaction were recommended and this review supports this view. Interventions that focus on educating participants can be correlated with more positive health outcomes, income, employment and educational attainment and can result in savings. They are also based on the premise that action to tackle health inequalities can include targeted parenting interventions that can mitigate risk factors and address the fundamental problems (Beeston et al, 2013).

4.3. Implications for future research

Cost benefit analysis can be proposed as a robust economic tool by which to ascertain and deliver information to decision makers (CRD, 2009; Frick, 2009; Dukhovny and Zupancic, 2011; Beeston et al, 2013; Charles et al, 2013), however the limited data available precluded economic modelling in the form of a cost benefit analysis. Developing our ability to model the economic impact of parenting interventions, including the spin off effects, could fill the demonstrated gap in existing public health research (SG, 2007; Allen and Duncan Smith, 2008; Zeedyk et al, 2008; New Economics Foundation, 2009; Heckman, 2011). Until

substantive UK economic efficiency data become available, the significance of the contribution of the early years workforce and improved parent-infant interaction to the economy cannot be measured adequately; therefore, investment in the early years may continue to be at risk. Worryingly Robling et al. (2016) found no additional improvements in short term outcomes, suggesting investment in targeted interventions such as FNP be discontinued. Despite the well documented avoidable increases in related remedial costs, for example, the cost of social problems is thought to be in the region of £161.3 billion per annum, this could reach £4 trillion by 2030 (New Economics Foundation, 2009). Results expected from The Social Research Unit (2013) calculating the costs and benefits of investment opportunities could add to the evidence base for intervention effectiveness and economic efficiency and safeguard investment in early years interventions.

Renfrew et al. (2012) highlighted that the quality of economic analyses can be improved through access to comprehensive longitudinal data and to data that can be used to identify spurious relationships between the variables which may cause estimation errors (confounders). Enhanced methods of data collection are required to inform our understanding of the economic outcomes of parenting interventions (Frick, 2009). These outcomes could then be modelled and values calculated. The results of this review concord with two other related studies of note, the Family Nurse Partnership (Olds et al, 2011) and the Sure Start Evaluation (DE, 2010) indicating that specifically over the long term economic savings accrue, which is where there is a significant dearth of information in the UK that needs addressed. As parenting interventions aim to address long-term health outcomes, study follow-up periods need to reflect this aim (Robling et al, (2016).

5. Conclusion

Early years policy has far reaching implications and is morally important in a democratic society. It is important for decision-makers to note that reducing inequalities can be achieved as a by-product of parenting interventions. Increasing support for parents to improve the quality of their parent-infant interaction can result in significant economic savings over the life course of an individual and on to future generations, although the format and content of these programmes needs further research. From the studies reviewed here, the range of suggested health and related service savings were from £200 per person over the short term to over £2.5K per family over the long term and over £145K per person over the life course for the criminal justice system,.. Arguably saving money is not the end goal, saving money and 'doing the right thing' to achieve improvements in health, wellbeing and life chances should be the broader intention with both aspects reflected in future studies.

6. Recommendations

To make the case to extend the provision of collaborative early years parenting interventions that aim to enhance parent-infant interaction, there is a need for an informed society to widely debate Early Years Policy, specifically the synergistic and spin-off effects that impact upon population health, including reducing health and social inequalities. It is also recommended that well-designed studies are undertaken to enable comprehensive and ongoing cost benefit analyses of existing parenting interventions, including the ripple effect, to provide decision-makers with robust evidence to facilitate strategic investment. Studies could be embedded into current parent-infant interventions and all future interventions should only be commissioned with an embedded impact assessment and cost benefit analyses data collection tool. Decision-makers are encouraged to consider UK evidenced based parenting interventions due to the compatibility issues of transferring the results of oversees studies.

The results of this review may strengthen decision-makers proposals to secure higher levels of strategic early years funding for this important public health intervention.

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Key Messages

- Substantial societal savings may accrue by supporting families to break the cycle of deprivation and reduce inequalities in health, anti-social behaviour and criminality
- Current evidence suggests that with investment in parenting interventions, the health service could save around £2.5k per family over 25 years whilst the criminal justice system could save over £145k per person over the life course
- Further research is needed of UK evidenced based parenting interventions which should then be commissioned with an embedded impact assessment and cost benefit analyses data collection tool
- An important debate is needed about early years policy, to include acknowledgement of the differences between UK and international healthcare systems, the lessons learned from studies to date and the synergistic and spin-off effects of parenting interventions.

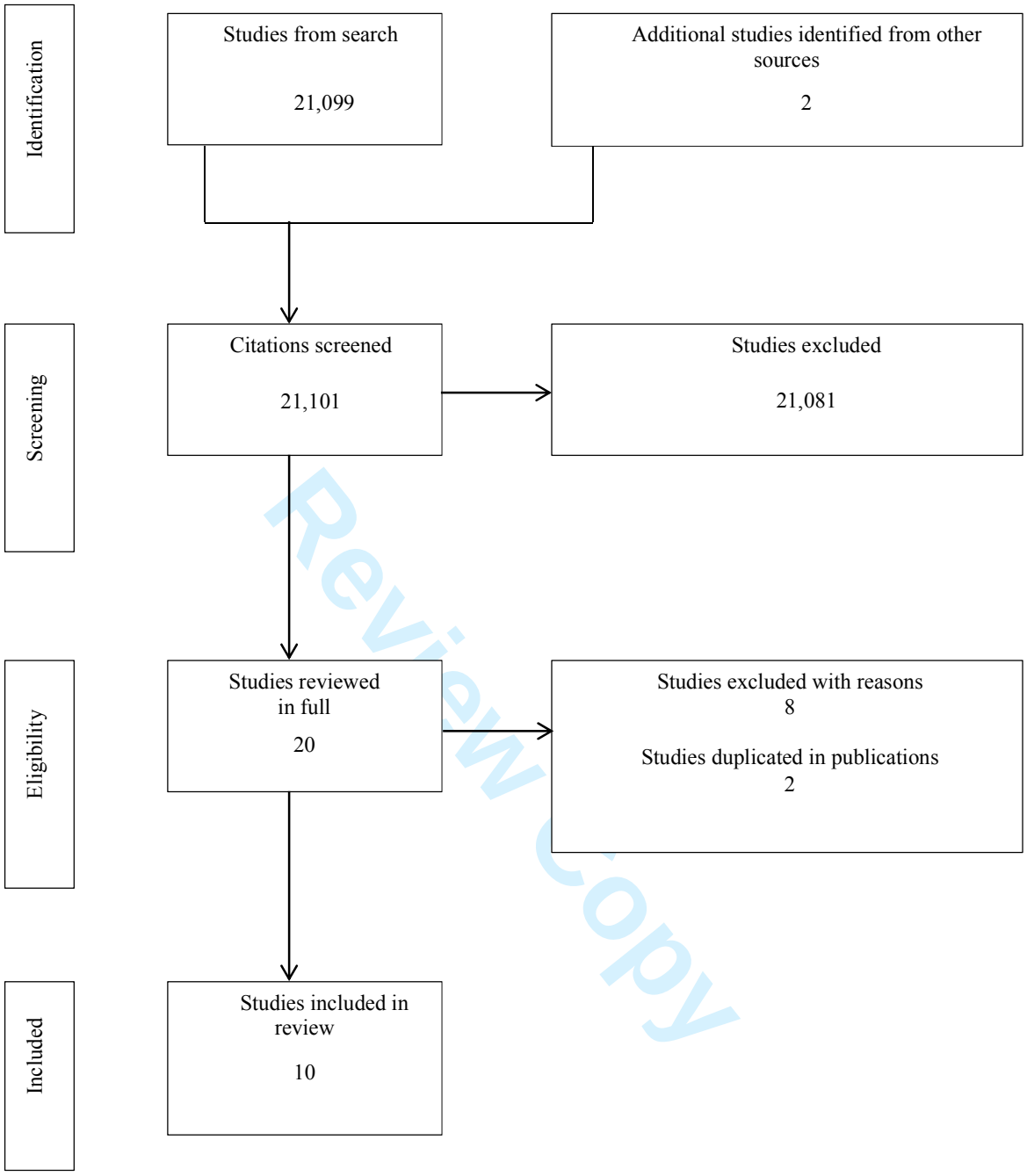
Identification
Studies from search
21,099
Additional studies identified from other sources
2
Screening
Citations screened
21,101
Studies excluded
21,081
Eligibility
Studies reviewed in full
20
Studies excluded with reasons
8
Studies duplicated in publications
2
Included
Studies included in review
10

Figure 1 PRISMA flow diagram

References

Allen, G. & Duncan Smith, I. (2008) Early intervention: good parents great kids, better citizens. Centre for Social Justice and Smith Institute: London.

Atherton, C. (2007) The Incredibles. *Community Care*, **1673,** 32-33

Bank of England. (2015) Inflation calculator. Bank of England. http://www.bankofengland.co.uk/education/Pages/resources/inflationtools/calculator/flash/default.aspx. Last accessed 27 June 2016

Barlow, J., Davis, H., McIntosh, E., Jarrett, P., Mockford, C. & Stewart-Brown, S. (2007) Role of home visiting in improving parenting and health in families at risk of abuse and neglect: results of a multicentre randomised controlled trial and economic evaluation. *Archives of Disease in Childhood*, **92,** 229-233. http://doi.org/10.1136/adc.2006.095117

Barlow, J., Parsons, J. & Stewart-Brown, S. (2005) Preventing emotional and behavioural problems: the effectiveness of parenting programmes with children less than 3 years. *Child: Care Health and Development*. **31,** 33-42. http://doi.org/10.1111/j.1365-2214.2005.00447.x

Barlow, J., Schrader McMillan, A., Kirkpatrick, S., Ghate, D., Smith Thomas Coram, M. & Barnes, J. (2008) Health-led parenting intervention in pregnancy and early years. University of Warwick: England.

Barlow, J., Smailagic, N., Ferriter, M., Bennett, C. & Jones, H. (2010) Group-based

parent training programmes for improving emotional and behavioural adjustment in children from birth to three years old. *Cochrane Database of Systematic Reviews*, **3.** http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003680.pub2/abstract

Bayer, J., Hiscock, H., Scalzo, K., Mathers, M., McDonald, M., Morris, A., Birdseye, J. & Wake, M. (2009) Systematic review of preventative interventions for children's mental health: what would work in Australian contexts? *Australian and New Zealand Journal of Psychiatry*, **43,** 695-710. http://doi.org/10.1080/00048670903001893

Beeston, C., McCartney, G., Ford, J., Wimbush, E., Beck, S. & MacDonald, W. (2013) Health inequalities policy review for the Scottish ministerial task force on health inequalities. NHS Health Scotland: Edinburgh.

Bloomfield, L. & Kendall, S. (2007) Testing a parenting programme evaluation tool as a pre- and post-course measure of parenting self-efficacy. *Journal of Advanced Nursing*, **60**, 487-493. http://doi.org/10.1111/j.1365-2648.2007.04420.x

Bonin, E. M., Stevens, M., Beecham, J., Byford, S. & Parsonage, M. (2011) Costs and longer-term savings of parenting programmes for the prevention of persistent conduct disorder: a modelling study. *BMC Public Health*, **11**, 803-8012. http://doi.org/10.1186/1471-2458-11-803

Bunting, L. (2004) Parenting programmes: the best available evidence. *Child Care in Practice*, **10**, 327-343. http://doi.org/10.1080/1357527042000285510

Centre for Reviews and Dissemination. (2014) Welcome to the CRD database. University of York Centre for Reviews and Dissemination. http://www.crd.york.ac.uk/CRDWeb/HomePage.asp. Last accessed 27 June 2016

Centre for Reviews and Dissemination. (2009) Systematic reviews CRD's guidance for

undertaking reviews in health care. University of York: Centre for Reviews and Dissemination.

Charles, J. M., Edwards, R. T., Bywater, T. & Hutchings, J. (2013) Micro-costing in public health economics: steps towards a standardized framework, using the incredible years toddler parenting program as a worked example. *Prevention Science*, **14**, 377-389. http://doi.org/10.1007/s11121-012-0302-5

Department for Education. (2011) Supporting families in the foundation years. Department for Education: London.

Department for Education. (2010) National evaluation of sure start local programmes: an economic perspective. Department for Education: London.

Department of Health. (2009) Healthy lives, brighter futures the strategy for children and young peoples' health. http://webarchive.nationalarchives.gov.uk/20130401151715/http://www.education.gov.uk/publications/eOrderingDownload/285374a.pdf. Last accessed 26 January 2017

Department of Health. (2016) Shared Delivery Plan: 2015 to 2020. https://www.gov.uk/government/publications/department-of-health-shared-delivery-plan-2015-to-2020/shared-delivery-plan-2015-to-2020. Last accessed 10 August 2016

Department of Health. (1998) Independent inquiry into inequalities in health report. London: The Department of Health.

Department of Health and Social Security. (1980) The Black report inequalities in health: Report of a research working group. London: The Department of Health and Social Security.

Dukhovny, D. & Zupancic, J.A.F. (2011) Economic evaluation with clinical trials in

neonatology. NeoReviews, **12**, e69-e75. http://doi.org/10.1542/neo.12-2-e69

Edwards RT, Ceilleachair A, Bywater T, Hughes D A, Hutchings J. (2007) Parenting programme for parents of children at risk of developing conduct disorder: cost effectiveness analysis. British Medical Journal **334**, 682-687. http://doi.org/10.1136/bmj.39126.699421.55

Frick KD. (2009) Overcoming challenges for the economic evaluation of investments in children's health. Academic Pediatrics **9,** 136-137. http://dx.doi.org/10.1016/j.acap.2009.02.001

Friedli L. (2012) 'What we've tried, hasn't worked: the politics of assets based public health. Critical Public Health **23,** 131-145. http://dx.doi.org/10.1080/09581596.2012.748882

Heckman JJ. (2011) The economics of inequality: the value of early childhood education. American Educator **35**, 31-35, 47.

Her Majesty's Government. (2010) Healthy lives, healthy people: Our strategy for public health in England. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216096/dh_127424.pdf. Last accessed 26 January 2017

Keys, M. (2007) The role of nurses and midwives in child protection. A report to the Scottish Executive. Edinburgh: Scottish Executive Health Department.

Kilburn RM, Karoly LA. (2008) What does economics tell us about early childhood policy? USA: RAND.

Mays N, Pope C, Popay J. (2005) Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. Journal of

Health Services Research and Policy **10**, 6-20. http://doi.org/10.1258/1355819054308576

M^cGilloway S, NiMhaille G, Bywater T, Leckey Y, Kelly P, Furlong M, Comiskey C, O'Neill D, Donnelly M. (2013) Reducing child conduct disordered behaviour and improving parent mental health in disadvantaged families: a 12-month follow-up and cost analysis of a parenting intervention. European Child and Adolescent Psychiatry, **23**, 783-794. http://doi.org/10.1007/s00787-013-0499-2

M^cIntosh E, Barlow J, Davis H, Stewart-Brown S. (2009) Economic evaluation of an intensive home visiting programme for vulnerable families: a cost-effectiveness analysis of a public health intervention. Journal of Public Health **31**, 423-433. http://doi.org/10.1093/pubmed/fdp047

Muntz R, Hutchings J, Edwards RT, Hounsome B, O'Ce´illeachair A. (2004) Economic evaluation of treatments for children with severe behavioural problems. The Journal of Mental Health Policy and Economics. **7**, 177-189.

NHS England. (2014) Five year forward view. https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf. last accessed 4 August 2016

National Institute for Health and Clinical Excellence. (2006) Parent-training / education programmes in the management of children with conduct disorders. London: NICE.

New Economics Foundation. (2009) Backing the future, why investing is children is good for us all. London: New Economics Foundation.

Niccols A. (2008) 'Right from the start': randomized trial comparing an attachment group intervention to supportive home visiting. Journal of Child Psychology and Psychiatry. **49**, 754-764. http://doi.org/10.1111/j.1469-7610.2008.01888.x

OECD. (2016) Health spending. https://data.oecd.org/healthres/health-spending.htm. Last accessed 10 August 2016

O'Neill D, McGilloway S, Donnelly M, Bywater T, Kelly P. (2013) A cost-effectiveness analysis of the incredible years parenting programme in reducing childhood health inequalities. European Journal of Health Economics **14**, 85-94. http://doi.org/10.1007/s10198-011-0342-y

Olds D, Miller TR, Knudtson M, Luckey D, Bondy J, Stevenson A, Holmberg J., Hanks C, Kitzman H, Anson E, Arcoleo K. (2011) Impact of the nurse-family partnership on neighbourhood context, government expenditures and children's school functioning. USA: U.S. Department of Justice.

Online Calculator for German Family Law. (2015) Inflation rate calculator consumer price index (cpi) and price rise. Inflation rate. http://www.lawyerdb.de/Inflationrate.aspx. Last accessed 31 July 2016

Parkes A, Sweeting H, Wight D. (2014) Growing up in Scotland: family and school influences on children's social and emotional well-being. Edinburgh: The Scottish Government.

Patterson J, Mockford C, Stewart-Brown S. (2005) Parent's perceptions of the value of the Webster-Stratton parenting programme: a qualitative study of a general practice based initiative. Child: Care Health and Development. **31**, 53-64. http://doi.org/10.1111/j.1365-2214.2005.00479.x

Public Health England. (2016a) Health Matters: giving every child the best start in life. Available from https://www.gov.uk/government/publications/health-matters-giving-every-child-the-best-start-in-life/health-matters-giving-every-child-the-best-start-in-life.

Last accessed 23 August 2016

Public Health England. (2016b) Strategic plan for the next four years: Better outcomes by 2020. London: Public Health England.

Public Health England. (2014) From evidence into action: opportunities to protect and improve the nation's health. Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/366852/PHE_Priorities.pdf Last accessed 23 August 2016

Ranson KE, Urichuk LJ. (2008) The effect of parent-child attachment relationships on child biopsychosocial outcomes: a review. Early Childhood Development and Care **178**, 129-152.

Renfrew MJ, Pokhrel S, Quigley M, McCormick F. (2012) Preventing disease and saving resources: the potential contribution of increasing breastfeeding rates in the UK. UK: UNICEF.

Reynolds AJ, Temple JA, White BAB, Ou SR, Roberston DL. (2011) Age 26 cost-benefit analysis of the child-parent center early education program. Child Development **82**, 379-404. http://doi.org/10.1111/j.1467-8624.2010.01563.x

Reynolds AJ, Temple JA. (2008) Cost-effective early childhood development programs from preschool to third grade. Annual Review of Clinical Psychology **4**, 109-139. http://doi.org/10.1146/annurev.clinpsy.3.022806.091411

Robling M, Bekkers MJ, Bell K, Butler CC, Cannings-John R, Channon S, Corbacho Martin B, Gregory JW, Hood K, Kemp A, Kenkre J, Montgomery AA, Moody G, Owen-Jones E, Pickett K, Richardson G, Roberts ZES, Ronaldson S, Sanders J, Stamuli E, Torgerson D. (2016) Effectiveness of a nurse-led intensive home-visitation

programme for first-time teenage mothers (Building Blocks): a pragmatic randomised controlled trial. The Lancet **387**, 146-155. http://dx.doi.org/10.1016/S0140-6736(15)00392-X

Simkiss DE, Snooks HA, Stallard N, Kimai PK, Sewell B, Fitzsimmons D, Anthony R, Winstanley S, Wilson L, Phillips CJ, Stewart-Brown S. (2013) Effectiveness and cost-effectiveness of a universal parenting skills programme in deprived communities: multicentre randomised controlled trial. BMJ Open **3**, 1-13.

Sutton C. (2014) Crime is falling: how community practitioners can contribute to reducing crime and antisocial behaviour. Community Practitioner **87**, 26-29.

The Chartered Institute of Public Finance and Accountancy. (2015) Prevention better than cure? Public health and the public pound multiplier. London: The Chartered Institute of Public Finance and Accountancy.

The Cochrane Collaboration. (2011) Cochrane handbook for systematic reviews of interventions. The Cochrane Collaboration. http://handbook.cochrane.org. Last accessed 31 July 2016

The Marmot Team. (2010) Fair society, healthy lives: Strategic review of health inequalities in England post-2010. London Institute for Health Equity University College London. https://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review. Last accessed 31 July 2016

The Royal Bank of Scotland. (2015) Currency Converter. The Royal Bank of Scotland. http://personal.rbs.co.uk/personal/travel-international/travel-money/currency-converter.html. Last accessed 31 July 2016

The Scottish Government. (2012) Family nurse partnership programme (FNP).

Edinburgh: The Scottish Government.

The Scottish Government (2011) A pathway of care for vulnerable families (0-3). Edinburgh: The Scottish Government.

The Scottish Government (2009a) Getting it right for every child: changing professional practice and culture to get it right for every child. Edinburgh: The Scottish Government.

The Scottish Government (2009b) An evaluation of the development and early implementation phases of getting it right for every child in Highland 2006-2009. Edinburgh: The Scottish Government.

The Scottish Government. (2007) Health in Scotland 2006 – annual report of the chief medical officer. Edinburgh: The Scottish Government.

The Social Research Unit. (2013) Investing in children: technical report. The Social Research Unit. http://investinginchildren.eu/sites/default/files/Investing%20in%20Children%20-%20Technical%20Report%20%28September%202013%29.pdf. Last accessed 31July 2016

US Inflation Calculator. (2015) US inflation home. US Inflation Calculator. http://www.usinflationcalculator.com. Last accessed. 31 July 2016

Washington State Institute for Public Policy. (2014) Child welfare benefit-cost results. Washington State Institute for Public Policy. http://www.wsipp.wa.gov/BenefitCost/ProgramsByTopicPdf/3/Wsipp_BenefitCost_ProgramDetails_Child-Welfare. Last accessed 31 July 2016

Whittaker KA, Cowley S. (2012), An effective programme is not enough: a review of factors associated with poor attendance and engagement with parenting support programmes. Children and Society, 26 138–149. http://doi.org/10.1111/j.1099-0860.2010.00333.x

Zeedyk MA, Werritty I, Riach C. (2008) One year on: perceptions of the lasting benefits of involvement in a parenting support programme. Children and Society **22**, 99-111. http://doi.org/10.1111/j.1099-0860.2007.00080.x

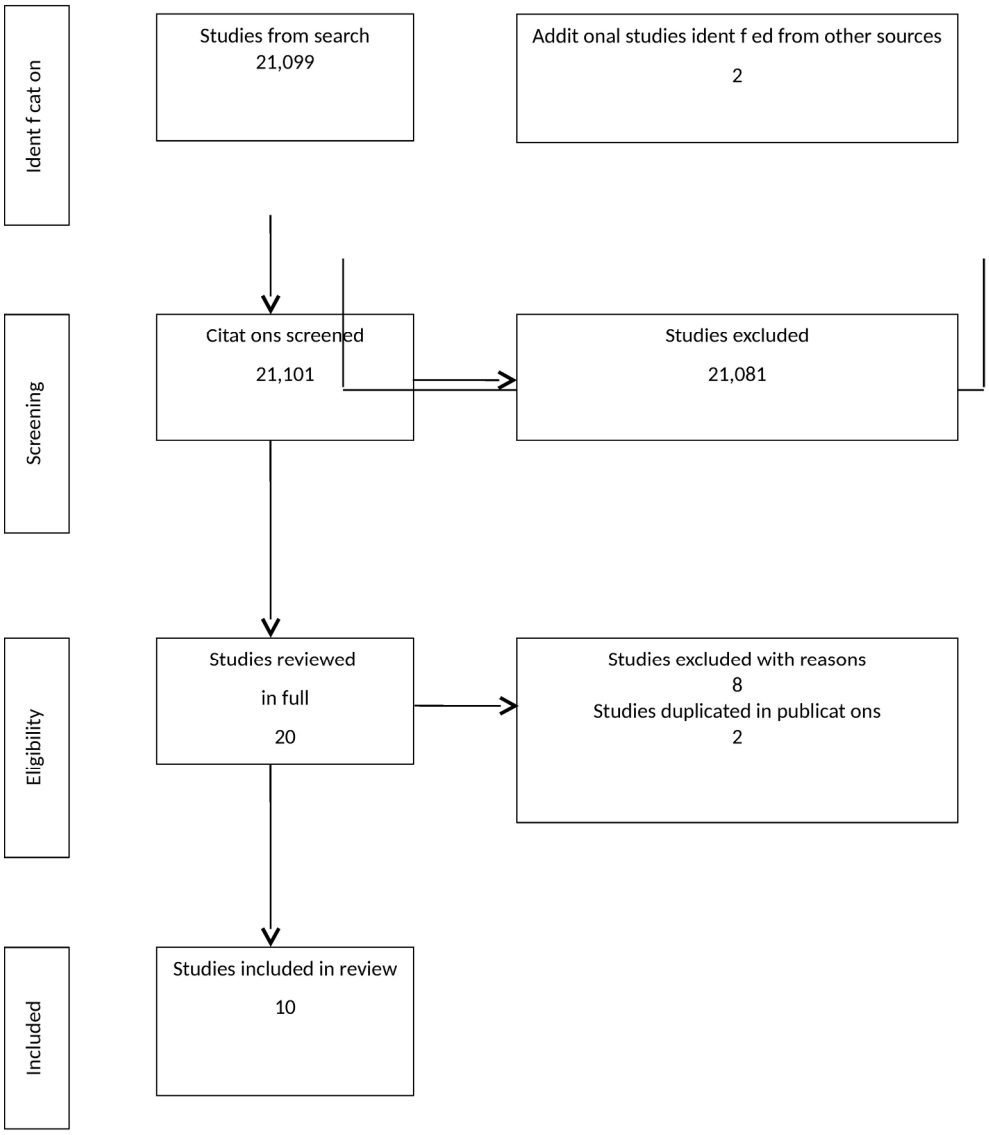

Figure 1 PRISMA flow diagram

PRISMA flow diagram

199x244mm (300 x 300 DPI)

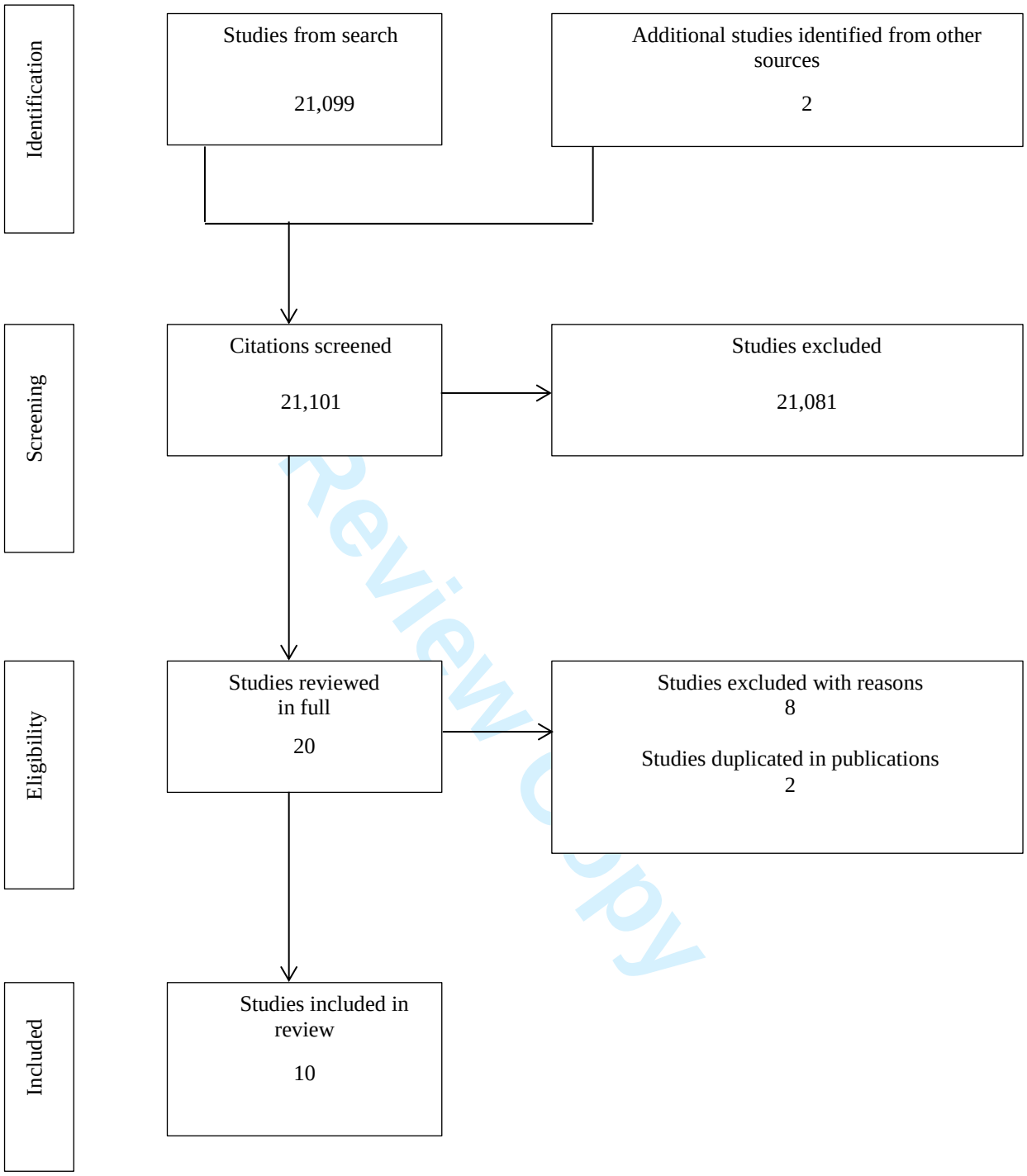

Figure 1 PRISMA flow diagram

Table 1 Inclusion and exclusion criteria

	Inclusion	Exclusion
Type of studies	Studies published over the last 10 years; to ensure that the information reviewed was up to date and reflected current resource use Published / unpublished studies with an a priori-designed economic evaluation Partial economic evaluations Randomised controlled trials (RCT) with estimates of resource usage or costs linked to the intervention / comparator High quality qualitative studies with an economic element.	Studies with low quality analyses Poorly constructed quantitative studies Studies which did not contain an economic element Studies not published in English Studies not freely available through the University of Dundee / The Knowledge Network.
Type of participants	Parents attending a parenting intervention and with children aged 0-3.	Participants had children aged over 3 or had children with a disability including ADHD, physical and behavioural and developmental delay including language.
Type of interventions	Parenting interventions that aimed to promote parent-infant interaction Funded by direct government investment, NHS, private and /or voluntary sector Health visitor and / or early years practitioner contribution A comparator could be exposure to universal health visiting service provision at current investment levels without additional early years practitioner intervention.	Services aimed at children over 3 years old / specifically for pre-term infants Those without health visitor and / or early years practitioner contribution Programmes where the aim of the intervention was other than improving parent-infant interaction.
Types of outcomes	Efficiency measures such as efficient use of resources from a healthcare and or societal perspective including, for example, the costs and benefits to society demonstrated through analysis of economic factors such as healthcare resources, crime rates, quality of life, employment, housing, or educational attainment.	Efficiency measures not reported.

Table 2 Study characteristics

Study	Design	Intervention and delivery time	Sample size	Age range (years)	Setting	Follow- up	Economic efficiency measure	Measure of statistical accuracy	Main findings
UK / Ireland Based Studies of Targeted Parenting Interventions									
Charles et al. 2013	RCT and micro-costing of the intervention based on 3 studies	Targeted Incredible Years 12 x 2 – 2.5 hour weekly sessions	89	1-3	Wales	n/a	Micro costing to provide detailed cost data	Sensitivity analysis	Set up and delivery costs recorded for various scenarios. Problematic to deliver an economic efficiency report.
McGilloway et al. 2013	RCT and cost analysis of service use a 12 month follow-up study	Targeted Incredible Years Delivery time not stated	87	2-8	Ireland	Baseline, 6 and 12 months	Cost of service use	No measure recorded	Costs of service use recorded showing savings at 6 months and 12 months follow-up.
O'Neill et al. 2013	RCT with cost effectiveness evaluation	Targeted Incredible Years 2 hour sessions over 12-14 week period	149	3-7	Ireland	Baseline, 6 and 12 months	Incremental cost effectiveness analysis Long term cost benefit analysis estimated for effect of intervention on education, crime and unemployment	Sensitivity analysis using cost effectiveness acceptability curves and cost effectiveness plane to demonstrate the probability given varying valuations for outcomes Bootstrap methods	Savings made from special education, criminality and unemployment
Bonin et al. 2011	Review of studies to develop an economic model to analyse cost savings	Targeted Evidence based parenting programme No time scale	n/a	5	England	n/a	Economic modelling Long term extrapolation of data	Sensitivity analysis performed within defined parameters	Societal savings over long term (25 year period).
McIntosh et al.	RCT with cost	Targeted	313	0-1	England	Baseline 2,	Direct costs of the	Sensitivity analysis	Costs for targeted and universal

Study	Design	Intervention and delivery time	Sample size	Age range (years)	Setting	Follow- up	Economic efficiency measure	Measure of statistical accuracy	Main findings
2009 and Barlow et al. 2007 and	effectiveness evaluation	Intensive health visitor home visiting 18 months				6 and 12 months	interventions were reported. Cost effectiveness analysis to justify decision makers willingness to pay Incremental cost effectiveness plane and cost effectiveness acceptability curves used to value outcome improvements	from a societal perspective Bootstrap methods Incremental cost effectiveness ratio used to report uncertainty	parenting support services recorded.
Atherton 2007 and Edwards et al. 2007	RCT and incremental cost effectiveness analysis	Targeted Incredible Years 12 x 2 hour weekly sessions	153 (study total) (116 economic data were available)	3-4	Wales	Baseline 6, 12 and 18 months	Incremental cost per unit of improvement on the intensity score of Eyberg child behaviour inventory Programme costs	Sensitivity analysis Bootstrap methods Cost effectiveness curve	Start-up, delivery and total costs of targeted parenting support services recorded.
Muntz et al. 2004	RCT and incremental cost-effectiveness analysis	Targeted Child and Adult Mental Health Service CAHMS Standard care and 3x5 hour sessions of unit based treatment over 6 months	41	2-10	Wales	Baseline 6 months and 4 years	Incremental cost effectiveness analysis used to compare long term costs of targeted vs comparator from a multi- sector service perspective	Sensitivity analysis and statistical test – bootstrap methods used	Costs and savings recorded. Savings made on intervention in comparison to usual care.

Study	Design	Intervention and delivery time	Sample size	Age range (years)	Setting	Follow- up	Economic efficiency measure	Measure of statistical accuracy	Main findings
UK / Ireland Based Studies of Universal Parenting Interventions									
Simkiss et al. 2013	RCT with cost effectiveness analysis	Universal The Family Links Nurturing Programme 2 hours over 10 week course	286	2-4	Wales	Baseline, 3 and 9 months	Quality Adjusted Life Years (QALY)	Sensitivity analyses Probability estimates of cost per QALY. Linear extrapolation	Costs and savings recorded in QALY gained. Economic analysis does not provide evidence that intervention results in economic efficiency.
USA Based Studies of Targeted Parenting Interventions									
Reynolds et al. 2011	Cost benefit analysis over 26 years	Targeted Chicago Longitudinal Study Child Parent Centre 3 hours per day 5 days a week for 9months	1539	3-9	Chicago	Baseline - 26 years	Cost benefit analysis	Sensitivity analysis including probit, negative binomial and linear regression and confidence intervals. Monte Carlo simulations used including latent-variable modelling, bounding methods, econometric methods, propensity scores and alternative comparison groups	Costs and savings to society recorded. Primary benefits from savings made from criminal justice spending.
Reynolds and Temple 2008	Review over 26 years to calculate cost effectiveness	Targeted Centre based 3 hours per day 5 days a week for 9 months	n/a	3-4	USA	Baseline - 26 years	Sensitivity analysis Cost effectiveness, cost benefit analyses of the long term effects of programmes. Societal benefits representing total	Discounting Standard deviation unit	Costs and savings to society recorded.

Study	Design	Intervention and delivery time	Sample size	Age range (years)	Setting	Follow- up	Economic efficiency measure	Measure of statistical accuracy	Main findings
							economic worth of the programmes.		

Table 3 Quality assessment of included studies

Study	Randomised allocation	Blinding of researchers	Sample size stated	Loss to follow-up reported	Measure of economic uncertainty reported
UK / Ireland Based Studies of Targeted Parenting Interventions					
Charles et al. 2013	-	-	√	-	√
McGilloway et al. 2013	√	√	√	√	-
O'Neill et al. 2013	√	-	√	√	√
Bonin et al. 2011	-	-	-	-	√
McIntosh et al. 2009 Barlow et al. 2007	√	√	√	√	√
Atherton 2007 Edwards et al. 2007	√	-	√	√	√
Muntz et al. 2004	√	-	√	√	√
UK / Ireland Based Studies of Universal Parenting Interventions					
Simkiss et al. 2013	√	√	√	√	√
USA Based Studies of Targeted Parenting Interventions					
Reynolds et al. 2011	-	-	√	√	√
Reynolds and Temple 2008	-	-	-	-	√
Totals	**6**	**3**	**8**	**7**	**9**

Key:

Where no data provided - Where data provided √

Table 4 Results summary of the costs from investment in parenting interventions (Reported data from studies that have included this information)

	Costs of parenting interventions							
	Start-up costs			Delivery costs			Total costs	
Author	Universal	Targeted	Per participant	Universal	Targeted	Per participant	Per participant	Per intervention
UK / Ireland Based Studies of Targeted Parenting Interventions								
Charles et al. 2013	-	√	√	-	√	√	√	√
McGilloway et al. 2013	-	-	-	-	-	-	-	-
O'Neill et al. 2013	-	-	-	-	-	-	√	√
Bonin et al. 2011	-	-	-	-	-	-	√	-
McIntosh et al. 2009 Barlow et al. 2007	-	-	-	-	-	-	√	-
Atherton 2007	-	-	-	-	-	-	√	-
Edwards et al. 2007	-	√	√	-	√	√	√	√
Muntz et al 2004	-	-	-	-	-	-	√	-
UK / Ireland Based Studies of Universal Parenting Interventions								
Simkiss et al. 2013	-	-	-	-	-	-	√	√
USA Based Studies of Targeted Parenting Interventions								
Reynolds et al. 2011	-	-	-	-	-	-	√	-
Reynolds and Temple 2008	-	-	-	-	-	-	√	-
Total	0	2	2	0	2	2	10	4

Key: where no data provided - where data provided √

Table 5 Reported costs of parenting interventions

Summary of the start-up costs, delivery costs and total costs of investment in parenting interventions. The table shows the start-up, delivery and total costs per participant (revised standardised figures in 2013 prices).

	Costs of Parenting Interventions (pounds sterling 2013 prices)					
	Start-up costs		Delivery costs		Total costs	
Author	Targeted £	Per participant £	Targeted £	Per participant £	Per participant £	Per intervention £
UK / Ireland Based Studies of Targeted Parenting Interventions						
Charles et al. 2013	4,670[1] 4,876[2]	583[1] 488[2]	6,188[1] 6,350[2]	774[1] 635[2]	1,357[1] 1,123[2]	10,859[1] 11,226[2]
O'Neill et al. 2013	-	-	-	-	1,162[19]	115,096
Bonin et al 2011	-	-	-	-	1,108	-
McIntosh et al. 2009 Barlow et al. 2007	-	-	-	-	9,539[9] 3,874[10]	-
Atherton 2007	-	-	-	-	2341	-
Edwards et al. 2007	4,880	610[3] 407[4]	16,461[5]	2,058[6] 1,372[7]	2,668[11] 1,778[12]	21,341
Muntz et al 2004	-	-	-	-	1,379[13] 286[14]	-
UK / Ireland Based Studies of Universal Parenting Interventions						
Simkiss et al. 2013	-	-	-	-	758[8]	6,071[8]
USA based Studies of Targeted Parenting Interventions						
Reynolds et al. 2011	-	-	-	-	5,546[15]	-
Reynolds and Temple 2008	-	-	-	-	6,385[16] 3,177[17] 9,095[18]	-

Footnotes to table 3: 1) based on 8 participants per group, 2) based on 10 participants per group, 3) based on 8 participants per group, 4) based on 12 participants per group, 5) total delivery costs of 12 week support service, 6) based on a group of 8 participants, 7) based on a group of 12 participants,8) figures based on total of 58 courses having been run, 9) Total cost per participant of the targeted parenting intervention, 10) Total cost per participant of the universal (control) parenting intervention 11) total cost based on 8 per participant per group, 12) total cost based on 12 participants per group, 13) Parenting intervention total cost, 14) Control (universal service provision) total cost, 15) based on 1.55 years participation on the Chicago Child-Parent Centre intervention, 16) based on 1 years participation on the High/Scope Perry Preschool intervention, 17) based on 1 years participation on the Chicago Child-Parent Centre (CPC) intervention, 18) based on 1 years participation on the Abecedarian Project, 19) based on approximately 11 parents per group. Numbers were rounded up to the nearest integer there may be rounding errors.

Table 6 Results summary of the savings from investment in parenting interventions

	Savings from Investment in Parenting Interventions							
	Health service		Special education		Criminal justice		Social	
Author	Universal	Targeted	Universal	Targeted	Universal	Targeted	Universal	Targeted
UK / Ireland Based Studies of Targeted Parenting Interventions								
Charles et al. 2013	-	-	-	-	-	-	-	-
McGilloway et al. 2013	-	√	-	√	-	-	-	√
O'Neill et al. 2013	-	-	-	√	-	√	-	√
Bonin et al. 2011	-	√	-	√	-	√	-	√
McIntosh et al. 2009 Barlow et al. 2007	-	-	-	-	-	-	-	-
Atherton 2007	-	-	-	-	-	-	-	-
Edwards et al. 2007	-	-	-	-	-	-	-	-
Muntz et al. 2004	-	-	-	-	-	-	-	-
UK / Ireland Based studies of Universal Parenting Interventions								
Simkiss et al. 2013	√	-	-	-	-	-	-	-
USA Based Studies of Targeted Parenting Interventions								
Reynolds et al. 2011	-	√	-	√	-	√	-	√
Reynolds and Temple 2008	-	-	-	√	-	-	-	√
Total	1	3	0	5	0	3	0	5

Key:
where no data provided - where data provided √

Table 7 Reported savings from investment in parenting interventions

The table shows the savings per person unless otherwise stated (revised standardised figures in 2013 prices)

	Savings from investment in parenting interventions (pounds sterling 2013 prices)				
	Health service		Special education	Criminal justice	Social
Author	Universal £	Targeted £	Targeted £	Targeted £	Targeted £
UK / Ireland Based Studies of Targeted Parenting Interventions					
McGilloway et al. 2013	-	199[3] 302[4]	(67)[7] 33[4]	-	6[3] 1.59[4]
O'Neill et al. 2013	-	-	489[8]	145,383[10] 40,880[11]	4,985[13]
Bonin et al. 2011	-	2,556[5]	803[5]	15,616[5]	158[5] 19,134[14]
UK / Ireland Based Studies of Universal Parenting Interventions					
Simkiss et al. 2013	40,864[1] 2,218[2]	-	-	-	-
USA Based Studies of Targeted Parenting Interventions					
Reynolds et al. 2011	-	2,155[6]	3,479[6]	27,782[12]	60,338[15]
Reynolds and Temple 2008	-	-	3,330[9]	-	87,530[16] 92,483[16] 51,520[16]

Footnotes to table 5: 1) Adult QALY gained over 5 years, 2) Adult QALY gained over 10 years, 3) Savings made at 6 months follow up, 4) Savings made at 12 months follow up, 5) Projected savings per family over a 25 year period, 6) Savings over one year, 7) Loss at 6 months follow up, 8) Special education savings per year for a pupil over first four years of primary school, 9) Annual saving following CPC intervention, 10) Lifetime savings for those with highest tariff conduct disorder, 11) Lifetime savings for those with mild conduct disorder, 12) Saving made from preventing an adult criminal career, 13) One off saving by time a person is 30 via social benefit savings, 14) Total savings to society over 25 year period per family, 15) Economic return to society, 16) Total net benefit (benefit less cost) measured over life course for CPC, PPP and ABC respectively. Numbers were rounded up to the nearest integer there may be rounding errors.