



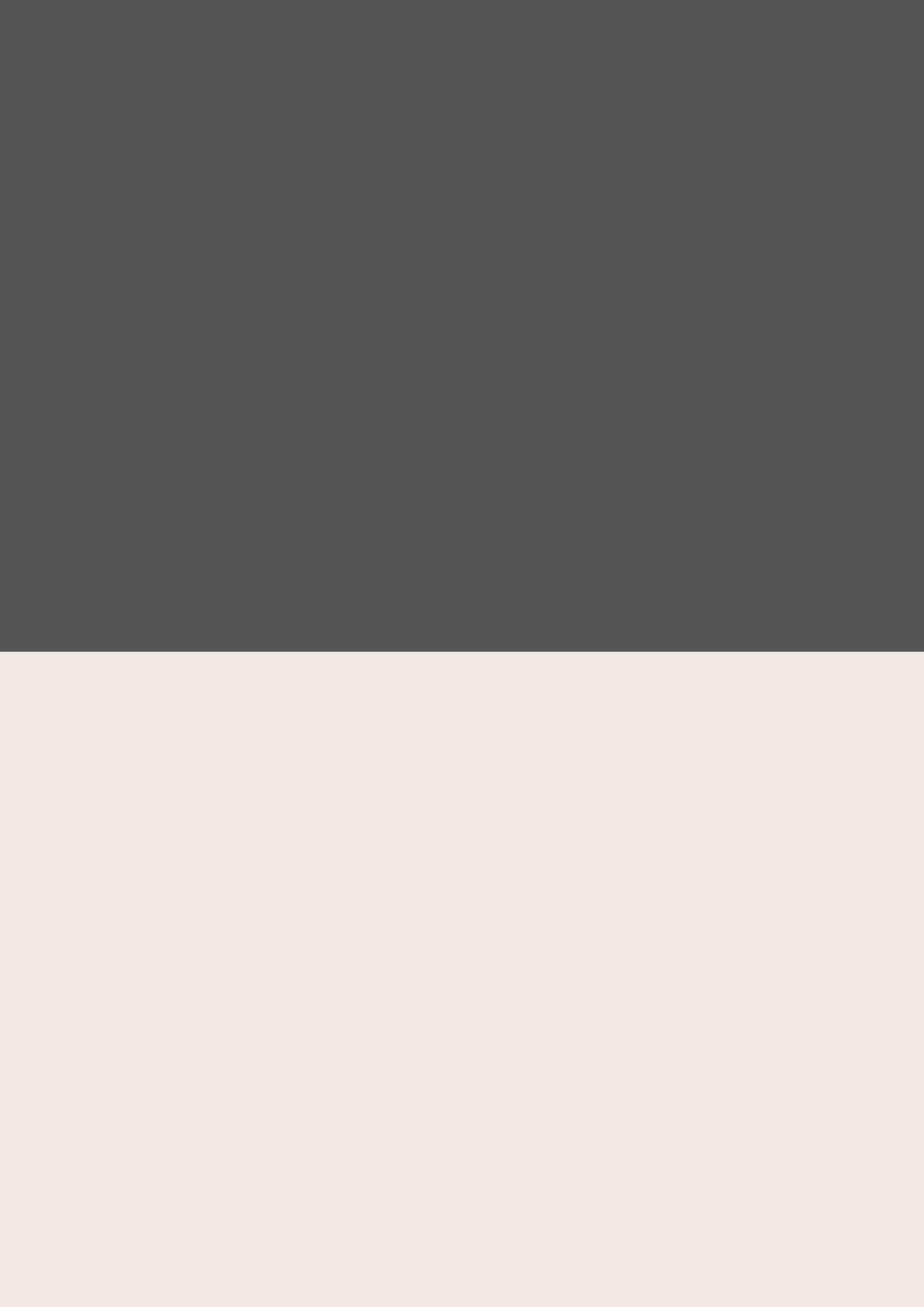
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APPENDICES



Appendix 1: Cost of Lost Opportunities in the Early Years, 2018/2019

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Basic assumptions and data considerations

The following is an overview of the methods and data sources used to estimate the cost to England of lost opportunities in the early years i.e. expenditure that might reasonably be avoided or replaced by preventative action in early childhood. The estimate includes long-term expenditure associated with adverse childhood experiences (ACEs), taking into account population attributable fractions¹ (PAFs), i.e. the fraction of expenditure related to the problem in question that may be causally linked to ACEs.

The latest complete set of available data were used in the analysis (2018/19), and all costs are presented in 2018/19 prices. Our analysis includes data for England only.

Incidence data are drawn from publicly available figures for England. The primary sources for unit costs are the national schedule of NHS reference costs,² the PSSRU volume *Unit Costs of Health and Social Care 2019*,³ the New Economy Manchester unit cost database for cost-benefit analysis (NEM),⁴ previous analysis by the Early Intervention Foundation (EIF)⁵ and our own calculations based on the principles of unit costing.⁶ Where unit costs needed to be updated, the GDP deflators presented in the NEM were used.

Here we provide information on data sources for incidence and unit costs for each category of cost. Where decisions had to be made around choice of parameters and inclusion of cost categories in a grand total calculation, we have as a rule opted for the one that results in a more conservative estimate.

Children's social care

Annual spend on looked after children

The total number of looked after children (LAC) by local authorities on census day (31 March; 78,140⁷) in 2018/19 was taken from DfE data.⁸ The total spend associated with LAC was calculated as the sum of the total net expenditure on LAC and 50% of net expenditure on safeguarding, taken from DfE Section 251 returns.⁹ This amounts to £5,709,278,000.

Number of Children in Need

The number of children in need (CiN; 338,450), here defined as the 'number of children with an episode of need at any point during the year', was taken from DfE data.¹⁰ The unit cost associated with the case management process (average total cost of case management over six months; £1,668) was taken from the NEM.

Injuries and self-harm in children and young people

Data on hospital admissions and A&E visits due to injuries were drawn from the PHE Fingertips dashboard (<https://fingertips.phe.org.uk/>). Incidence for each indicator is shown in Table 1.

Unit costs were calculated from the National Schedule of NHS Costs (2018/19). The cost of A&E attendances was estimated as the weighted average of non-admitted episodes. Note that this unit cost is not specific to children, and therefore case mix and resource use may not accurately reflect the cost for children. The cost of hospital admissions for injuries was calculated as the weighted average for paediatric injuries. This may not include all relevant categories of admissions and may not adequately reflect resource use relating to young people.

NICE guidance on self-harm in children and young people¹¹ specifies that they should be admitted to a paediatric or adolescent ward overnight, following appropriate triage and assessment in children's A&E, with a fuller assessment and decision about discharge or further treatment the next day. The cost associated with an admission for self-harm is therefore estimated as a contact with an A&E Mental Health Liaison Service plus the weighted average of child and adolescent mental health services (CAMHS) admissions, from NHS reference costs. Since we only include A&E attendances for children aged 0-4 above, and this indicator looks at children and young people (CYP) aged 10-24, there is no risk of double counting. We do not make assumptions about further treatment, as this expenditure is captured elsewhere and the care pathway is likely to vary considerably between individuals.

Indicator	Incidence	Unit cost	Included in grand total?
A&E attendances (0-4 years)	2,203,962	£144	Yes
Hospital admissions for injuries (age 0-14)	97,700	£1,816	Yes
Hospital admissions for injuries (age 15-24)	90,550	£1,816	Yes

Table 1: PHE indicators and corresponding unit costs

NHS expenditure on mental health

Overall NHS expenditure on mental health according to the Five Year Forward Plan mental health dashboard¹² was £12.51bn. This breaks down into £10.56bn spent by local Clinical Commissioning Groups (CCGs) and £1.95bn of specialised commissioning spend by NHS England. The total figure includes £2.1bn attributable to learning disabilities and dementia, leaving around £10.41bn spent on other mental health services. The population attributable fraction (PAF) of this figure is included in the grand total estimate.

The NHS cost data collection (NHS reference costs) covers £69bn, or 61% of total NHS expenditure for 2018/19 (£113bn). Of this, the

total categorised as spend on mental health, Improving Access to Psychological Therapies (IAPT) and secure services is £7.5bn, with 62% costed against mental health care clustered and 38% against other mental health services (recorded in other units of activity).

Looking more closely at expenditure relating to CYP, the reported annual CCG expenditure on CYP mental health, excluding learning disabilities but including eating disorders, was £753.3m. The number of admissions for CYP under 18 in CAMHS Tier 4 wards for 2018/19 was 4,614, with 425,841 bed days.¹³ We apply the weighted cost of admissions related to mental health presented above (£798). These figures are presented for information, but not included in the grand total.

School absence and exclusion

Persistent absence from school

The number of persistent absentees (771,863) was taken from Pupil absence in schools in England: 2018 to 2019,¹⁴ Table 2. Note that there was a change in the definition of persistent absence from the academic year 2015/16 ('pupil enrolments missing 10% or more of their own possible sessions').

The unit cost associated with one person per effective year was taken from the NEM. Given the likely overlap with other problem categories, only the expenditure attributable to provision of alternative education falling on local authorities is included in the estimated grand total.¹⁵

Agency	Amount	Included in grand total?
Local Authority (Education)	£901	Yes
Local Authority (Social services)	£419	No
NHS	£66	No
Criminal Justice System	£541	No

Table 2: Unit cost of persistent absence

Permanent exclusion from school

The number of permanent exclusions for the academic year 2018/19 (7,894) was retrieved from DfE data,¹⁶ while the unit cost was taken from the NEM. Given the likely overlap with other problem categories, only the expenditure attributable to provision of alternative education falling on local authorities is included in the estimated grand total.¹⁷

Agency	Amount	Included in grand total?
Local Authority (Education)	£9,169	Yes
Local Authority (Social services)	£1,281	No
NHS	£81	No
Criminal Justice System	£1,239	No

Table 3: Unit cost of permanent school exclusion

Economic inactivity in young people

We use estimates of incidence from the Labour Force Survey (average for Q2–Q4 2018 and Q1 2019) to estimate the costs associated with being not in education, employment or training (NEET).¹⁸ Given a lack of more recent data, we use the unit cost provided by the EIF (updated to 2018/19 costs), which includes only an estimate of benefits paid by the Department for Work and Pensions. Note that due to changes in the benefit system, there is much uncertainty around the accuracy of this figure.

16–17-year-olds who are NEET

There were an estimated 59,500 people aged 16 and 17 who were NEET during 2018/19 (average over four quarters). Note that the confidence interval around this estimate is large at $\pm 13,000$.

The unit cost applied is £650 per person.¹⁹

18–24-year-olds who are NEET

There were an estimated 619,000 people aged 18–24 who were NEET during 2018/19 (average). Note that this is an estimate, and the confidence interval is large at $\pm 47,000$. The unit cost applied is £3,638 per person.²⁰

Crime and antisocial behaviour

Reported antisocial behaviour incidents

The number of reported antisocial behaviour incidents (1,356,319) was taken from the 2019 Release of crime in England and Wales.²¹

The unit cost of £368 per reported incident is taken from the NEM and is the average of incidents requiring further action and no further action.²²

Youth offending teams

The number of young people in the youth justice system (21,700; CYP who were cautioned or sentenced) was taken from Youth Justice Statistics: 2018 to 2019.²³ The unit cost is based on funding for Youth Offending Teams (YOTs), assigned to different agencies based on the breakdown provided in the EIF report⁵ (Technical Appendix, Table 7, p. 17). Total YOT funding from Youth Justice Boards (YJB) for England and Wales was £71,621,951, while other YOT funding was £182,308,895 (Annex F to Youth Justice Statistics 2018 to 2019). YJB YOT funding for England only was £66,995,612. Assuming the proportion of other YOT funding for England only is the same, and applying the EIF breakdown, funding and unit costs were calculated as follows:

Agency	% YOT funding (per EIF data)	Funding amount England only	Unit cost	Included in grand total?
Justice System	82%	£194,547,882	£8,965	Yes
Police	13%	£30,651,390	£1,413	Yes
NHS	0%	£1,003,232	£46	Yes
Local Government	5%	£11,325,966	£522	Yes

Table 4: Estimated breakdown of YOT funding and unit cost

Reported cases of domestic violence and abuse

The number of recorded domestic abuse-related crimes in England was 704,687 in 2018/19.²⁴ The average unit cost per incident was taken from Rhys et al. (2019), updated to 2018/19 prices.

Agency	Unit cost	Included in grand total?
NHS	£1,245	Yes
Criminal Justice System	£918	Yes
Other ²⁵	£389	Yes

Long-term consequences of ACEs

Hospital admissions attributable to the physical health consequences of adverse childhood experiences are shown below. The average unit cost for an elective inpatient stay (£4,078; NHS reference costs 2018/19) was applied.

Smoking

Data on NHS hospital admissions with a primary diagnosis which can be caused by smoking, and those estimated to be attributable to smoking, were taken from Table 11 of the NHS smoking statistics for 2018/19.²⁶ The total number of admissions attributable to smoking (excluding those related to circulatory disease) was 377,400.

Disease	Attributable numbers	Included in grand total?
Cancers	175,200	Yes
Respiratory diseases	154,900	Yes
Circulatory diseases	126,800	No
Diseases of the digestive system	20,200	Yes
Other diseases	27,100	Yes

Table 5: Admissions attributable to smoking

Heart and circulatory diseases; obesity

Data on admissions for heart and circulatory diseases were obtained from the British Heart Foundation compendium.²⁷

Disease	Attributable numbers	Included in grand total?
Cardiovascular disease (CVD)	261,100	Yes
Diabetes	56,900	Yes
Obesity	11,300	Yes

Table 6: Admissions for heart and circulatory diseases; obesity

Asthma in children

Data on hospital admissions for asthma in under-19s were taken from PHE data.²⁸ There were 22,495 admissions in 2018/19.

Homelessness

Local authority expenditure on homelessness was taken from LA revenue outturns for housing services (RO4).²⁹ We follow the calculation by Shelter³⁰ by looking at total expenditure and excluding the categories administration, prevention and support. Total spend is calculated at £1,086,316,000.

While we do not attempt to calculate a unit cost of homelessness, Table 7 shows the number of households owed a relief and prevention duty, by reason (based on Tables A2P and A2R³¹).

Reason	Owed relief duty	Owed prevention duty
End of assured shorthold tenancy (AST) (private)	13,570	45,090
End of non-AST private tenancy	2,140	3,760
Family/friends no longer willing/able to accommodate	31,820	34,430
Non-violent relationship breakdown with partner	11,980	9,390
Domestic abuse	14,070	8,910
Other violence or harassment	3,420	2,080
End of social rented tenancy	4,560	8,530
Eviction from supported housing	5,460	2,890
Left institution with no accommodation available	3,510	1,060
Required to leave accommodation provided by Home Office as asylum support	1,750	1,580
Other reason/not known	29,350	30,150
Total	121,630	147,880

Table 7: Number of households owed relief duty and prevention duty, by reason

Population attributable fractions for England (all ACEs)

Population attributable fractions (PAFs) were applied to total estimates of costs by problem category where those were available, to provide further insight into the amount of public expenditure that is attributable to adversity in the early years. However, it would be inappropriate to claim that the fact this fraction of costs is attributable to a risk factor such as ACEs means that it could necessarily be avoided through early action. Table 8 shows PAFs by outcome. The PAF for depression was applied to all expenditure related to mental health, i.e. all conditions and all ages. The PAF for self-harm was applied to all categories of injury.

No PAFs were applied to the following problem categories: children's social care; school absences and exclusions; youth economic inactivity; crime and antisocial behaviour. Arguably, only a fraction of the associated costs in these categories will be attributable to ACEs, although this fraction will be higher for children's social care than for other categories.

Outcome	PAF	Source
Alcohol use	0.131	(Hughes et al., 2020)
Smoking	0.165	(Hughes et al., 2020)
Drug use	0.526	(Hughes et al., 2020)
High BMI	0.022	(Hughes et al., 2020)
Depression	0.303	(Hughes et al., 2020)
CVD	0.117	(Bellis et al., 2019)
Diabetes	0.079	(Bellis et al., 2019)
Respiratory disease	0.185	(Bellis et al., 2019)
Homelessness	0.533	(Roos et al., 2013)
Hospital injuries	0.415	(Afifi et al., 2008)
A&E injuries	0.415	(Afifi et al., 2008)
Self-harm	0.415	(Afifi et al., 2008)
Child mental health	0.303	(Hughes et al., 2020)

Table 8: Population attributable fractions applied to estimates

Endnotes

- 1 <https://www.who.int/data/gho/indicator-metadata-registry/imr-details/1287>
- 2 <https://www.england.nhs.uk/national-cost-collection/>
- 3 <https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-2019/>
- 4 <https://www.greatermanchester-ca.gov.uk/what-we-do/research/research-cost-benefit-analysis/>
- 5 EIF (2016), <https://www.eif.org.uk/report/the-cost-of-late-intervention-eif-analysis-2016>
- 6 Beecham (2000), <https://www.pssru.ac.uk/publications/pub-4233/>
- 7 While this is not the true number of LAC, the numbers of children starting and ceasing to be looked after during the year are similar, making this a close approximate estimate of the number of LAC adjusted for a 12-month period. This assumption about the denominator affects the top-down calculation of the unit cost, but not the total cost.
- 8 <https://explore-education-statistics.service.gov.uk/find-statistics/children-looked-after-in-england-including-adoptions/2020#releaseHeadlines-charts>; accessed 16/04/2021.
- 9 <https://www.gov.uk/guidance/section-251-2018-to-2019#section-251-outturn>; accessed 16/04/2021; EIF (2016), technical appendix p. 10.
- 10 <https://www.gov.uk/government/statistics/characteristics-of-children-in-need-2018-to-2019>, Table A1.
- 11 <https://www.nice.org.uk/guidance/cg16/chapter/1-guidance#special-issues-for-children-and-young-people-under-16-years>
- 12 <https://www.england.nhs.uk/publication/nhs-mental-health-dashboard/>; 2018/19, Q4
- 13 <https://www.england.nhs.uk/publication/nhs-mental-health-dashboard/>; 2018/19, Q1-Q4
- 14 <https://www.gov.uk/government/statistics/pupil-absence-in-schools-in-england-2018-to-2019>
- 15 Also see EIF (2016), technical appendix p. 8.
- 16 <https://explore-education-statistics.service.gov.uk/find-statistics/permanent-and-fixed-period-exclusions-in-england>; accessed 16/04/2021.

- 17 Also see EIF (2016), technical appendix p. 9.
- 18 <https://www.gov.uk/government/statistics/participation-in-education-training-and-employment-2019>; NEET statistics annual brief 2019: tables (table 1b, second part)
- 19 EIF (2016), Technical Appendix p. 15.
- 20 EIF (2016), Technical Appendix p. 16.
- 21 <https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/bulletins/crimeinenglandandwales/yearendingmarch2019>
- 22 EIF (2016), Technical Appendix p. 16.
- 23 <https://www.gov.uk/government/statistics/youth-justice-statistics-2018-to-2019>
- 24 <https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/datasets/domesticabuseprevalenceand-victimcharacteristicsappendix-tables>; accessed 30/04/2021
- 25 Victim services and multi-agency work resulting from domestic violence and abuse.
- 26 <https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-smoking/statistics-on-smoking-england-2020/statistics-on-smoking-2020-data-tables>
- 27 <https://www.bhf.org.uk/what-we-do/our-research/heart-statistics/heart-statistics-publications/cardiovascular-disease-statistics-2021>
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- 29 <https://www.gov.uk/government/statistics/local-authority-revenue-expenditure-and-financing-england-2018-to-2019-individual-local-authority-data-outturn>
- 30 https://england.shelter.org.uk/media/press_release/homelessness_crisis_costs_councils_over_1bn_in_just_one_year
- 31 <https://www.gov.uk/government/statistical-data-sets/live-tables-on-homelessness>; Detailed local authority level tables: financial year 2018-19.

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Appendix 2: Case Studies

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Part 1:

Economic evidence for interventions addressing maternal mental health

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Key summary points

- Economic evaluations suggest that training health professionals, such as health visitors, in systematically assessing women’s mental health and providing or arranging for psychologically informed support techniques where needed is likely to be cost-effective.
- Treatments that have been shown in trials to be cost-effective include cognitive behavioural therapy, interpersonal therapy and guided self-help.
- Psychological interventions that target the mother-infant relationship can help with infant attachment where a mother is suffering from postnatal depression, and have the potential to be cost-effective.
- In addition to improving maternal outcomes, findings suggest that treatment, when incorporating mother-infant relationship components, might potentially achieve positive impacts on the infant, such as improved sleep or temperament as well as child development or behaviour.
- Evidence gaps remain regarding impacts of interventions in children, and how to best value child outcomes in economic evaluations.

Introduction

Perinatal mental health problems, defined as mental health problems experienced during the period from pregnancy to one year after birth, affect one in five women.¹ The short- and long-term impacts of perinatal mental health problems on the child are well established.² A 2014/2015 study,^{1,3} which estimated the economic consequences of perinatal mental health problems taking a life course modelling approach, demonstrated that costs linked to maternal mental ill health during this period were high (£8.1 billion per cohort of UK births), and that the largest proportion of costs (more than two-thirds) were attributed to the impact on children.

Impacts on children can take various forms. Children of mothers who experience perinatal mental health problems are exposed to a higher risk of being born pre-term or with low birth weight, and to develop intellectual, behavioural and socio-emotional problems. A number of mechanisms have a role in explaining the links between maternal mental ill health and developmental

problems in the child. Fetal programming, which refers to biological reactions in-utero such as those between increased cortisol concentrations and the offspring's brain development, is likely to play an important role in the prenatal period.⁴ In the postnatal period, psychological rather than biological factors are more relevant. Mental health problems can, for example, affect mothers' responsiveness to their infants or affect their nurturing.⁵ Both insecure mother-infant attachment styles⁶ and exposure to child maltreatment⁷ are more common in children of mothers with maternal mental health problems during the perinatal period, and are exacerbated by factors like poverty, domestic violence, addictions and lack of social support.²

Whilst the economic case for investing in perinatal mental health services has been successfully made in the UK and elsewhere, leading to substantial investments in specialist perinatal mental health services, questions remain about how to best allocate resources, and about which interventions are effective and cost-effective.^{8,9}

In this summary, we provide an overview of the evidence on the economic impact of interventions, services or approaches that seek to address maternal mental health problems during the perinatal period. Whilst the focus of this funded study is on early child development, therefore posing the question as to which interventions can cost-effectively reduce the adverse impact on children, we have included economic evaluations that only consider mothers' outcomes. We assume that in the absence of sufficient evidence on children in this area, interventions that are cost-effective from a mother's perspective are important to consider.

Method

This review was based on pragmatic searches of the literature. Whilst we did not apply a cut-off year for including studies, our focus was on studies published within the last 10–15 years. Most of our studies were from the UK, or with direct relevance to the UK. This included studies of interventions that have been adopted in the UK. Our review covered studies of interventions that sought to identify, prevent or reduce maternal mental health problems during the perinatal period and that measured maternal mental health outcomes. We included studies that measured infant outcomes, either as primary or secondary outcome. We also included all types of economic evaluations, independent of study type, outcome or cost perspective.

Findings

In addition to studies identified in recent systematic reviews,^{9–12} we identified a small number of additional economic evaluations published since then.^{13–15} In this summary, we present findings from systematic reviews alongside findings from single studies in the following categories: strategies for identifying mental health problems; intervention types; models of delivery. Although the focus of this summary is on the economic evidence, we present findings in the context of effectiveness evidence where feasible and useful.

Strategies for identifying perinatal mental health problems

Findings from a systematic review by Camacho et al.¹⁰ on the cost-effectiveness of perinatal interventions for depression or anxiety suggested that screening-plus-treatment programmes were likely cost-effective. Cost per QALY thresholds ranged from £8,642 to £15,666. (QALY stands for quality-adjusted life years gained and is a generic measure of disease burden that combines quality and quantity of life, which is commonly used for economic evaluations of clinical interventions. A cost per QALY threshold is used to help decide if an intervention can be considered cost-effective. In the UK, interventions with cost per QALY thresholds of between £20,000 and £30,000 are typically considered cost-effective.)

Various decision-analytic modelling studies have been conducted, which investigate how to cost-effectively identify women using screening tools such as the Whooley questions, the Edinburgh Postnatal Depression Scale (EPDS), the Patient Health Questionnaire (PHQ-2/9) or Generalised Anxiety Disorder (GAD) scales. One of the modelling studies was conducted for a 2014 guideline on ante- and postnatal mental health problems by the National Institute for Health and Care Excellence (NICE).¹⁶ The study directly informed NICE's recommendation for a two-stage application of the Whooley questions in combination with the Edinburgh Postnatal Depression Scale (EPDS) or the Patient Health Questionnaire (PHQ-9), which was found to be more cost-effective than using only one of these tools.^{13,17} Average cost per woman screened ranged from £50 to £104, whilst QALYs were very similar between strategies. It is perhaps important to note that modelling studies that compare the economic impact of different screening tools are based on a simplified assumption that false identification always leads to higher treatment costs without additional health improvements.

This might underestimate prevention effects of psychological treatments for women without mental health problems.^{18, 19}

Intervention types

Psychological and psychosocial interventions

1 Focused on mothers' mental health

Findings from systematic reviews and meta-analyses^{9, 20-24} suggest that psychological and psychosocial interventions, provided alone or alongside drug treatments, are effective in preventing and reducing maternal mental health problems. For example, cognitive behavioural therapy (CBT) and interpersonal therapy (IPT), together with other structured psychological approaches modified to include pregnancy- or parenting-related needs, have been found to prevent and improve common mental health problems during the perinatal period.^{9, 20, 25, 26} In addition to improving maternal outcomes, findings from some studies suggest that these interventions might improve early neonatal outcomes such as sleep duration and temperament²⁷ as well child development and behaviour.²⁸⁻³⁰ Questions remain regarding long-term effectiveness and impact on child outcomes,³⁰ with findings from some studies suggesting that treatment alone is not sufficient to improve these.³¹

One health technology assessment,⁹ which included a systematic review, meta-analysis and economic modelling covering a wide range of interventions to prevent postnatal depression, found that psychological and psychosocial interventions, such as person-centred psychological approaches, CBT and IPT were likely to be cost-effective. Cost per QALY ranged from £447 to £62,251 (in 2012/13 prices), although there was considerable uncertainty in estimates. Universally provided interventions were costed at less than £100 per woman. Interventions targeting women considered at risk because of their social circumstances cost between £70 and £495. Interventions targeting women with raised scores on mental health screening tools cost between £500 and £1,850. QALY gains of interventions ranged from below zero, indicating a loss in comparison with standard care, to 0.026. The evidence was based on 13 economic evaluations, including nine conducted alongside trials and three decision models.

NICE recommends psychosocial and psychological treatments in low- and high-intensity forms as part of a stepped care model.¹⁶ According to NICE, low-intensity treatment in the form

of guided self-help should be offered to women with common mental health problems who do not require more intensive treatment. Findings from an economic evaluation¹⁴ suggest that guided self-help is potentially not only effective but also cost-effective. When QALYs linked to a reduction in depressive symptoms were compared against costs, the cost per QALY was £7,200 (in 2015/16 prices). Mean costs of delivering the intervention were £418 per participant. Whilst this model referred to low-intensity treatment delivered as part of a mental health service, other psychological approaches have been studied as part of health visitor- or midwifery-led models of care, suggesting that these are cost-effective (see section below). With regards to high-intensity treatment, we were unable to identify directly relevant cost-effectiveness evidence from the UK. However, findings from an economic modelling study from the US³² suggest that an intensive treatment intervention (CBT) provided to women on low income in their own home was likely to be cost-effective from a government perspective.

2 Combined focus on mothers' mental health and infant development

A few studies have investigated the effects of psychological or psychosocial interventions that specifically address the mother-infant relationship. Findings suggest that these can have positive effects on infant attachment for mothers with perinatal mental health problems.³³⁻³⁵ Importantly, they might also have positive long-term effects on the child. For example, one recent study found that adding parenting interventions such as video feedback therapy to intensive treatment for women with severe and persistent depression improved child development outcomes measured when the child was two years old.³⁰ Findings from one older economic evaluation¹⁹ conducted alongside a randomised controlled trial (RCT) showed a high probability of cost-effectiveness (71%), which was due to improvements in maternal mental health. Average costs per woman were £120 (in 2000 prices) higher in the intervention than in the control group, and the intervention achieved a mean net benefit of £384. Most studies³⁴⁻³⁶ conclude that more research is needed on the (cost-)effectiveness of such integrated interventions, which should include evidence on long-term child outcomes in order to capture their full economic value.

Social support interventions

Lack of social support is a key risk factor for maternal mental health problems, and various interventions have been developed to address social support needs of women during the perinatal

period, including befriending and peer support. Overall, there is a lack of robust evidence that would allow confirmation of the effectiveness of such interventions.^{24, 37, 38}

Findings from one economic evaluation conducted alongside a small, feasibility RCT of a telephone-delivered peer support intervention (Mums4Mums)³⁹ were reported in a PhD thesis.¹⁵ They suggested that whilst the costs for other NHS expenditure were only half of the costs in the standard care group (£801 vs. £1,538; price year not reported), this was not enough to offset the intervention costs (£2,900). Findings from a study of the original intervention, which was first developed and implemented in Canada, also found that the intervention costs were not offset in the short term (\$4,497 vs. \$3,280; in 2011 Canadian dollars).⁴⁰ In terms of cost-effectiveness, the Canadian study presented the cost per case of postpartum depression averted, which was \$20,196. The authors concluded that this was in the range for other accepted interventions for this population.

In the UK, the planned cost-effectiveness analysis was not conducted, which, according to the researchers, was because of insufficient follow-up data. Since there was no detectable difference in depressive symptoms or mother-infant interaction, it is unlikely that the intervention was cost-effective within the studied timeframe. Interestingly, the researchers found that costs in the intervention group reduced over time in comparison with the control group, and women in the intervention group continued to improve whereas women in the control group did not. This might suggest that mobilising social support might have longer-term effects that require longer evaluation periods. However, the study sample was small (N=28), the drop-out rate high (50%) and the reporting quality in the PhD thesis low, which means that caution needs to be applied.

We identified two economic evaluations of befriending interventions.^{41, 42} Interventions were provided by third-sector organisations, which play an important role in providing support for women's mental health during the perinatal period. One evaluation reported an average cost of the intervention of £2,230 per woman and short-term net benefits that ranged between £199 and £2,193. The other evaluation estimated long-term return on investment of £6.50 per £1 spent, of which £1.50 referred to government expenditure. However, the evaluations were simple cost-benefit models based on a range of assumptions, were not published in peer-reviewed journals and had low reporting quality.

A particular challenge of evaluating costs and benefits of these kinds of intervention is that they are designed to meet needs flexibly, depending on a person's preferences and wishes, and that they develop over time in the local context. In addition, because they often reach out to women who would not engage in treatment or support provided as part of standard mental health services, or in standard research, their value is difficult to compare with other interventions. Therefore, evaluating costs and benefits of these programmes requires particular methodologies that are still in development, although examples from other areas of health and social care exist.⁴³

Psychoeducational interventions

Psychoeducation is a common component of psychological or psychosocial interventions. A few interventions have been designed to provide psychoeducation as a standalone intervention. The educational element of these can refer to parenting, mental health, infant behaviour or relationships. Modelling conducted for the above-mentioned health technology assessment⁹ found that educating women in preparing for parenting was cost-effective. The interventions referred to women at risk of perinatal mental health problems due to their social circumstances, including first-time mothers and mothers of twins. The estimated mean total cost was £266 per woman (in 2012/13 prices) and the mean QALY gain was 0.0193. The resulting cost per QALY was £13,785 and the probability that the intervention was cost-effective was 86%.

Interventions with a primary focus on infant development

Various interventions exist that have a primary aim to improve infant development and health whilst addressing maternal mental health. An economic evaluation of an intensive home visiting programme (called the Family Partnership Model) reported a mean cost per unit improvement in maternal sensitivity and infant cooperativeness of £3,246 per woman (in 2004 prices).^{44, 45} Mothers' mental health did not improve. The intervention was provided to families who had been identified as vulnerable by their community midwives, based on selected indicators including maternal mental health and suspected child abuse or neglect.

An example of an intervention that has been demonstrated to be cost-effective in Australia is a community-delivered behavioural intervention targeting infant sleep problems and maternal well-being in mothers who reported infant sleep problems.⁴⁶ The intervention led to significantly

improved infant sleep problems (39% vs. 55%), a non-significant improvement in remission from depression (25% vs. 28%) and significantly reduced mean costs (£97 vs. £117; price year not reported). The authors concluded that the sleep intervention might lead to health gains for infants and mothers and to resource savings for the healthcare system.

Models and modes of delivery

The cost-effectiveness of interventions is likely to be influenced by various intervention features, including the delivery mode and who is providing the intervention.

Online and group formats

We identified an older systematic review conducted as part of a health technology assessment¹² investigating the cost-effectiveness of group-based CBT in addressing postnatal depression. The review did not find enough evidence to derive conclusions about the cost-effectiveness of group-based CBT. There is, however, evidence that psychosocial or psychological interventions provided online,^{22, 47, 48} as well as group-delivered forms of treatment,^{25, 49, 50} are acceptable to some women, and can achieve similar effects for those women. Costs linked to interventions provided in group format and/or online are generally lower than for one-to-one and/or in-person treatment, so that for women who accept (and prefer) those modes of delivery, they are likely to be cost-effective.

Midwifery- and health visitor-led model of care

Midwives and health visitors, together with general practitioners, have an important role in identifying and supporting women with maternal mental health problems. Various UK studies^{18, 19, 51-57} have been conducted over the past decades to generate knowledge about how to best train health visitors or midwives to enhance their role in identifying mental health problems and providing support, including how to do this cost-effectively.

They find that training health visitors and midwives in systematically assessing women's mental health problems and providing psychologically informed support techniques is not only feasible but can also be (cost-)effective.^{9, 18, 52-54, 58} Economic evidence refers only to health visitors thus far. QALY gains per woman ranged from 0.002 for women at high risk of mental health problems (i.e. women who received treatment) to 0.001 for women not at risk (i.e. who were screened or assessed but who did not receive treatment).^{9, 18, 54} Costs per woman were lower in the intervention groups than in the

control groups. For women at high risk of mental health problems, total costs were between £3 and £35 lower in the intervention group than in the control group. For women not at risk they were £82 lower (in 2003/4 prices). Estimated probabilities that assessment and treatment of women by health visitors was cost-effective ranged between 90% and 99% at cost per QALY thresholds of £20,000 to £30,000.

Evidence gaps and methodological challenges

Overall, substantial evidence gaps remain in this area of research. Most of the economic evidence relates to women with depression. Economic evidence for interventions that target women with severe mental illness during the perinatal period is largely lacking. This might partly be due to methodological challenges in conducting such studies, for example due to the rarity of some of these conditions, and because of challenges to include an appropriate 'standard care' group that also meets ethical research requirements. In addition no, or insufficient, economic evidence is available for interventions that address populations particularly affected by perinatal mental health problems such as women living in, or at risk of, poverty, Black women and women from other ethnic backgrounds.

The impact of interventions on infants and on fathers is rarely included in economic evaluations.¹⁰ There is currently no agreed standard approach for measuring and valuing infant outcomes for the purpose of economic evaluation. For example, insecure attachment is an important predictor for substantive long-term costs.⁵⁹ However, there is currently no agreed methodological approach for including these costs in economic evaluations. Without such approaches, it is likely that the cost-effectiveness of interventions is underestimated, and that interventions are prioritised that are cost-effective in the short term over those that are cost-effective in the long term.

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Part 2:

Economic evidence for parenting programmes addressing child behaviour problems

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Key summary points

- Systematic reviews report small benefits of parenting programmes in addressing behaviour problems in young children; however, there is some evidence that studies which find positive results are more likely to be published (publication bias).
- A small number of cost-effectiveness analyses based on trials suggest that programmes can bring about improvements in children's behaviour problems at a reasonable cost.
- Cost-effectiveness studies which model longer-term costs and benefits based on a set of assumptions demonstrate how programmes could be cost-saving in the long term if effects on children's behaviour are maintained. This is because of the relatively low implementation costs compared with the high costs associated with long-term antisocial and criminal behaviour that can be prevented with the intervention.
- More evidence is needed to understand:
 - The degree to which benefits are lasting in the longer term;
 - How (cost-)benefits differ for different population groups, and between types of delivery (e.g. group, one-to-one, online);
 - What happens to those who drop out of programmes;
 - The extent to which programmes are suitable for those people most likely to present with high-cost and high-harm behaviour in the long term: how can barriers to participation and benefit be addressed for those most in need?

Introduction

Common behavioural parenting programmes such as the Incredible Years (Webster-Stratton, 2000) and Triple P (Sanders, 2012) aim to help parents learn skills to increase their children's prosocial behaviours and reduce 'externalising' problem behaviours including aggression, tantrums and excessive non-compliance, for example through play, consistent discipline and giving attention and praise to positive behaviours. A previous review (Stevens, 2014) found that existing evidence indicated that such programmes have the potential to be cost-saving in the long term,

but also found the following gaps in research, limiting understanding of programmes' economic value: lack of follow-up of families who drop out of programmes; absence of control groups in longer-term follow-ups; and little information about costs and effects of programmes in routine practice. The review concluded that the size of savings resulting from implementation of effective parenting programmes will depend on the extent to which those families who are most likely to be costly to society attend the programmes and experience lasting benefit.

What is the evidence that parenting programmes are effective in reducing behaviour problems in children aged 2–5?

Parenting programmes have been concluded to be effective in several systematic reviews of randomised and quasi-randomised trials of parent training programmes for parents of children between ages 3 and 12. For example, a 'meta-meta analysis' (a meta-analysis of 26 meta-analyses) of parent-based interventions for children with behaviour problems found overall moderate positive effects on children's behaviour, although there was considerable variation within results (Mingebach et al., 2018). Statistically significant improvements have been found in the short term in children's behaviour problems, parental mental health and parenting skills and reductions in harsh parenting (Dretzke et al., 2009; Furlong et al., 2012; Piquero et al., 2016). While evidence from systematic review suggests parenting programmes can improve maternal mental health, there was no evidence that effects remain after one year (Barlow et al., 2014).

While there is some evidence of maintenance of improvements in child behaviour up to two years post-intervention (Bywater et al., 2009; Högström et al., 2017), such measurements generally lack controlled comparisons. This is often because 'no intervention' groups are 'waiting list' controls, offered the intervention within a year (Edwards et al., 2016; Nystrand et al., 2020). However, one exception is a cluster randomised study which compared intervention and control groups after ten years with some suggestion of fewer externalising problems in the intervention (Triple P) group (Kim et al., 2018).

Reviews point to some evidence of publication bias (Piquero et al., 2016); trials are often conducted by programme developers, raising the possibility of bias (whether conscious or unconscious), as well as raising questions about differing 'fidelity' to the programme when developers are not involved (Epstein et al., 2015). Lower-quality studies have been reported to find on average larger effects (Ross et al., 2011).

There has been a trend for parenting programmes to move online which, if effective, could potentially provide a cost-effective alternative to in-person parent training (MacDonell & Prinz, 2017). Online programmes can potentially address some of the barriers to participation in programmes, including accessibility and stigma associated with attendance (Hall & Bierman, 2015; McGoron & Ondersma, 2015). Two meta-analytic reviews have examined the effectiveness of online parenting programmes for children's behaviour problems (Spencer et al., 2019; Thongseiratch et al., 2020). Thongseiratch and colleagues found 12 studies with a lower age limit in the 2–5 years age range and including 2,025 participants in total. In their review they included only higher-quality (i.e. controlled, peer-reviewed) studies. They concluded that there were overall significant positive effects on children's behavioural problems in addition to positive outcomes for child emotional and parental mental health problems. They also concluded that sending reminders to parents to undertake work on self-directed components of the programme contributed to effectiveness. Neither review found trials directly comparing online with in-person delivery, but Thongseiratch and colleagues reported that effect sizes were comparable between the two delivery modes.

A significant barrier to the cost-effectiveness of parenting programmes, often not considered in trials, is low take-up by parents and high drop-out rates (Koerting et al., 2013). Evidence has suggested that attrition in Internet-only programmes may be even higher (Hall & Bierman, 2015). A synthesis of high-quality qualitative research (Koerting et al., 2013) investigated barriers to accessing and engaging with (in-person) programmes; the review recommended raising awareness, providing flexible, individually tailored support and using highly skilled, trained and knowledgeable therapists. Salient components of programmes have also been investigated quantitatively; a meta-analytic review, after controlling for differences attributable to research design, found programme components consistently associated with larger effects included increasing positive parent-child interactions and emotional communication skills; teaching parents to use time

out and the importance of parenting consistency; and requiring parents to practise new skills with their children during parent training sessions. Conversely, those components consistently associated with smaller effects included teaching parents problem solving; teaching parents to promote children's cognitive, academic or social skills; and providing other, additional services (Wyatt Kaminski et al., 2008). A more recent meta-analysis of 154 trials which paid attention to the role of programme components found effects on child externalising problems where programmes included positive reinforcement (e.g. praise) and discipline techniques, in particular natural/logical consequences of the child's behaviour (Leijten et al., 2019).

What is the evidence from trials that parenting programmes are cost-effective?

Interventions aimed at children's externalising behaviour problems, if effective in preventing subsequent antisocial and criminal behaviour in adolescence and adulthood, are likely to be cost-effective (or even cost-saving) in the longer term (Stevens, 2014). But time horizons in trials are short and there is limited information to guide where resources should be targeted to support those most in need, or most likely to be helped (MacKenzie et al., 2012; Stevens, 2014). A growing number of economic evaluations based on randomised controlled trials (RCTs) have estimated a cost per unit of improvement in children's behaviour in the short term (e.g. Edwards et al., 2007; Donal O'Neill et al., 2013; Sampaio et al., 2016). More recently the programme Parents Under Pressure, targeted at substance-misusing parents was concluded to be cost-effective in reducing child abuse potential (Barlow et al., 2019). Edwards and colleagues, using a pragmatic RCT of the Incredible Years programme, presented cost-effectiveness in terms of the proportion of 144 children moved below a threshold for problem levels of behaviour (an additional 23% over the number moving in the control group) for a cost per child of between £1,612 and £2,418).

Other trials have compared costs and effects of different types of programme, sometimes finding differences in costs but not effectiveness (Gross et al., 2019). Sonuga-Barke and colleagues, for example, concluded that the New Forest Parenting Programme was less costly than Incredible Years

and had better attendance, while effectiveness outcomes did not differ (Sonuga-Barke et al., 2018). Studies have also estimated increased cost-benefits of adding interventions together, for example a teacher component added to a parenting intervention (Sayal et al., 2016). The Sayal trial found parent-only intervention most likely to be cost-effective, and changes were found in parental mental health and parent reporting of child behaviour but not in observed child behaviour. However, elsewhere the Incredible Years programme delivered simultaneously to teachers, parents and children (aged 3-8) was estimated more likely to be cost-effective than a single approach (Foster et al., 2007).

Cost-effectiveness could be improved if it were known which families were most likely to benefit and how cost-effectiveness could therefore be maximised. Building on previous research (Gardner et al., 2015), Gardner and colleagues attempted to pool analyses of fourteen trials of the Incredible Years, using individual-level data, to consider the extent to which socially disadvantaged families benefit, and to examine moderators of effectiveness (Gardner et al., 2017). From the available data, they found no evidence that effects differed in socio-economically disadvantaged families, ethnic minority families, families with different parenting styles or children with comorbid ADHD or emotional problems. They found strongest effects in children where baseline behaviour problems were greatest and where parents were more depressed; although parental depression itself was not found to improve. From the five UK trials with economic data they found an average cost per person of £2,414 and concluded that the intervention would be considered effective 99% of the time if willingness to pay was £145 per one-point improvement on the Eyberg Child Behaviour Inventory Intensity scale. As the authors note, the available data did not allow assessment of which population groups had access to the programmes.

What is the evidence from modelling studies of cost savings in the longer term?

Modelling studies have been used to make up for the lack of evidence from trials on longer-term effects on children's behaviour and wellbeing (Bonin et al., 2011; Mihalopoulos et al., 2007; O'Neill et al., 2011; Sampaio et al., 2018). Based on the assumptions used in models (including about

longer-term impacts), savings are estimated to accrue because of reduced costs to education and health services, improved productivity in adulthood (e.g. Nystrand et al., 2019, 2020, children age 5+) and reduced costs to criminal justice (E.-M. Bonin et al., 2011). Studies based on Triple P concluded that the programme would be considered cost-effective according to local levels of willingness to pay (Sampaio et al., 2018). Another study concluded that, with an assumption of a 7% reduction in conduct problems, Triple P would be cost-saving if delivered on a population level (Mihalopoulos et al., 2007). Incredible Years (Donal O'Neill et al., 2013) was concluded likely to be cost-effective in the longer term taking into account future estimated savings relating to education, crime and welfare benefits. Modelled savings often accrue to sectors other than those that made the initial outlay to fund programmes. However, Nystrand and colleagues also estimated savings for local authorities that implemented programmes. Their analysis concluded that four different parenting programmes would be cost-saving and that a fifth intervention, a self-help manual, would be the most cost-effective, due to its low implementation costs. These positive conclusions from modelling studies are, however, based on assumptions of lasting effects of programmes for which there is currently little evidence (see above).

Conclusions and further considerations

Benefits of programmes found in trials are generally small (Barlow et al., 2014; Stewart-Brown, 2004) and there remains a lack of evidence on long-term costs and effects (Schmidt et al., 2020). There are good reasons to suppose that more consistent support may be needed (Barlow, 2015). We should be wary of inadvertently favouring interventions because, being 'manualised' and contained, they are easier to research, compared with, for example, ongoing family support or social work intervention (Featherstone et al., 2011; Stevens, 2018b). While the role of volunteers has been raised as a potentially cost-effective alternative to professional parenting advisors (Scavenius et al., 2020), the evidence above suggests that the quality of the support is key. Online programmes have also been promoted as cost-effective but will not necessarily provide some of the (social and sometimes ongoing) benefits of group-based in-person programmes that are appreciated by parents, indeed sometimes cited by parents as the most important aspect (Koerting et al., 2013; Stevens, 2018b). However, the development of online peer support interventions has been accelerating over

the course of the COVID-19 pandemic (Kostyrka-Allchorne et al., 2021).

A focus on changing parenting has been a feature of family support for some time (Klett-Davies, 2016) and there is some evidence of positive effects, as indicated above. However, qualitative research suggests that there is also potential for negative effects resulting from implicitly or explicitly thereby blaming parents for children's behavioural difficulties, (Broomhead, 2013; MacDonald, 1990; Stevens, 2018b; White et al., 2009). Skilled practitioners and strengths-based approaches may help avoid such damaging discourses.

Longitudinal evidence of impacts of interventions is lacking, but longitudinal study does suggest that improvements in the environment around the child and family (in terms of maternal hostility, maternal depression, maternal views of the neighbourhood and ease of paying the rent) are associated with a lower likelihood of children with difficult behaviour going on to display antisocial behaviour in adulthood (Stevens, 2018a). Which outcomes are measured is important. It may be, for example, that changes in how children are treated is more important than changes in observed child behaviour in the longer term; it may be that changes in maternal wellbeing, whether financial or psychological (for example through improved mood or improved social support), are more important to the child's wellbeing in the longer term than short-term changes in child behaviour.

The tentative evidence presented above suggests that effects of parenting programmes do not differ between population groups. However, many of those most in need may not attend programmes (and even less trials). Parents involved in child protection proceedings may be particularly reluctant or fearful, for example, and parenting training needs to be offered at the right time (Ward et al., 2014). Professionals need to be aware of their potential to both increase and reduce resistance to change (Forrester et al., 2012). Assessing 'readiness to change' prior to embarking on challenging intervention to change parenting may help make intervention more cost-effective (Barlow, 2015:136; Power et al., 2008:5).

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