

# Assessing the impact of the Reading Recovery programme

An economic evaluation prepared by Neil Pratt, Jon Franklin and Toby Kenward



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## Foreword

It is almost a truism to say that early interventions are likely to have a greater impact than later ones, whether that intervention is seeking to improve education, skills, the economy or well-being. The impact of early intervention cannot be underestimated but often is if we fail to quantify it properly. Doing so is crucial if we are to make good policy choices. Yet these calculations are rarely straightforward, as they involve complex calculations about future, uncertain outcomes for individuals and societies.

It is against this background that I very much welcome this analysis by Pro Bono Economics (PBE) on behalf of the KPMG Foundation which assesses the impact of the Reading Recovery literacy programme. This early intervention programme was scaled up in 2005 and offers literacy support to children aged five and six. The report builds on the recent work of Professor Jane Hurry of the UCL Institute of Education, together with earlier studies in 2009 by the Every Child a Chance Trust and in 2011 by the Department for Education.

This report examines the benefits of the Reading Recovery programme between 2005/6 to 2016/17. It has the benefit of using a large sample of over 100,000 pupils. Based on those pupil experiences, it estimates two sets of benefits. Firstly, savings to the public purse from the programme. These are conservatively estimated to be worth around £2,900 per pupil, largely due to a reduced reliance on Special Educational Needs support, with total savings of around £290 million over the programme.

The larger benefits, though, are estimated to accrue to the pupils themselves. They are on average estimated to benefit by up to £9,100 in higher income over the course of their lifetimes. Put differently, the programme so far may have boosted the lifetime earnings prospects of pupils by around £1 billion. Early intervention to improve reading ability appears capable of putting young people on a different branch of the life-tree – a higher and stronger branch.

Taken together the study finds that, for every £1 spent on the programme, there is a societal benefit of up to £4.30. This is a significant social return on the programme's investment and a concrete demonstration of the impact early intervention can have in improving children's educational attainment, life chances and career pathways. Of course, there are significant uncertainties around these estimates, especially around the benefits to lifetime incomes. But these uncertainties are unlikely to alter the broad cost-benefit calculus.

Indeed, the benefits of early intervention to support literacy could be larger even than the estimates presented here. The UK fares poorly in international league tables of basic literacy and numeracy. Programmes like Reading Recovery have the potential to move the societal dial in ways which, longer-term, could boost the skills and productivity of people and the economy at large. As Chair of the Government's Industrial Strategy Council, as well as Trustee of the charities Pro Bono Economics and National Numeracy, these are issues close to both my head and heart.

I welcome the timely and important report from Pro Bono Economics and the KPMG Foundation.

Andy Haldane

Chief Economist at the Bank of England and Co-Founder and Trustee at Pro Bono Economics.

## Executive Summary

Pro Bono Economics was commissioned by the KPMG Foundation to carry out an economic analysis of the costs and benefits of the Reading Recovery literacy programme. Our study provides an up-to-date assessment of the social return on investment of the Reading Recovery programme based on the latest evidence on the long-term impact of the programme.

### Background

Reading Recovery is a widely implemented and researched early intervention designed to help the lowest attaining children aged five and six learn to read. Schools in England started to offer Reading Recovery support in 1990, with an expansion in 2005 as part of The Every Child a Reader initiative that was developed by the KPMG Foundation in collaboration with the Institute of Education. The funding partners were the Department for Education and Skills (DfES), the KPMG Foundation, Man Group Plc Charitable Trust, the Esmee Fairbairn Foundation, SHINE, the Indigo Trust, the JJ Charitable Trust and the Mercers' Company. Since 2005, over 100,000 children in England have benefited from Reading Recovery support, including over 4,400 children in 531 schools in the 2016/17 school year.

Effective early intervention remains necessary to help those children who leave primary school with very poor literacy skills. In 2018 some 20,215 11-year-olds had reading standards so low that they either could not be entered for the National Reading Test or took the test but did not achieve any score.<sup>1</sup>

### Scope of this study

Our study is based on recent research by Professor Jane Hurry of the UCL Institute of Education which uses data from a ten-year study that tracks the progress of a group of 84 children in London schools who received Reading Recovery support in 2005/6. The study finds that these children did better in Key Stage 4 GCSE exams and were also less likely to require special educational needs support than a comparable group of 136 children in schools that did not provide Reading Recovery.

Using these findings, we quantify the potential economic benefits that accrue over the lifetime of the 101,000 children in England who have received Reading Recovery support since 2005/6, assuming the positive effects in the follow-up study apply to all these children. Our analysis considers benefits related to increased earnings from employment, reduced expenditure by local authorities on Statements of Special Educational Need (SEN) or Education, Health and Care plans (EHCP) for children in schools, cost savings for the NHS, and reduced costs of crime. We assess the overall value for money of the Reading Recovery programme by comparing these potential benefits to the costs of the programme over the period 2005/6 to 2016/17.

### Key findings

All costs and benefits are in 2017/18 prices and represent present values over the lifetime of the children included in the study.

- The Hurry follow-up study shows Reading Recovery support increased the likelihood that a child will attain 5+ good GCSEs (including Maths and English) by 18 to 26 percentage points and reduced the proportion of children requiring a SEN Statement/EHCP by 7 percentage points.

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<sup>1</sup> Department for Education (2018): National curriculum assessments: key stage 2, 2018 (provisional).

- We estimate potential benefits to UK society from Reading Recovery of £940 million to £1,200 million across the 101,000 children supported since 2005/6.
- Estimated potential benefits are £9,200 to £12,100 per Reading Recovery pupil compared to around £2,800 in costs, giving a net benefit of £6,400 to £9,300 per pupil.
- These findings imply that every £1 spent on Reading Recovery since 2005/6 will create a potential societal benefit of £3.30 to £4.30.
- Reading Recovery support increases the expected lifetime income from employment of around £6,300 to £9,100 per pupil. This is equivalent to approximately 70% of the total societal benefit.
- Savings from the reduction in the number of children with a SEN Statement/EHCP are conservatively estimated as £2,900 per Reading Recovery pupil accruing to local authorities.

## Implications

Our study shows the potential of well-designed early interventions addressing literacy difficulties to improve children's life prospects and create a significant societal return on the cost of the intervention. As is invariably the case in evaluations of early interventions, our analysis is based on several assumptions. For example, we assume that the positive effects in the follow-up study apply to all the children supported by Reading Recovery in the evaluation period.<sup>2</sup>

There are significant uncertainties around our estimate of the potential benefits over the lifetime of Reading Recovery pupils. However, the key conclusion that benefits exceed programme costs is quite robust. Moreover, our estimate of benefits is conservative as we do not consider potential savings in SEN expenditure by schools or on lower forms of SEN support, or other wider savings such as reduced truancy and school exclusions.

The availability of reliable long-term follow-up data plays a key role in assessing early interventions, and our study has benefited from the evidence in the Hurry study. There would be considerable value in further strengthening the evidence base on the long-term effects of early literacy interventions such as Reading Recovery, for example through a large scale randomised study of Reading Recovery that covers children and schools outside London. More generally, the application of a rigorous evaluation approach to other early literacy interventions will help facilitate a comparison between different approaches in this important area.

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<sup>2</sup> All the key assumptions underpinning our findings are set out in full in the main report.



# 1 Introduction

This report, which was commissioned by the KPMG Foundation, sets out an economic analysis of the costs and benefits of the Reading Recovery literacy programme. Reading Recovery is a widely implemented and researched early intervention designed to help the lowest attaining children aged five and six learn to read. Support is provided by specially-trained teachers who work one-to-one with children daily for 12 to 20 weeks.<sup>3</sup>

Schools in England started to offer Reading Recovery support in 1990, with an expansion in 2005 as part of the Every Child a Reader initiative that was developed by the KPMG Foundation in collaboration with the Institute of Education, Government and several other charitable funders.<sup>4</sup> Since then, over 100,000 children in England have benefited from Reading Recovery support, including over 4,400 children in 531 schools in the 2016/17 school year.

Effective early intervention remains necessary to help those children who leave primary school with very poor literacy skills. In 2018 some 20,215 11-year-olds had reading standards so low that they either could not be entered for the National Reading Test or took the test but did not achieve any score.<sup>5</sup>

## Scope of this study

Our study is based on recent research into the long-term effectiveness of Reading Recovery by Jane Hurry, Professor of Psychology at the UCL Institute of Education. Using evidence gathered in a ten-year follow-up study, Professor Hurry and her co-author find that a group of 84 children who were given Reading Recovery support in 2005/6 achieved better results in national Key Stage 4 exams and were less likely to require Special Educational Needs (SEN) support than a comparable group of 136 children in schools that did not provide Reading Recovery.<sup>6</sup>

We use the findings from the Hurry & Fridkin (2018) study to quantify the potential economic benefits from Reading Recovery support over the lifetime of the 101,000 children in England who have received Reading Recovery support since 2005/6, assuming the positive effects in Hurry apply to all these children. Our analysis covers a 12-year evaluation period from 2005/6 to 2016/17.

There are three key elements in our analysis:

- We estimate the potential benefits from Reading Recovery support related to increased lifetime earnings of Reading Recovery children, cost savings to the public sector relating to health, criminal justice, and the provision of high-needs SEN support in schools. The monetary value of each of these benefits is assessed using existing published estimates.
- We assess the cost of Reading Recovery support over the evaluation period using data from two previous economic evaluations for the period prior to 2011/12, and cost estimates based on data provided by the International Literacy Centre at UCL for 2012/13 to 2016/17.

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<sup>3</sup> See <https://www.ucl.ac.uk/reading-recovery-europe/reading-recovery> for further details on Reading Recovery.

<sup>4</sup> The other funders were Man Group Plc Charitable Trust, the Esmee Fairbairn Foundation, SHINE, the Indigo Trust, the JJ Charitable Trust and the Mercers' Company.

<sup>5</sup> Department for Education (2018): National curriculum assessments: key stage 2, 2018 (provisional).

<sup>6</sup> Hurry, J. & Fridkin, L. (2018): Reading remediation at age six: long term effects on qualifications and support at age 16. Paper submitted for publication.

- We assess the overall value for money of the Reading Recovery programme over the period 2005/6 to 2016/17 by comparing the potential benefits over the lifetime of the children who received Reading Recovery support in the evaluation period.

We have benefited from advice from Jean Gross CBE, a SEN expert and former Director of Every Child a Reader programme, particularly in relation to the costs of Reading Recovery and special educational needs.<sup>7</sup>

## Structure of the report

The report is structured as follows:

- Section 2 sets out the background on the Reading Recovery programme and earlier evaluations.
- Section 3 describes our analytical approach.
- Section 4 sets out our analysis of potential benefits.
- Section 5 sets out our estimates of the cost of Reading Recovery support.
- Section 6 sets out our findings on the value for money of the programme.
- Section 7 sets out our conclusions.

Costs and benefits are expressed in 2017/18 prices throughout the report unless otherwise stated.

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<sup>7</sup> Jean Gross (<https://www.jean-gross.com/>) is an education expert with in-depth knowledge of the Reading Recovery programme based on her previous involvement in Every Child a Reader. Jean was engaged by the KPMG Foundation as an adviser for this study.

## 2 Background

This section sets out the background to our study. Section 2.1 outlines the main features of the Every Child a Reader (ECaR) programme and the provision of Reading Recovery support since 2005. Section 2.2 summarises the key findings on the long-term effect of Reading Recovery support from the ten-year follow-up study conducted by Professor Hurry. Section 2.3 summarises the key features of two earlier studies that considered the costs and benefits of Reading Recovery and the wider ECaR programme, and Section 2.4 explains how our study differs from these earlier studies.

### 2.1 The Every Child a Reader programme

The Every Child a Reader (ECaR) programme was introduced in 2005 to support children with reading in Key Stage 1. Developed by the KPMG Foundation in collaboration with the Institute of Education and Government, the programme comprised three ‘waves’ tailored to provide different levels of reading support:

- Wave 1: ‘quality first teaching’. This was aimed at all children through class-based teaching and focused on word recognition and language comprehension, as well as systematic phonics where children are taught to sound out words.
- Wave 2: small group (or less intensive one-to-one) intervention. This was aimed at children who were expected to catch up with their peers with relatively light-touch additional support, usually from a teaching assistant.
- Wave 3: intensive individual reading support. This was provided primarily through the Reading Recovery intervention with a programme of daily one-to-one support from a highly trained specialist teacher for up to 20 weeks, targeted at the lowest attaining five to ten per cent of children in school Year 1 (aged five or six).<sup>8</sup>

The Every Child a Reader programme ran between 2005/6 and 2010/11 and had two broad phases as follows.

- Pilot phase from 2005/06 to 2007/08: In this phase the KPMG Foundation (and later the Every Child a Chance Trust) led the development of the programme. Financial support was provided by the Government, a group of charitable trusts and business, as well as schools who part-funded their own implementation. An average of 2,500 pupils per year received Reading Recovery support in this phase.
- National roll-out phase from 2008/09 to 2010/11: National roll-out of the programme was managed by the Government’s National Strategies, working in partnership with the Reading Recovery national network at the Institute of Education. In this phase also, schools part-funded the costs of employing a Reading Recovery teacher. An average of more than 15,000 pupils per year received Reading Recovery support intervention in this phase.

Following the end of the ECAR programme in 2010/11, Reading Recovery support has continued to be provided by schools in England with the costs covered wholly by their own budgets. An average of just over 8,000 pupils per year received Reading Recovery support in this school-funded phase between 2011/12 to 2016/17.

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<sup>8</sup> The development of the ECaR programme is described in Department for Education (2011): Evaluation of Every Child a Reader.

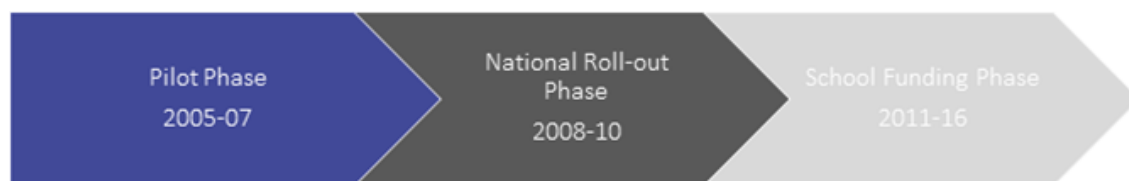
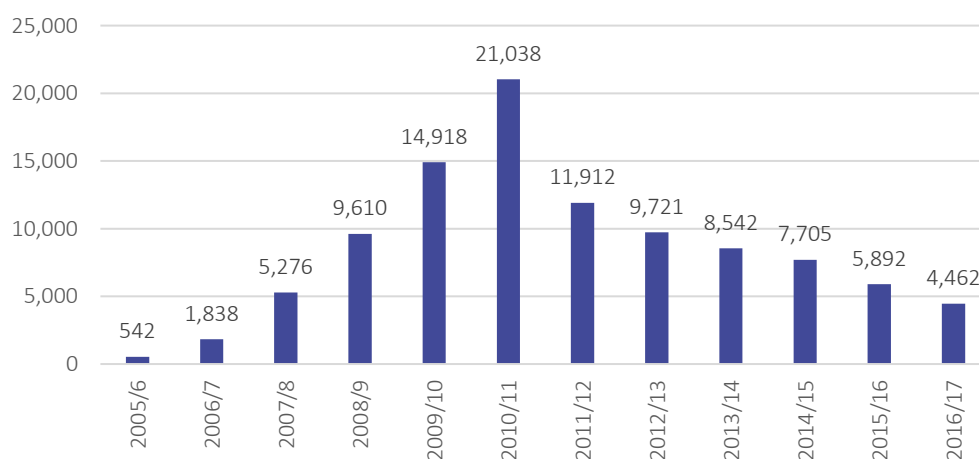


Figure 1 shows the number of children who received support in each of the 12 cohorts in the evaluation period for this study.<sup>9</sup> In total, over 100,000 children in England have benefited from Reading Recovery support since 2005/6. As shown, the size of the cohorts increased rapidly in the national roll-out phase, peaking in 2010/11.

**Figure 1. Children who received Reading Recovery support in England**



Source: International Literacy Centre at the UCL Institute of Education

## 2.2 Evidence from the ten-year follow-up study

Our economic analysis of the potential benefits of Reading Recovery is based on new evidence on the long-term effects of the intervention reported in a recent study by Professor Jane Hurry. Professor Hurry's research is based on a ten-year follow-up study that was established by the KPMG Foundation at the beginning of the ECaR programme in 2005. This research provides valuable information on the effectiveness of the Reading Recovery intervention on outcomes in the secondary school stage. It complements and extends previous follow-up studies, which have tended to focus on the shorter-term effects of Reading Recovery.

The follow-up study tracks the progress of a group of 84 children in London who received Reading Recovery support in 2005/6, and a 'Comparison group' of 136 children with similar characteristics from schools that did not provide Reading Recovery. These children were monitored as they progressed through school in a series of six follow-ups over the next 10 years through to the end of Key Stage 4 when the children were aged 16.<sup>10</sup> The data collected in this way includes children's academic attainment in Key Stage 4 and the need for special educational support. Annex A provides further details on the Hurry & Fridkin study.

Hurry & Fridkin (2018) highlight two limitations of their study which imply that some caution is needed when applying their findings:

<sup>9</sup> The pupil numbers in the pilot phase relate to children who received Reading Recovery funded through the ECaR programme. It does not include some children in schools that fully funded Reading Recovery in the period 2005-08. Numbers for the other two phases include all children who received Reading Recovery in England.

<sup>10</sup> The six follow-ups occurred in 2006, 2007, 2009, 2011, 2014 and 2016.

- First, the assignment of children to the Reading Recovery and Comparison groups was not random. Whilst there was no significant difference in the literacy levels of the children in the two groups, or in several other key demographic variables, a significantly higher proportion of children in the Comparison group (62%) received Free School Meals (FSMs) than in the Reading Recovery group (43%).
- Second, the children in the follow-up study were from economically disadvantaged areas of London and a relatively high proportion spoke English as an additional language. As noted in Hurry & Fridkin (2018) this may have implications for extrapolating the study results to more affluent, mono-cultural communities.

Hurry & Fridkin consider the implications of the difference in the proportion of children eligible for FSMs in the two groups by investigating the effect of Reading Recovery support separately for children who received FSMs and those who did not. Reading Recovery pupils in both groups had better GCSE outcomes than Comparison group pupils, with the effect slightly larger for those not taking FSMs.

We summarise the key findings from Hurry & Fridkin (2018) used in our analysis below.

#### Key findings used in our study

Table 1 shows the estimated effects we use in our analysis. These are based on the prevalence of the different outcomes in the Reading Recovery and Comparison groups found in the Hurry & Fridkin study. The difference between these provides a measure of the effect of Reading Recovery support. As can be seen, children in the Reading Recovery group were:

- More likely to obtain at least five good GCSEs (A\* to C grades), including English and Maths.
- Less likely to leave school with no qualifications.
- Less likely to require a SEN Statement/EHCP.

The figures in the first two columns of Table 1 relating to GCSE attainment are sourced from Table 5 in Hurry & Fridkin (2018) and relate to the estimated effect of Reading Recovery based on the full sample of 220 children in the follow-up study. The figures relating to SEN Statement/EHCP proportions are calculated from the underlying pupil-level data for the Reading Recovery and Comparison groups used in Hurry & Fridkin (2018).

**Table 1. Long-term effects of Reading Recovery support**

Group	5 good GCSEs, including Maths and English	No GCSE qualifications	SEN Statement/EHCP
Reading Recovery	49%	2%	3%
Comparison	23%	7%	10%
Difference	+26pp	-5pp	-7pp

Note: the KS4 results in this table are sourced from Table 5 of Hurry & Fridkin (2018). The SEN Statement/EHCP proportions are based on PBE analysis of pupil level data for the two groups.

As noted above, the Reading Recovery group contains a lower proportion of children eligible for FSMs than the Comparison group. Since Hurry & Fridkin report that Reading Recovery has a slightly larger effect on GCSE attainment for those not taking FSMs, there is therefore a risk that the estimated effect based on the full sample overstates the actual effect of Reading Recovery. To allow for this uncertainty we have estimated benefits using a range of 18 to 26 percentage

points for the effect of Reading Recovery support on the likelihood to achieving 5+ good GCSEs (including Maths and English). The lower end of this range corresponds to the estimated effect in the subsample of pupils in the follow-up study who were eligible for FSMs.<sup>11</sup>

## 2.3 Previous economic evaluations

The costs and benefits of Reading Recovery and the ECaR programme have been considered in earlier studies by the Every Child a Chance Trust in 2009, and the Department for Education in 2011. We briefly outline these studies here with further details in Annex B.

### The long-term cost of literacy difficulties

The Long-Term Cost of Literacy Difficulties study was carried out in 2009 by the Every Child a Chance Trust.<sup>12</sup> The study quantifies the costs incurred by the public sector in relation to individuals that have very low literacy skills in adulthood (defined as the 6% of adults with attainment below Level 3 in the old National Curriculum framework). These costs are used to estimate the potential 'fiscal benefits' from reducing the number of adults with very low literacy by providing Reading Recovery support to children aged six who are experiencing literacy difficulties.

The estimated benefits of Reading Recovery support in this study assume that it lifts 79% of children with very poor literacy skills out of literacy failure in adulthood. The estimated success rate for the intervention is based on a study of 651 11-year old children who had received Reading Recovery at age six, of whom 79% achieved Level 3+ attainment at age 11 and had therefore been lifted out of the very low literacy group as defined in the Every Child a Chance Trust study.

The study considers a range of fiscal benefits including increased employment-related tax and national insurance revenues, reduced unemployment benefits, and savings on public services such as education, crime and healthcare over the life course of these children. Comparing the estimated fiscal savings to the cost of Reading Recovery support, the study finds that every £1 invested in Reading Recovery support delivers a return of £11-17 in public sector savings.<sup>13</sup>

### Evaluation of Every Child a Reader study

The Evaluation of Every Child a Reader study is an independent evaluation of the overall ECaR programme that was commissioned by the Department for Education in 2011.<sup>14</sup> The study considers the costs and benefits associated with the overall ECaR programme. As explained in section 2.1 the ECAR programme was broader than the Reading Recovery intervention and included several other strands.

There are several other important differences between the Department for Education study and the Every Child a Chance Trust study, including:

- The Department for Education study considers benefits flowing from the impact of literacy support on attainment at Key Stage 4, rather than from lifting children with literacy difficulties out of literacy failure in adulthood.
- Benefits are estimated using data on the effect of the programme on Key Stage 1 tests to predict expected attainment at Key Stage 4, and linking this to the likelihood of future employment, health and crime outcomes.

<sup>11</sup> This was provided by Professor Hurry. See Annex A for further details.

<sup>12</sup> Every Child a Chance Trust (2009): The long-term cost of literacy difficulties. This study is the second edition of a report commissioned by the KPMG Foundation in 2006.

<sup>13</sup> This figure relates to the 'moderate certainty' scenario in the study (see Annex B for details).

<sup>14</sup> Department for Education (2011): Evaluation of Every Child a Reader.

- Employment-related benefits are assessed in terms of the potential increase in the lifetime income of children who are supported, rather than fiscal benefits only.
- The study does not consider several cost savings that are included in Every Child a Chance Trust, including costs related to SEN provision, adult literacy support or substance abuse and teenage pregnancy.

Comparing the estimated benefit to the cost of ECAR programme, the study finds that every £1 invested in the programme gives a societal return of around £1.80.<sup>15</sup>

## 2.4 The relationship between our study and previous evaluations

Our analysis builds on and develops the earlier studies described in section 2.3 as follows:

- We use the most recent evidence on the longer-term effect on Reading Recovery support on Key Stage 4 attainment and SEN support from the Hurry & Fridkin ten-year follow up study. As a result, we do not have to rely on assumptions about the impact of the intervention on children to the same extent at the previous studies.
- Our study covers a period of 12 years, which is significantly longer than the earlier studies, and includes the three different funding phases described in section 2.1.

As in the 2011 Department of Education study, we consider potential benefits relating to the impact of Reading Recovery support on lifetime income as well as cost savings related to crime and the health service.<sup>16</sup> We also consider cost savings for local authorities related to maintaining SEN Statements/EHCP that are not considered in the Department for Education study.

Our study differs from the 2009 Every Child a Chance Trust study in several important ways:

- First, we consider the economic benefits associated with improving the likelihood that children with literacy difficulties attain 5+ good GCSEs (including Maths and English) in Key Stage 4 exams, rather than the benefits of lifting children with literacy difficulties out of literacy failure in adulthood.
- Second, we consider employment-related benefits associated with increased lifetime income and not only the fiscal benefits of increased tax revenues and savings in benefit payments.
- Third, our analysis does not consider several potential savings that are considered in the Every Child a Chance Trust study, including: savings on SEN support other than those related to SEN Statements/EHCPs, the costs of truancy and exclusion from school, the costs of adult literacy classes, and the costs of substance abuse, teenage pregnancy, obesity and depression.

We explain the approach we use to assess the cost and benefits of Reading Recovery support in the next section.

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<sup>15</sup> This estimate is for the 'no depreciation' scenario in which improvements in Key Stage 1 are assumed to persist until Key Stage 4. See Annex B for further details.

<sup>16</sup> As explained in Annex E we use a more conservative approach for estimating healthcare savings than in the Department for Education study.

## 3 Our approach

This section provides an overview of the approach used in our analysis. Section 3.1 explains the overall analytical framework we use and the types of benefit that are considered. We then highlight the key assumptions that underpin our analysis in section 3.2.

### 3.1 Analytical framework

The overall aim of our analysis is to assess the total costs and benefits of Reading Recovery support provided to children in England over the evaluation period from 2005/6 to 2016/17. This is done in four steps, as shown in Figure 2:

- Step 1: Estimation of the benefits per Reading Recovery pupil.
- Step 2: Estimation of the costs per Reading Recovery pupil.
- Step 3: Calculation of the total cost and benefits for each Reading Recovery cohort.
- Step 4: Calculation the total costs and benefits for the Reading Recovery programme.

As explained below, total costs and benefits are expressed in present value terms using 2005/6 as the base year and are in 2017/18 prices. This ensures that costs and benefits that occur at different times can be compared.

#### Estimation of benefits

In step 1, we estimate the potential benefits of Reading Recovery for each cohort that relate to the effect of Reading Recovery on academic attainment in Key Stage 4 and on the likelihood that a child will require a SEN Statement/EHCP. Our analysis includes the following four types of benefit:

- **Increase in lifetime income:** improved GCSE attainment is expected to lead to reduced unemployment and higher lifetime earnings for participants in the Reading Recovery programme.<sup>17</sup>
- **Reduction in costs related to SEN:** a reduction in the number of children who require a SEN Statement/EHCP is expected to reduce the costs incurred by local authorities and schools associated with special education needs support. As explained below, we are only able to estimate the savings to local authorities related to high needs SEN support with the available data.
- **Reduction in expenditure on health services:** better outcomes in the employment market from improved GCSE attainment are linked to improved health outcomes and hence expected to reduce the cost of providing health services.
- **Reduction in the costs of crime:** better educational attainment is linked to a reduced propensity to commit property-related crimes and is expected to reduce the costs of crime.

The specific approaches taken for each of the types of benefit are discussed in section 4 with further details in Annexes C to F.

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<sup>17</sup> These benefits also capture the value of increased productivity over and above higher earnings which to consumers and businesses.



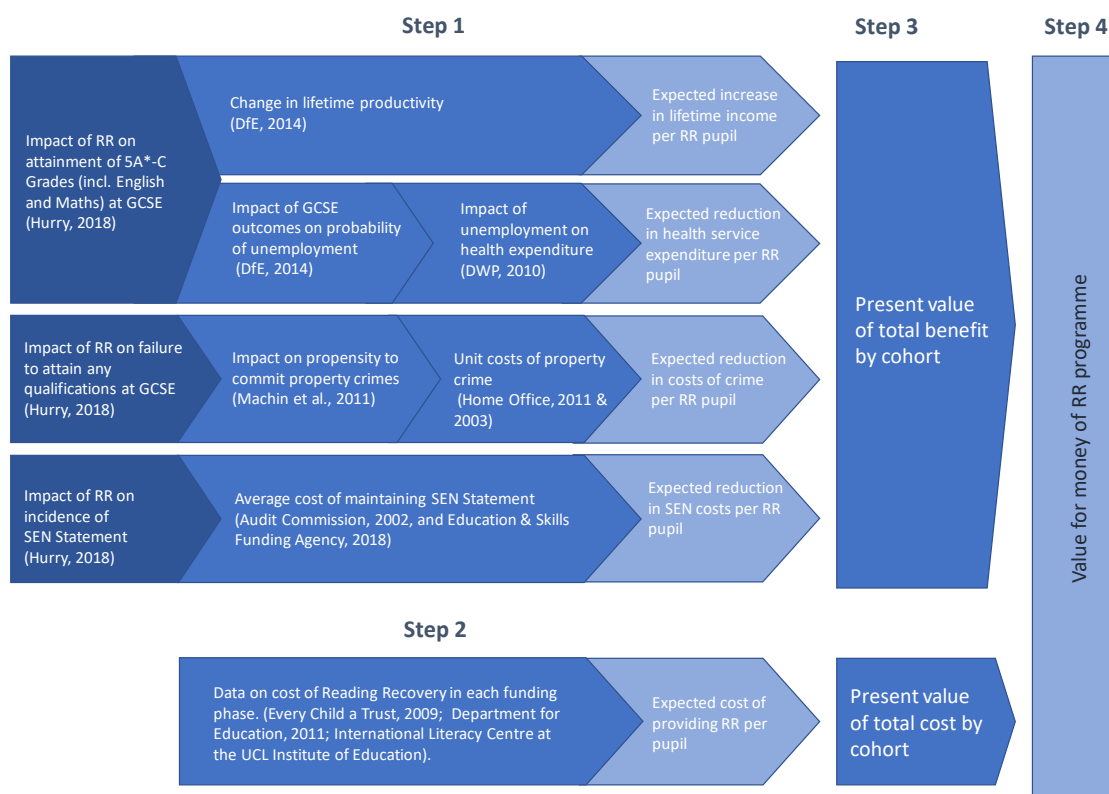
### Estimation of the costs of Reading Recovery

In step 2 we use data on the cost of Reading Recovery in the different funding phases to estimate the unit cost per pupil in each cohort. This is discussed further in section 5, with details in Annex G.

### Estimation of cohort and programme costs and benefits

In step 3 we calculate the total costs and benefits for each Reading Recovery cohort. These are expressed in present values terms by discounting costs and benefits that occur over the lifetime of children in each cohort back to age six. Finally, in step 4 we calculate the total programme costs and benefits in the evaluation period by discounting the total costs and benefits for each of the twelve cohorts back to 2005/6. Discounting of costs and benefits is done in line with the HM Treasury Green Book methodology.<sup>18</sup> Annex H gives further details on our approach to discounting.

Figure 2. Overview of analytical approach



## 3.2 Key assumptions in our study

Our analysis is based on several assumptions, the most important of which are:

- We assume the estimated long-term effects of Reading Recovery support from the Hurry & Fridkin study apply to all the children supported by Reading Recovery in the evaluation period.
- We assess the cost of Reading Recovery support in the pilot and national roll-out phases using estimates from the earlier 2009 Every Child a Chance Trust and 2011 Department of Education studies. In the school-funded phase we use cost data provided by the International Literacy Centre at UCL.

<sup>18</sup> HM Treasury (2018). The Green Book.

- Our analysis of the employment-related benefits of improved GCSE attainment is based on estimates of the impact of intermediate qualifications such as GCSEs on expected lifetime earnings from a study by the Department for Education in 2014.<sup>19</sup> These estimates are based on a statistical analysis of the general population that will not exactly match the characteristics of the pupils who received Reading Recovery support. In addition, estimates of lifetime earnings are inherently uncertain given the potential for significant structural changes in the economy that could materially affect returns from employment over the course of an individual's working life.
- Our analysis of the potential benefits related to crime and health also rely on existing published estimates of the monetary value of improved outcomes associated with better GCSE attainment that are subject to uncertainty.

Section 6.3 explores the sensitivity of our analysis and findings to these assumptions.

Our estimate of savings related to SEN support are likely to be conservative for two reasons. First, we only consider savings that accrue to local authorities from a reduction in the number of children who require a SEN Statement/EHCP. This is because we are not able to assess potential associated savings for schools due to a lack of publicly available information on their actual SEN spend. These are likely to be significant, as schools are expected by government to spend around £6,000 per annum per pupil with a Statement/EHCP. Second, although Hurry and Fridkin find that there were significantly fewer 14-year-old pupils in the Reading Recovery requiring any form of SEN support (including School Support, formerly School Action/School Action Plus, as well as a Statement/SEN) than in the comparison group, we are not able to assess the resulting savings due to a lack of information on the cost of lower levels of SEN support.

We also note that there are several other potential benefits associated with lifting children out of low literacy levels that are not included in our analysis. These include savings related to reduced truancy or school exclusion, non-property crime, and substance abuse.

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<sup>19</sup> Department for Education (2014): The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships.

## 4 Analysis of potential benefits

This section sets out our estimates of the potential benefits of Reading Recovery support. Sections 4.1 to 4.4 discuss the expected increase in lifetime income for Reading Recovery pupils, savings in local authority costs related to SEN provision, and savings in health service and crime costs.<sup>20</sup> Section 4.5 provides a summary of the estimated benefits, and section 4.6 compares our estimates to those of the two earlier studies.

### 4.1 Increase in lifetime income

Improved academic attainment results in improved employment prospects for an individual through both a signalling effect (potential employers are more likely to offer a role to someone with better academic qualifications) and direct productivity impacts (individuals have gained more skills and knowledge to apply in a working environment). These effects will lead to lower unemployment and better wages for individuals.

The Hurry & Fridkin study finds that Reading Recovery pupils are 18 to 26 percentage points more likely to attain 5A\*-C Grades (including English and Maths) at GCSE. We link this evidence to lifetime income using published estimates of the average value to an 18-year old of attaining different levels of qualification that considers changes in employment prospects and wages.<sup>21</sup> We discount these estimates to reflect the value of this future income to an individual at age six – the point at which pupils receive the Reading Recovery intervention. Further details of our approach can be found in Annex C.

Table 2 shows the estimated potential benefits from improved lifetime income for the programme and the average benefit per Reading Recovery pupil.

**Table 2. Benefits from increased lifetime income**

	Programme benefits	Benefit per RR pupil
Increased lifetime income	£640 to £930 million	£6,300 to £9,100

Figures are present values and are in 2017/18 prices.

### 4.2 Expected reduction in costs related to SEN Statement/EHCP

Improved reading skills at age six mean that pupils are less likely to require intensive support through the SEN framework during their school career. As explained in section 2.2, our estimate of the potential cost saving is based on a 7-percentage point reduction in the proportion of children requiring a SEN Statement/EHCP at some point during school amongst Reading Recovery pupils. As noted in section 3.2, our estimate of cost savings relates to the expected reduction in expenditure on SEN Statements/EHCPs by local authorities and does not include any associated savings for schools, or any savings on lower forms of SEN support.

Our analysis includes both the one-off cost of the initial SEN Statement/EHCP assessment and the ongoing annual cost of support as follows:

<sup>20</sup> Programme benefits are rounded to the nearest ten million pounds, and benefits per pupil are rounded to the nearest one hundred pounds.

<sup>21</sup> Department for Education (2014).

- We estimate the cost of the initial assessment for a SEN Statement/EHCP as £3,500 in 2017/18 prices, based on an Audit Commission report.<sup>22</sup> This study is relatively old but is the most recent publicly available estimate of this cost as far as we know.

We estimate the ongoing annual cost of support by calculating the annual average cost per pupil of ongoing support using data on local authorities' total 'high needs' spending on pupils with a SEN Statement/EHCP in state-funded mainstream primary and secondary schools in England in 2017/18. This gives a figure of £10,400 per pupil with a SEN Statement/EHCP per year which is provided by the local authority as 'top up' funding to supplement schools' own funding.<sup>23</sup>

To calculate the expected cost saving we assume that pupils are on average issued with a SEN Statement/EHCP at age 11 and this remains in place for just over five years.<sup>24</sup> Further details of our approach are set out in Annex D.

Table 3 shows the estimated benefit from savings in SEN Statement/EHCP costs for the programme and the average benefit per Reading Recovery pupil.

**Table 3. SEN Statement/EHCP cost savings**

	Programme benefits	Benefit per RR pupil
SEN Statement/EHCP cost savings	£290 million	£2,900

Figures are present values and in 2017/18 prices.

### 4.3 Expected reduction in health service costs related

Several studies have established a correlation between levels of educational attainment and health outcomes for individuals, although there is a lack of consensus on the exact causal reasons for this.<sup>25</sup> We focus on a specific indirect link to health impacts based on evidence that improved academic attainment is associated with reduced unemployment, which is in turn associated with lower use of health services.

As previously noted, Hurry & Fridkin find that Reading Recovery pupils are 18 to 26 percentage points more likely to attain 5A\*-C Grades (including English and Maths) at GCSE. We assume that this results in reduction in the probability of being unemployed in each year of around 0.6%, based on estimates relating to the impact of improved academic attainment on the likelihood of unemployment in the Department for Education (2014) study we use in relation to the lifetime earnings benefit.

The potential cost saving to the NHS is assessed by multiplying the reduction in the probability of unemployment by an estimate of the additional cost to the NHS per unemployed person of £570 per year (2017/18 prices) from the Department of Work and Pensions (2014) study.<sup>26</sup> Further details of our approach are set out in Annex D.

<sup>22</sup> Audit Commission (2002): Statutory Assessments and Statements of SEN: in need of review? This estimate is based on the old SEN statement system, prior to the introduction of the Education, Health and Care plans in 2014. We assume that the cost of the initial assessment remains similar.

<sup>23</sup> Data from <https://www.gov.uk/government/statistics/statements-of-sen-and-ehc-plans-england-2018>

<sup>24</sup> This figure relates to local authority spend on pupils in 'mainstream schools' in England with a SEN Statement/EHCP. See Annex D for details.

<sup>25</sup> See for example Organisation for Economic Cooperation & Development (2006).

<sup>26</sup> Department of Work and Pensions (2010): The Department for Work and Pensions Social Cost-Benefit Analysis framework.

Table 4 shows the estimated benefit from health service cost savings for the programme and the average benefit per Reading Recovery pupil.

**Table 4. Benefit from health service cost savings**

	Programme benefits	Benefit per RR pupil
Health service cost savings	£1 million	£10

Figures are present values and in 2017/18 prices.

#### 4.4 Expected reductions in costs of crime

The Hurry & Fridkin study finds Reading Recovery pupils are five percentage points less likely to attain no qualifications at GCSE.<sup>27</sup> We link this evidence to crime impacts based on evidence from the study by Machin et al. (2011) into the relationship between academic attainment and the likelihood of an individual being convicted of committing a property crime.<sup>28</sup>

From this study we estimate that Reading Recovery support reduces the likelihood of an individual committing a property crime in any given year by around 4%. We estimate the expected cost savings over the lifetime of each Reading Recovery pupil by applying this probability to a base level of crimes per individual taken from the Crime Survey for England and Wales and an estimated unit cost of a typical property crime base on Home Office reports.<sup>29</sup> Further details of our approach are set out in Annex E.

We estimate that the potential reduction in the annual costs of property crime cost is around £7 per Reading Recovery pupil. This figure takes account of costs incurred by the Government on the criminal justice system, crime prevention costs, the impact of crime on victims' emotional and physical wellbeing, and the value of property that is lost or damaged through crime.

Table 5 shows our estimate of the present value of the benefit from reduced costs of crime for the programme and the average benefit per Reading Recovery pupil.

**Table 5. Benefits from reduced costs of crime**

	Programme benefits	Average benefit per RR pupil
Crime cost savings	£11 million	£100

Figures are present values and in 2017/18 prices.

#### 4.5 Summary of benefits

Table 6 provides a summary of the estimated benefits from the Reading Recovery programme. In total, the potential benefits of the programme are between £940 million to £1,200 million for the 101,000 children supported between 2005/06 and 2016/17. This is equivalent to £9,200 to £12,100 per Reading Recovery pupil. The estimated increased in lifetime income accounts for around 70% of total benefits, with cost savings to local authorities related to SEN Statements/EHCPs accounting for most of the remaining 30%.

<sup>27</sup> The sample sizes in the Hurry & Fridkin (2018) study for those obtaining no qualifications at Key Stage 4 are relatively small and as a result the difference in outcomes is not statistically significant. We have chosen to adopt these estimates as the best available evidence but note that there is higher degree of uncertainty around impacts of RR on costs of crime. The overall scale of these benefits means that this uncertainty does not affect the key conclusions of our analysis.

<sup>28</sup> Machin et al. (2011): The Crime Reducing Effect of Education.

<sup>29</sup> Home Office (2003) and Home Office (2011).

**Table 6. Summary of benefits**

Benefit category	Programme benefits	Benefit per RR pupil
Increased lifetime income	£640 to £930 million	£6,300 to £9,100
SEN Statement/EHCP costs	£290 million	£2,900
Health service costs	£1 million	£10
Crime costs	£11 million	£100
<b>Total benefit</b>	<b>£940-1,200 million</b>	<b>£9,200-12,100</b>

Figures are present values and in 2017/18 prices. Note that the total benefit figures are rounded.

### Comparison to earlier evaluations

Our estimate of potential benefits is somewhat higher than the estimate in the 2011 Department for Education study of £8,400 per person. This is due to a combination of factors.

- First, our estimate of the increase in lifetime income, based on the actual impact of Reading Recovery support on GCSE attainment from the follow-up study, is higher than the estimate in the Department for Education Study.
- Second, we include cost savings related to local authority expenditure on SEN Statements/EHCPS that are not considered in the Department for Education study.
- Third, our estimate of health benefits, which is based on the link between GCSE attainment and unemployment, is more conservative than the approach used in the Department for Education study.

Our estimate of potential benefits is considerably lower than the estimate in the 2009 Every Child a Chance Trust study of £50,500 per pupil. However, as noted in section 2.4 there are several significant differences in the approach used to assess benefits in that study compared to our study that means our estimated benefits are not directly comparable to this figure.

## 5 Costs of the Reading Recovery programme

This section sets out our estimates of the cost of Reading Recovery over the evaluation period. There were significant differences in the way the programme operated in the three different funding phases over the period 2005/6 to 2016/17 which are reflected in different cost structures over the phases. For example, the pilot and national roll-out phases had greater costs at local authority level, whereas, in the school-funded phase, all costs at local authority level are charged back to schools in the form of training costs.

We have taken these differences in cost structure into account by assessing the cost of Reading Recovery in each of the three funding phases as follows.

- Pilot phase: we use the costs reported in the 2009 Every Child a Chance Trust study.<sup>30</sup>
- National roll-out phase: we derive an estimate of the cost of Reading Recovery support from the costs for the wider ECaR programme reported in the 2011 Department for Education study.
- School-funded phase: we use costs that are based on information provided by the International Literacy Centre at the UCL Institute of Education and using the methodology from the 2009 Every Child a Chance Trust study.<sup>31</sup>

We have been assisted by Jean Gross, former Director of The Every Child a Reader programme, in preparing these estimates.

Below, we summarise the cost estimates we use in our value for money analysis. These are expressed in 2017/18 prices. Further details on the basis for these estimates are provided in Annex F.

### 5.1 Estimated unit cost by phase

Table 7 shows the estimated unit costs per pupil in each phase.<sup>32</sup> These figures include the cost of teacher time, training costs and additional costs for books and materials to support lessons. Upfront costs for schools and local authorities are spread across four years to provide average costs per pupil.

The unit cost per pupil is significantly higher in the national roll-out phase of the ECaR programme compared to the pilot and school-funded phases. It is not possible to fully reconcile the reasons for this cost variation based on the publicly available information. However, we understand that there are several factors that influenced unit costs in the different phases:

- The pilot and national roll-out phases involved a relatively high level of up-front investment to set up the infrastructure for a large-scale expansion of the Reading Recovery programme, such as training Teacher Leaders and Reading Recovery teachers, compared to the later school-funded phase.
- The ECaR programme relied on more experienced teachers initially, which will tend to increase the teacher-related costs of Reading Recovery.<sup>33</sup>

<sup>30</sup> Every Child a Chance Trust (2009).

<sup>31</sup> See Appendix 3 of Every Child a Chance Trust (2009).

<sup>32</sup> Unit costs estimates are rounded to the nearest one thousand pounds and programme cost to the nearest ten million pounds.

<sup>33</sup> We also note that our approach to deriving the cost of Reading Recovery support in the national roll-out phase from the figures in the 2011 the Department for Education study is conservative and hence may overstate the unit cost estimate in this phase. See Annex F for further details.

- Central costs of the Reading Recovery programme, such as training, have been scaled back in recent years to enable schools to maintain Reading Recovery during a period of austerity.

As discussed in section 6.3, our sensitivity analysis indicates that the Benefit to Cost ratio of Reading Recovery is greater than one even if we use the higher unit cost relating to the national roll-phase in all years.

**Table 7. Unit cost per pupil**

	Pilot	National roll-out	School-funded
Unit cost	£3,100	£3,900	£2,500

Figures are in 2017/18 prices.

## 5.2 Programme cost

We estimate the total cost of the Reading Recovery programme by multiplying the unit cost in each year by the number of pupils in the Reading Recovery cohort, and then summing across all 12 cohorts in the evaluation period. The total costs for each cohort are discounted back to 2005/06 to take account of the differences in timing across cohorts to give the present value of the programme costs. Table 8 shows the programme cost, broken down by funding phase.

**Table 8. Estimated programme cost**

	Pilot	National roll-out	School-funded	Programme
Total cost	£20 million	£190 million	£70 million	£280 million

Figures are present values and in 2017/18 prices



## 6 Analysis of value for money

This section sets out our analysis of the value for money of the Reading Recovery programme over the evaluation period. Section 6.1 presents our estimate of the Benefit Cost ratio for the programme. The average costs and benefits per Reading Recovery pupil are set out in section 6.2. Finally, section 6.3 discusses the results of our sensitivity analysis. As discussed in section 3.1 the programme costs and benefits are calculated by aggregating the estimated costs and benefits for each of the twelve cohorts in the evaluation period and are expressed as present values, with 2005/6 as the base year.

### 6.1 Benefit Cost Ratio for the programme

The Benefit Cost Ratio (BCR) is a commonly used measure of value for money which gives an indication of the expected return to society for every £1 invested in the Reading Recovery programme. A BCR greater than one indicates that expected benefits exceed the programme costs.

Table 9 shows the overall benefits and costs and the BCR for the programme. The BCR indicates that every £1 spent on the Reading Recovery programme has generated an expected benefit of £3.30-4.30.

**Table 9. BCR for the Reading Recovery programme**

Total for programme	
Benefits	£940 to £1,200 million
Costs	£280 million
BCR	3.3-4.3

Figures are present values and in 2017/18 prices.

Our estimate of the BCR for the programme is higher than the estimate in the 2011 Department for Education study reported in section 2.3. This is due to the combined effect of the difference in the costs and benefits used in the earlier studies (see earlier discussion in section 2.4 and section 5). Conversely our estimate is substantially lower than the BCR estimate in the 2009 Every Child a Chance Trust study. However, as explained earlier, it is not meaningful to compare these figures due to the significant differences in the purpose and approach used in the two studies.

Table 10 shows the benefits and costs for each funding phase. The variation in the BCR reflects the difference in the unit cost in each phase as explained in Section 5.

**Table 10. Summary of Value for Money by funding phase**

	Pilot	National roll-out	School-funded
Benefits	£80-110 million	£560-710 million	£300-390 million
Costs	£20 million	£190 million	£70 million
BCR	3.6-4.7	2.9-3.7	4.5-5.8

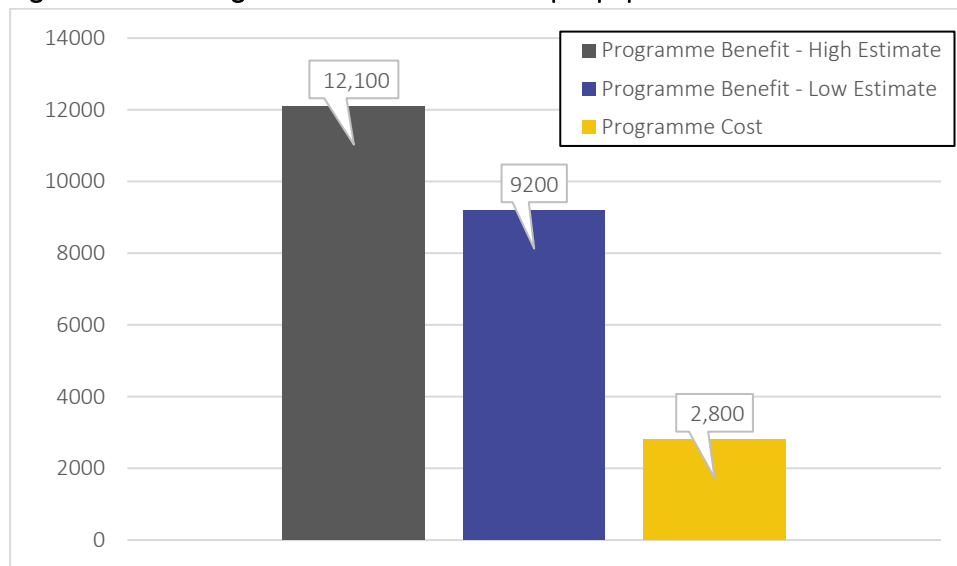
Figures are present values and in 2017/18 prices.

### 6.2 Net benefit per pupil

The value for money of the Reading Recovery programme can also be expressed in terms of the benefits and costs per pupil. On average the Reading Recovery programme provides £9,200-

12,100 in benefit per pupil with a cost of £2,800 per pupil, as shown in Figure 3.<sup>34</sup> In other words, the programme provides a net benefit of around £6,400-9,300 for each pupil who received Reading Recovery support.

**Figure 3. Programme costs and benefits per pupil**



Figures are present values and in 2017/18 prices.

### 6.3 Sensitivity analysis

In this section we assess the sensitivity of the estimated BCR to plausible variations in some of the key assumptions that we rely on in our analysis (see the earlier discussion in section 3.2). As will be seen, the overall finding that the potential programme benefits outweigh the costs is quite robust.

#### Sensitivity 1: Lower lifetime earnings benefits

This explores the sensitivity of the estimated BCR to a lower impact of achieving 5+ good GCSEs on lifetime income. We do this by using the lower estimate of the increase in lifetime income from attaining 5+ good GCSEs (including Maths and English) in the Department of Education (2014) study. These are £34K for men and £42K for women in 2017/18 prices (compared to £68K for men and £59K for women in our main analysis). Table 11 shows that this reduces the BCR to 2.3-2.9.

**Table 11. Impact of lower lifetime earnings benefits**

	Core scenario	Lower lifetime earnings
BCR	3.3-4.3	2.3-2.9

#### Sensitivity 2: Higher cost assumptions

This explores the sensitivity of the estimated BCR to a higher cost per Reading Recovery pupil. We do this by setting the unit cost at the level in the national roll-out phase in all years. As noted in section 5, this is higher than in the pilot and school-funded phases of the programme. Table 12 shows this reduces the BCR to 2.9-3.7.

<sup>34</sup> The £2,800 cost per pupil figure is a present value and is therefore not directly comparable to the unit cost estimates in Table 7.

**Table 12. Impact of higher cost assumptions**

	Core scenario	Higher costs
BCR	3.3-4.3	2.9-3.7

**Sensitivity 3: Switching value of estimated effects of Reading Recovery**

This considers the sensitivity of the BCR to a smaller effect of Reading Recovery support on Key Stage 4 attainment and the incidence of SEN Statement/EHCP support. This allows us to explore the impact of any potential overestimate of the average effect of Reading Recovery support related to applying the Hurry & Fridkin results to all Reading Recovery pupils in the evaluation period.

We calculate the size of these effects that would result in programme benefits equal to costs. These are commonly referred to 'switching values' and they are the minimum effect required for a BCR of one. This is done by proportionately reducing the estimated effects used in our main analysis until the BCR is equal to one. Table 13 shows the switching value effects and the values reported in the Hurry & Fridkin study. As can be seen, our finding that the BCR exceeds one is robust to a significant reduction in the effect of Reading Recovery on pupil outcomes.

**Table 13. Switching Value impacts**

	5+ good GCSEs, incl. Maths and English	No KS4 qualifications	SEN Statement/EHCP
Impact in Hurry & Fridkin study	+18pp to 26pp	-5pp	-7pp
Switching value impact	+5pp to 6pp	-2pp to -1pp	-2pp

## 7 Conclusion

This study provides an up-to-date assessment of the return on investment of the Reading Recovery programme, drawing on the latest evidence of the long-term impact of the programme. It has demonstrated that early interventions on literacy skills are likely to have significant returns to society.

Our key findings are as follows:

- The Hurry & Fridkin follow-up study shows Reading Recovery support increased the likelihood that a child will attain 5+ good GCSEs (including Maths and English) by 18-26 percentage points and reduced the proportion of children requiring a SEN Statement/EHCP by 7 percentage points.
- We estimate potential benefits to UK society from Reading Recovery of £940 million to £1,200 million across the 101,000 children supported since 2005/6.
- Estimated potential benefits are £9,200 to £12,100 per Reading Recovery pupil compared to around £2,800 in costs, giving a net benefit of £6,400 to £9,300 per pupil.
- These findings imply that every £1 spent on Reading Recovery since 2005/6 will create a potential societal benefit of £3.30 to £4.30.
- Reading Recovery support increases the expected lifetime income from employment of around £6,300 to £9,100 per pupil. This is equivalent to approximately 70% of the total societal benefit.
- Savings from the reduction in the number of children with a SEN Statement/EHCP are conservatively estimated as £2,900 per Reading Recovery pupil accruing to local authorities. This is equivalent to approximately 30% of the total societal benefit.

### Implications

Our study shows the potential of well-designed early interventions addressing literacy difficulties to improve children's life prospects and create a significant societal return on the cost of the intervention. As is invariably the case when evaluating early interventions our analysis is based on several assumptions. For example, we assume that the positive effects in the follow-up study apply to all the children supported by Reading Recovery in the evaluation period.<sup>35</sup>

There are significant uncertainties around our estimate of the potential benefits over the lifetime of Reading Recovery pupils. However, the key conclusion that benefits exceed programme costs is quite robust. Moreover, our estimate of benefits is conservative as we do not consider potential savings in SEN expenditure by schools or on lower forms of SEN support, or other wider savings such as reduced truancy and school exclusions.

The availability of reliable long-term follow-up data plays a key role in assessing early interventions, and our study has benefited from the evidence in the Hurry study. There would be considerable value in further strengthening the evidence base on the long-term effects of early literacy interventions such as Reading Recovery, for example through a large scale randomised study of Reading Recovery that covers children and schools outside London. More generally, the application of a rigorous evaluation approach to other early literacy interventions will help facilitate a comparison between different approaches in this important area.

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<sup>35</sup> All the key assumptions underpinning our findings are set out in full in the main report.

## Annex A: The Hurry & Fridkin study

This annex provides further background on the Hurry & Fridkin (2018) study we use to inform our analysis. As explained in section 2.2, this study presents new evidence of the longer-term effects of Reading Recovery on academic attainment at Key Stage 4 and the incidence of SEN support, based on the results of a ten-year follow up study of a group of children who were supported in 2005/6. We first describe the main features of the follow-up study, and then set out the key findings we rely on in our analysis.

### Design of the ten-year follow-up study

The follow-up study tracked outcomes for a group of 84 children who received Reading Recovery support in 2005/6 and for a comparison group of 136 similar children in schools that did not offer Reading Recovery at this time. The study was designed to answer two research questions:

- Do children with reading difficulties who received Reading Recovery at age six perform better on GCSEs than a comparison group of similar children?
- Are the children who received Reading Recovery at age six less likely to be formally identified with special educational needs at ages 14 and 16?

The study sample comprised two groups of children (the Reading Recovery group and the Comparison group) and has the following elements:

- Children in both groups were from schools in ten London Boroughs that are amongst the lowest achieving in England, with a very high proportion of children entitled to FSMs.
- 21 infant and primary schools in five London Boroughs were identified that had a Reading Recovery teacher providing literacy intervention in Year 1 in 2005/6. A further 21 comparison schools in five other London Boroughs that did not offer Reading Recovery in this year were identified. Schools in the two groups were similar in terms of children's literacy levels<sup>36</sup>, the proportion of children in receipt of FSMs, and the proportion with English as a second language.
- In each of these 42 schools the eight children with the lowest attainment in literacy were identified. A sample of 91 children was selected for the Reading Recovery group, of which four did not receive all the programme, and a sample of 148 children for the Comparison group.
- The study took data from the National Pupil database on two outcomes for pupils at age 14 and 16:
  - SEN status: data was collected on whether a child had been identified as requiring support to address learning or behaviour difficulties in relation to School Action, School Action Plus or a SEN Statement/EHCP at age 14 and 16.
  - Key Stage 4 attainment: data was collected on each child's GCSE attainment in Key Stage 4 GCSE exams at age 16.

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<sup>36</sup> Pupils were recruited to the comparison group on the basis that they had similar literacy levels as Reading Recovery pupils as measured by the Observation Survey of Early Literacy Achievement (OSELA) and the Word Recognition and Phonic Skills (WRAPS) test.

## Key findings from Hurry & Fridkin study used in our analysis

We estimate potential benefits based on evidence from the Hurry & Fridkin study on the impact of Reading Recovery support on GCSE attainment and the incidence of SEN Statements/EHCPs.

### GCSE attainment

Hurry & Fridkin find that children in the Reading Recovery Group achieved better results in Key Stage 4 GCSE exams than the Comparison group:

- Reading Recovery pupils were significantly more likely to achieve higher GCSE point scores than the Comparison group.
- Reading Recovery pupils were significantly more likely to achieve 5+ good GCSEs (at an A\* to C grade), including Maths and English, than the Comparison group.
- Reading Recovery pupils were significantly less likely to achieve no GCSEs than the Comparison group.

The proportion of children in the Comparison group (62%) receiving FSMs is significantly higher than in the Reading Recovery group (43%). Given this, Hurry & Fridkin carried out additional regression analysis for the subsample of 120 children receiving FSMs, and the subsample of 100 children who were not eligible, using GCSE point scores as the dependent variable. They find that the Reading Recovery group has significantly higher GCSE scores than the Comparison group for both analyses, but the effect is slightly larger for those not taking FSMs.

Our economic analysis of employment-related benefits relies specifically on the finding that Reading Recovery pupils are more likely to achieve 5+ good GCSE (including Maths and English), and less likely to achieve no GCSEs. Hurry & Fridkin (2018) report these results for the entire sample of 220 children in the follow-up study, irrespective of FSM status. These are summarised in Table 14.

**Table 14. GCSE performance of pupils in Reading Recovery and Comparison groups**

		5+A*-C including English and Maths	5+A*-C	5+A*-G	1+ below grade G	No passes
Comparison group (N=136)	N	31	16	64	15	10
	%	22.8%	11.8%	47.1%	11%	7%
Reading Recovery (N=84)	N	41	11	24	6	2
	%	48.8%	13.1%	28.6%	7.1%	2%

Source: Hurry & Fridkin (2018), Table 5.

Given the difference in the proportion of children taking FSMs in the two groups and the evidence that FSM status influences the effect of Reading Recovery support in Hurry & Fridkin (2018), we asked Professor Hurry to provide us with the comparable results by Free School Meal status. These are shown in Tables 15 and 16. These results confirm the finding that Reading Recovery support has a larger effect on GCSE attainment for the children who are not eligible for FSMs reported in Hurry & Fridkin (2018).

We take the estimated effect of Reading Recovery on the proportion of children who attained 5+ good GCSE (including Maths and English) in the no-FSM subsample as a lower bound estimate in our analysis. This is 18 percentage points, based on the results in Table 16.

**Table 15. GCSE performance of non-FSM pupils in Reading Recovery and Comparison groups**

		5+A*-C including English and Maths	5+A*-C	5+A*-G	1+ below grade G	No passes
Comparison group (N=52)	N	11	7	27	4	3
	%	21.2%	13.5%	51.9%	7.7%	5.7%
Reading Recovery (N=48)	N	26	6	12	4	0
	%	54.2%	12.5%	25.0%	8.3%	0%

Source: provided by Professor Hurry.

**Table 16. GCSE performance of FSM pupils in Reading Recovery and Comparison groups**

		5+A*-C including English and Maths	5+A*-C	5+A*-G	1+ below grade G	No passes
Comparison group (N=84)	N	20	9	37	11	7
	%	23.8%	10.7%	44.0%	13.1%	8.4%
Reading Recovery (N=36)	N	15	5	12	2	2
	%	41.7%	13.9%	33.3%	5.6%	5.6%

Source: provided by Professor Hurry.

### SEN status

Hurry & Fridkin also find that Reading Recovery support has a positive effect in reducing the need for special educational support:

- At baseline in 2005/6, just under 8% of the children in the sample had been identified with some level of SEN, and there was no statistically significant difference between the Reading Recovery and Comparison groups.
- There were significantly fewer children with a SEN Statement/EHCP at 16 in the Reading Recovery group, and significantly fewer pupils with any form of SEN support at age 14.

We estimate the savings associated with a reduction in the number of SEN Statements/EHCPs. As explained in Annex C, the size of the potential cost savings depends on the reduction in the number of children who require a SEN Statements/EHCP, as well as the school year in which a Statement/EHCP is first issued on average, and how long it remains in place. We estimate these parameters using underlying pupil level data from the follow-up study that was provided by Professor Hurry which indicates whether a pupil had a SEN Statement/EHCP at four follow-up points between Year 3 and Year 11. Based on this data, the proportion of children in the Reading Recovery group who had a SEN Statement/EHCP at some point in their time at school is 7 percentage points lower than in the Comparison group. This is comparable to the difference in the proportion of SEN Statements/EHCPs at age 16 in the two groups in Hurry & Fridkin (2018), which is just under 9 percentage points.

## Annex B: Previous economic evaluations

This annex provides further background on the earlier economic evaluations of the ECaR programme and Reading Recovery that are discussed in section 2.3. The discussion below focuses on the approach taken to assess costs and benefits in these studies.

### The Long-term Costs of Literacy Difficulties (2009) study

This study by the Every Child a Chance Trust builds on an earlier report by the KPMG Foundation in 2006.<sup>37</sup> The study reviews the research on the long-term impact of poor literacy skills on individuals and society, and estimates the resultant costs incurred by the public sector. The three largest cost categories relate to employment, education, and crime:

- Employment: children who leave primary school with very poor literacy skills are less well equipped for employment in later life and this results in lower tax and national insurance revenues, and higher expenditure on unemployment benefits.
- Education: children with very poor literacy skills are more likely to need SEN support at school and are at higher risk of exclusion and truancy, both of which increase education costs.
- Crime: children with very poor literacy skills are more likely to be convicted of a crime and be imprisoned, which will lead to higher criminal justice system costs.

The study also includes a range of other social costs associated with poor literacy skills, such as substance abuse, teenage pregnancy, depression and obesity.

The total cost to the public purse related to the failure to learn to read in primary school is estimated by summing these costs over an individual's life course (up to the age of 37). Using this figure, the potential public-sector savings from providing Reading Recovery support is calculated by assuming that the intervention lifts 79% of children with very poor literacy skills out of literacy failure.<sup>38</sup>

The study considers four 'cost cases' that provide a range of potential savings which reflects the degree of certainty attached to the likelihood that savings are realised.

Table 17 shows the estimated benefits per pupil in the Every Child a Chance Trust (2009) study. The overall value for money of the Reading Recovery intervention is assessed by comparing the estimated benefit per pupil to the cost of Reading Recovery (which is estimated as £3,100 per pupil). This gives a Benefit Cost Ratio (BCR) of 16 in the moderate certainty case (i.e. every £1 invested in Reading Recovery support delivers a return of £16), with a range of 11 to 17.

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<sup>37</sup> Every Child a Chance Trust (2009): The Long-Term Costs of Literacy Difficulties

<sup>38</sup> This was based on a study of 651 11-year-old children who had received Reading Recovery support which showed 79% had been lifted out of the 'very low literacy' category. The study assumed this was a permanent improvement.



**Table 17. Estimated benefits of Reading Recovery**

Benefit category	Benefits per pupil
Employment	£42,500
Education	£4,800
Health	£800
Criminal justice (see note)	Not Applicable
Other effects	£2,400
<b>Total benefit</b>	<b>£50,500</b>

Source: Every Child a Chance Trust (2009). Figures refer to the 'moderate certainty' scenario and are in 2017/18 prices.

Note: potential savings in the cost of the criminal justice system of £6,000 per person were excluded from the moderate certainty scenario.

#### The Evaluation of the Department for Education (2011) study

This study was commissioned by the Department for Education to provide an independent evaluation of the ECaR programme.<sup>39</sup> The analysis of costs and benefits carried out as part of the value for money analysis relate to the ECaR programme and not just the Reading Recovery component.

The study considers the impact of poor literacy on later outcomes relating to employment, crime and health. Employment-related benefits are estimated based on increase in the lifetime income of children who receive Reading Recovery support. Costs savings related to SEN support, adult literacy support or substance abuse and teenage pregnancy are not considered.

The effect of the programme on these longer-term outcomes is assessed using early evidence on the effect of Reading Recovery support on Key Stage 1 attainment to predict expected attainment at Key Stage 4. This is done in the context of two scenarios which allow for the difference in the assumed duration of improvements related to Reading Recovery support beyond Key Stage 1.<sup>40</sup>

Table 18 shows the estimated benefits for the 'no depreciation' scenario in which improvements in Key Stage 1 are assumed to persist until Key Stage 4. The overall value for money of the ECaR programme is assessed by comparing the estimated benefit per pupil to the cost per pupil of £4,600. This gives a Benefit Cost Ratio (BCR) of 1.8 i.e. every £1 invested in the ECaR programme deliver a return of £1.80.

<sup>39</sup> Department for Education (2011).

<sup>40</sup> These are referred to in the Department for Education study as the 'full depreciation' (i.e. effects do not continue beyond KS1) and 'no depreciation' (i.e. effects persist until KS4) scenarios.

Table 18. Estimated benefits of ECaR

Benefit category	Benefits per person
Lifetime income	£6,700
Education cost saving	Not included in Department for Education report
Health cost saving	£1,500
Criminal Justice cost saving	£200
Total benefit	<b>£8,400</b>

Source: Department for Education (2011). Figures refer to 'no depreciation' scenario and are in 2017/18 prices.

## Annex C: Lifetime income benefit

### Approach

We estimate the increase in lifetime income benefit for Reading Recovery pupils using data from a Department for Education (2014) study on the impact of GCSE attainment on lifetime earnings and output.<sup>41</sup> As explained below, this data can be linked to the expected increase in the likelihood of Reading Recovery pupils attaining 5+ good GCSE (including Maths and English) from the Hurry & Fridkin study.

### Calculation

We estimate the additional value of lifetime output for each Reading Recovery cohort using the following equation:

$$E_C = (G5_{RR} - G5_{CG}) \cdot V_{G,S} \cdot N_{G,C} \cdot DF^{(18-6)}$$

Where:

- $E_C$  = the value of additional economic output for cohort C (where C indexes the cohort from 1 to 12).
- $G5_{RR,CG}$  = the percentage of children attaining 5+ GCSEs graded C or above including English and Maths in the Reading Recovery and Comparison groups.
- $V_{G,S}$  = the impact of achieving at least five good GCSEs including English and Maths compared to fewer qualifications on lifetime output by gender (G) and scenario (S=C for central, S=L for low).
- $N_{G,C}$  = the number of pupils by gender in each cohort.
- DF = the discount factor is based on discount rates in line with HM Treasury's Green Book, which we use to discount benefits from age 18 back to age six (see Annex G for further details on how we discount future costs and benefits).<sup>42</sup>

All monetary values are stated in 2017/18 prices here and throughout the annexes.

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<sup>41</sup> Department for Education (2014): The economic value of key intermediate qualifications.

<sup>42</sup> HMT (2018): The Green Book.

Table 19. Summary of key variables for lifetime income benefit

Variable	Value
$G5_{RR}$	24% to 49%
$G5_{CG}$	42% to 23%
$V_{G,s}$	$V_{M,C} = £68,147$ $V_{F,C} = £59,003$ $V_{M,L} = £33,987$ $V_{F,L} = £41,986$
$N_{G,C}$	See Table 20
DF	$0.97^{43}$

## Inputs

### GCSE performance of Reading Recovery and Comparison group pupils

We use the findings from Hurry & Fridkin (2018) relating to the percentage of Reading Recovery and Comparison group pupils achieving five GCSEs A\*-C including English and Maths since this allows us to link the effect of Reading Recovery on GCSE attainment to the estimated lifetime value of economic output in the Department for Education (2014) study.

### Impact of GCSE performance on economic output

We use estimates from the Department for Education (2014) study on the impact of qualifications on lifetime earnings. Specifically, we use estimates of the impact of obtaining at least five good GCSEs including English and Maths on the economic value produced by individuals over their lifetime, compared to those who achieve anything lower at GCSE level. The study provides separate estimates for males and females, which we combine with pupil numbers split by gender.

- We take the ‘average’ values of qualifications from this study, which looks at the benefit to the individual of holding a qualification, regardless of whether it is their highest qualification. We use this as opposed to the ‘marginal’ value – which looks at the benefit to individuals of holding a qualification as their highest qualification – as we do not have qualification data beyond GCSE. Moreover, for the 5+ good GCSEs including English and Maths category, the average value is lower than the marginal value, so this provides a more conservative estimate of the value of additional qualifications on earnings.
- The study uses data on wage and employment rates of individuals with different qualifications from the Labour Force Survey. To obtain an estimate of the value of the economic output to society, rather than just earnings to the individual, the study applies an estimate of ‘non-wage labour costs’ of 30% to lifetime earnings.

We note that in principle our analysis should deduct any unavoidable additional costs that are incurred in relation to employment from the estimated increase in lifetime earnings. There are a range of ‘in-work’ costs that may arise, including the cost of travel and the cost of childcare. The incidence and magnitude of these costs is likely to depend on individual circumstances. For example, travel costs will depend on distance from an individual’s place of employment and the

<sup>43</sup> Calculated as  $1/(1+D)$ , where D = the discount rate of 3.5% (0.035).

costs of different modes of transport. Childcare costs will depend on whether an individual has children, the availability of informal childcare options, and whether the individual has a partner. Also, childcare costs will generally be incurred only in those years where an individual has children who are too young to be left alone.

Published estimates in the Department of Work and Pensions (2010) study suggest figures of £700-750 per annum for childcare, and around £430 per annum for transport for use in the evaluation of employment schemes.<sup>44</sup> For the purpose of our study, these figures should be multiplied by the impact of Reading Recovery support on the number of 'additional job years'. Using data in the Department for Education's (2014) study on the value of intermediate qualifications, we estimate that Reading Recovery support reduces the probability of unemployment by around 0.6% per annum. Based on these figures, the expected incremental in-work costs per person are less than £10 per annum (2010) prices. Taking these costs into account has no material impact on our analysis.

### Number of children by cohort

Table 20 shows the number of Reading Recovery pupils in England by cohort, broken down by gender. In the pilot phase (2005/6 to 2007/8) these figures include only those children who received Reading Recovery support that was funded by the KPMG-led ECAR programme. There were also some children who received Reading Recovery support outside the ECAR programme and these are not included. In all subsequent years pupil numbers relate to all the children in schools in England who received Reading Recovery support.

### Discounting

The discounting notation in the equation in this annex, and through to annex F, discounts the benefits and costs relating to each cohort back to when pupils were aged six. This gives us an estimate of the present value of costs and benefits for each cohort, at the time that cohort undertook Reading Recovery.

We estimate the programme benefits by summing the benefits across all 12 cohorts. This requires additional discounting to take account of the differences in the timing of benefits between cohorts. Annex G provides further detail on our discounting methodology.

We use discount rates from HMT Green Book to discount future costs and benefits. For economic output, we use a real discount rate of 3.5%.<sup>45</sup>

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<sup>44</sup> These cost estimates are in 2010 prices.

<sup>45</sup> Ideally, we would discount the value of individuals' output at 3.5% for the first 30 years and 3.0% thereafter, in line with Green Book guidance, but this is not possible using data published in Department for Education (2014). We therefore take the conservative approach of discounting by 3.5% over individuals' lifetime.

Table 20. Number of pupils in each cohort by gender

Year	Cohort	Males (N <sub>M</sub> )	Females (N <sub>F</sub> )	Total (N <sub>C</sub> )
2005/6	1	341	201	542
2006/7	2	1,103	735	1,838
2007/8	3	3,172	2,104	5,276
2008/9	4	5,839	3,741	9,610
2009/10	5	9,100	5,818	14,918
2010/11	6	12,833	8,205	21,038
2011/12	7	7,182	4,730	11,912
2012/13	8	5,849	3,872	9,721
2013/14	9	5,211	3,331	8,542
2014/15	10	4,667	3,038	7,705
2015/16	11	3,605	2,287	5,892
2016/17	12	2,593	1,869	4,462

### Caveats and limitations

- Our estimate of benefit focuses on the value of obtaining 5+ good GCSEs (including English and Maths). This is a relatively crude approach compared to the 2011 Department for Education study which considered the impact of Reading Recovery support on lifetime earnings for a range of qualifications at Key Stage 4 (including level 2 and 3 vocational qualifications) and Key Stage 5. Our approach reflects the fact that the 2018 Hurry & Fridkin study focuses on GCSE attainment.
- Our estimate of the employment-related benefits of improved GCSE attainment is based on evidence of the impact of intermediate qualifications such as GCSEs on expected lifetime earnings that is based on a statistical analysis of the general population that will not exactly match the characteristics of the pupils who received Reading Recovery support.<sup>46</sup> In addition, any such analysis of lifetime benefits is inherently uncertain as there is potential for significant structural changes in the economy over such a period that would alter relationships identified from historical data.
- The limitations of Hurry & Fridkin (2018) apply here, as we use this study to link Reading Recovery to lifetime earnings.

<sup>46</sup> Department for Education (2014): The economic value of key intermediate qualifications: estimating the returns and lifetime productivity gains to GCSEs, A levels and apprenticeships.

## Annex D: SEN cost savings

### Background

Pupils who are struggling at school may be identified by schools as requiring SEN support. Currently, the two main categories of SEN support are School Support (this combines the previous School Action and School Action plus categories), and an Education, Health and Care Plan, or EHCP (previously known as a Statement of SEN). Schools can add or remove children to these SEN categories in any year of primary or secondary education, based on an assessment of needs.

Pupils assigned to one of the SEN categories receive additional support, with the level and cost of support provided increasing from School Action up to a SEN Statement/EHCP. Schools are responsible for spending around £6,000 per annum from their own budgets to support each child with a SEN Statement/EHCP before they receive 'top-up' funding from the local authority.

### Approach

The Hurry & Fridkin study finds that Reading Recovery pupils were less likely than Comparison group pupils to have SEN status of any type (i.e. School Action, School Action plus or SEN Statement/EHCP) at age 14. At age 16 there were significantly fewer pupils in the Reading Recovery group with a SEN Statement/EHCP.

Our analysis only captures cost savings from the reduced incidence of SEN Statements/EHCPs in relation to local authorities. This reflects a lack of reliable published data on the costs of lower forms of SEN support, and on SEN costs at the school level.

As explained in Annex A, we use underlying pupil-level data from the follow-up study provided by Professor Hurry to estimate:

- The reduction in the likelihood of a Reading Recovery pupil having a SEN Statement/EHCP at some point.
- The average duration of a SEN Statement/EHCP and the average school year in which this status first applies.

These estimates are combined with estimates of the one-off administrative costs of issuing a SEN Statement/EHCP and annual support costs to calculate the cost per SEN Statement/EHCP. Our estimate of annual support costs only includes 'top-up' funding by local authorities, as there is no publicly available data on SEN support spending from school budgets.

### Calculation

We estimate the unit cost per occurrence of support for a pupil issued with a SEN Statement/EHCP as follows:

$$C = [A \cdot DF^{(11-6)} + \sum_{T=5}^{10} \left( \frac{TC}{N_{SEN}} \right) \cdot DF^T]$$

Where

- A = one-off administrative costs of issuing a statement.
- TC = annual running costs of high-needs support for SEN pupils in mainstream schools for all local authorities in England.
- $N_{SEN}$  = the number of pupils with a SEN Statement/EHCP.

- DF = discount factor, with T representing the years over which annual running SEN costs are incurred, running from 5 (age 11) to 10 (age 16).

We calculate the SEN cost savings per cohort of Reading Recovery pupils as:

$$\sum_{C=0}^{12} ((S_{CG} - S_{RR}) \cdot C) \cdot N_C$$

Where

- $S_{RR}$  = the percentage of pupils in the Reading Recovery group classified with a SEN Statement/EHCP at any point.
- $S_{CG}$  = the percentage of Comparison group pupils classified with a SEN Statement/EHCP.
- C = the unit cost per occurrence of SEN figure derived above.
- $N_T$  = the number of pupils in year T, running from 0 (2005/6) to 12 (2016/17).

**Table 21. Summary of key variables for SEN Statement/EHCP cost savings**

Variable	Value
A	£3,488
TC	£1,335 million
$N_{SEN}$	128,114
$D_F$	0.97
$S_{CG}$	10%
$S_{RR}$	3%
$N_C$	See Table 20

## Inputs

### Administrative costs of issuing a SEN Statement

- We use an estimate of the upfront administrative costs of issuing a SEN Statement from a 2002 report by the Audit Commission (now the National Audit Office, NAO).<sup>47</sup>
- The report does not state the price year of the estimate, but we assume this is 2000/01 and inflate to 2017/18 prices.

### Annual running costs of supporting SEN pupils

- We use Section 251 budget data, which provides data on planned and actual spending on education and children's social care by local authorities.<sup>48</sup>
- To estimate spending by local authorities on pupils with a SEN Statement/EHCP, based on expert advice, we used items 1.2.1-1.2.5 from this data on actual spend for 2017-18 on state-funded primary and secondary mainstream schools.

<sup>47</sup> Audit Commission (2002): Statutory Assessments and Statements of SEN: in need of review?

<sup>48</sup> Data from <https://www.gov.uk/guidance/section-251-2017-to-2018>



- We divide this by the number of pupils, N, which is taken as the number of pupils in 'mainstream schools' in England with a SEN Statement/EHCP.<sup>49</sup>
- This gives a figure of £10,400 per pupil with a SEN Statement/EHCP per year which is provided by the local authority as 'top up' funding to supplement schools' own funding.

#### Timing and discounting of costs per SEN Statement/EHCP occurrence

- To assess the present value of the cost per SEN Statement/EHCP occurrence we made assumptions about when these costs typically arise in a child's school years. This is informed by pupil-level data from Hurry & Fridkin that relates to the incidence of SEN Statements in the Reading Recovery and Comparison groups. Based on this, we assume:
  - SEN Statements/EHCPs apply from age 11 on average (Year 7 – the start of secondary school).
  - The average duration of SEN Statement/EHCP status is 5.3 years.
- These assumptions mean that we assume that administrative costs (A) occur at age 11 and running costs (TC/N) apply annually for 5.3 years from Year 11. Costs for the final 0.3 years are calculated on a pro-rata basis. Costs are discounted back to age six for each cohort.

#### Cost savings per Reading Recovery cohort

- We estimate the reduction in the likelihood of being classified with a SEN Statement/EHCP from Reading Recovery support using pupil level data from Hurry & Fridkin (2018).
- We find that 10% of Comparison group pupils had a SEN Statement/EHCP at some point during school, compared to 3% of Reading Recovery pupils. Based on this we assume that there is a 7-percentage point reduction in the likelihood that a Reading Recovery pupil will have a SEN Statement/EHCP in school.
- The expected cost savings for local authorities are calculated by first multiplying this percentage point difference by the cost per SEN Statement/EHCP, then multiplying by the number of pupils in a cohort.

#### Caveats and limitations

- As we use data from Hurry & Fridkin (2018), our estimates of SEN cost savings are subject to the general limitations of this study.
- The number of pupils with a SEN Statement/EHCP in the Hurry & Fridkin study is relatively small in both the Reading Recovery group (2) and the Comparison group (10). As a result, our estimate of the average duration for which a SEN Statement/EHCP applies is subject to a high degree of uncertainty. Whilst this duration was shorter for Reading Recovery pupils, we did not consider the sample size sufficiently large to draw conclusions, so we assumed the duration was the same between the two groups.

As noted in section 3.3, our approach to assessing SEN cost savings is likely to be quite conservative:

- We only consider local authority savings and do not include any potential savings by schools, due to a lack of available information on SEN spending by schools. Since schools are expected

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<sup>49</sup> Data from <https://www.gov.uk/government/statistics/statements-of-sen-and-ehc-plans-england-2018>

by government to spend around £6,000 per annum per pupil with a SEN Statement/EHCP, these savings are potentially significant.

- We do not consider savings related to lower levels of SEN support. As noted above, Hurry and Fridkin find that there were fewer 14-year-old pupils in the Reading Recovery requiring any SEN support (including School Support, formerly School Action/School Action Plus, as well as a Statement/SEN) than in the Comparison group.

## Annex E: Healthcare cost savings

### Approach

We estimate healthcare cost savings using the effect of Reading Recovery support on GCSE attainment from the Hurry & Fridkin study and linking this to an estimate of the impact of improved GCSE attainment on the probability of unemployment, and an estimate of the increase in the additional annual cost of an unemployed individual to the NHS from the Department for Work and Pensions (2010) study. We consider that this approach is conservative and is likely to underestimate the potential healthcare benefits.

### Calculation

We estimate the value of health cost savings over the working life of Reading Recovery participants, per cohort of Reading Recovery pupils as follows:

$$\sum_{T=0}^{58} [(G5_{RR} - G5_{CG}) \cdot \Delta \Pr(U_G) \cdot L] \cdot N_{C,G} \cdot DF^T$$

Where:

- $H_G$  is the expected cost of health savings over the working-age lifetime of a Reading Recovery participant (16-64), discounted back to age six and estimated by gender.
- $G5_{RR}$  and  $G5_{CG}$  are the % of Reading Recovery and Comparison group pupils obtaining at least five GCSEs A\*-C including English in Maths.
- $\Delta \Pr(U_G)$  is the percentage-point reduction in the probability of being unemployed at any time during an individual's working-age life, due to obtaining at least five good GCSEs including English and Maths, by gender.
- $L$  is the additional annual cost to the NHS of an unemployed individual.
- $N_{C,G}$  is the number of pupils in cohort C by gender.
- $DF$  is the discount factor, with  $T$  representing the 58 years between the Reading Recovery programme (age six) and retirement (64). Note that health savings are only assumed to be zero before age 16.

Table 22. Summary of key variables for healthcare cost savings

Variable	Value
$G5_{RR}$	49%
$G5_{CG}$	23%
$\Delta Pr(U_G)$	$\Delta Pr(U_{G=M}) = 0$ ; $\Delta Pr(U_{G=F}) = 0.02$
L	£574
$N_{C,G}$	See Table 20
DF	Varies (see below)

## Inputs

### Impact of Reading Recovery on GCSE attainment

- We use the proportion of Reading Recovery and Comparison group pupils achieving at least five GCSEs A\*-C, including English and Maths from Hurry & Fridkin (2018) to allow us to link with estimates on the risk of unemployment from the Department for Education (2014) study.

### The impact of improved GCSE attainment on unemployment probabilities

- We take the estimated impact of achieving five GCSEs A\*-C including English and Maths versus anything less on the probability of unemployment from Table 3 in the Department for Education (2014) study which we use to estimate the lifetime earnings benefit.
- Estimates are provided by gender. For men the coefficient is insignificant, so we set the value to zero, whilst the expected unemployment rate for women with five good GCSEs including English and Maths is 1.5 percentage points.

### The healthcare cost of unemployment

- Multiplying the previous two terms together provides estimates of the reduction in probability of being unemployed due to receiving Reading Recovery.
- We take the additional annual cost to the NHS of an unemployed individual (vs an employed individual) from the Department of Work and Pensions (2010) study.<sup>50</sup>
- Multiplying this with the previous two terms gives an estimate of the expected reduction in annual healthcare costs because of an individual receiving Reading Recovery.

<sup>50</sup> DWP (2010) "The Department for Work and Pensions Social Cost-Benefit Analysis Framework" available here:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/214384/WP86.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/214384/WP86.pdf)

### Timing and discounting of healthcare cost savings

- We assume that the expected annual healthcare cost savings occur over the working life of participants (ages 16-64). We discount this profile of annual cost savings back to age six using the discount rate from the Green Book: 3.5% for the first 30 years, falling to 3.0% thereafter.<sup>51</sup>
- The estimated healthcare cost savings for each cohort in the evaluation period are discounted at 3.5%.

### Limitations and caveats

- Our analysis of health benefits is conservative since we focus only on potential cost savings to the NHS. It is likely that there will also be benefits to the individual that we have not included relating to improved mental and physical health that could be significant.

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<sup>51</sup> The Green Book suggests that health benefits related to improvements in health should be discounted at 1.5%. However, we conservatively use a 3.5% discount rate since our health benefit is based on lower health service costs.

## Annex F: Costs of crime

### Approach

We estimate potential savings in the cost of crime using the same approach as in the Department for Education (2011) study of the ECaR programme. This involves linking the estimated impact of Reading Recovery support on GCSE attainment from Hurry & Fridkin (2018) with the estimate of the relationship between levels of qualification and the incidence of crime, taken from Machin et al (2011).

Our analysis focuses specifically on property crime (both convicted and recorded, but not convicted) and includes costs incurred by the Government on the criminal justice system, crime prevention costs, the impact of crime on victims' emotional and physical wellbeing, and the value of property that is lost or damaged through crime. We quantify cost savings using published estimates of the average unit costs of property crime.

### Calculation

We estimate the expected lifetime reduction in costs per pupil from convicted crime over the lifetime of a pupil as:

$$A_C = \sum_{T=0}^{58} [(NQ_{RR} - NQ_{CG}) \cdot EC \cdot V_V \cdot C_V] \cdot DF^T$$

Similarly, the expected reduction in costs per pupil from recorded but not convicted crime over the lifetime of a pupil given by:

$$A_R = \sum_{T=0}^{58} [(NQ_{RR} - NQ_{CG}) \cdot EC \cdot V_R \cdot C_R] \cdot DF^T$$

Where

- $NQ_{RR}$  and  $NG_{CG}$  are percentages of Reading Recovery and Comparison group pupils obtaining no qualifications at age 16.
- $EC$  is the elasticity of the crime rate with respect to the proportion of individuals with no qualifications.
- $V_V$  and  $V_R$  are the number of convicted and recorded but not convicted crimes per person in England.
- $C_V$  and  $C_R$  are the average unit costs of convicted and recorded but not convicted crime.
- $DF$  is the discount factor, with  $T$  representing the 58 years between the Reading Recovery programme (age six) and retirement (64). Note that crime savings are only assumed to be zero before age 16.
- We then estimate the value of crime benefits at cohort-level for Reading Recovery as
 
$$(A_C + A_R) \cdot N_C$$
- Where  $N_C$  is the number of pupils receiving Reading Recovery in cohort  $C$ .

Table 23. Summary of key variables for costs of crime savings

Variable	Value
$A_C$	£6
$A_R$	£122
$N_{Q_{RR}}$	2%
$N_{Q_{CG}}$	7%
$E_C$	0.85
$V_V$	0.0057
$V_R$	0.1437
$C_V$	£1,417
$C_R$	£1,140
$N_C$	See Table 20
DF	Varies (see below)

## Inputs

### Impact of Reading Recovery on GCSE performance

- We take the percentage of Reading Recovery and Comparison group pupils obtaining no qualifications at age 16 from Hurry & Fridkin (2018). We use this measure of GCSE attainment since it can be linked to data on the prevalence of crime.

### The impact of qualifications on annual crime rates

- We assume that a reduction in the proportion of youths with no qualifications (i.e. by giving them some level of formal qualifications) reduces the property crime rate by between 0.85-1 percentage points, based on Machin et al. (2011)<sup>52</sup>
- We take the lower bound of this range and multiply this by the number of convictions per capita and incidences of recorded crime (0.15 crimes per working age individual in the UK<sup>53</sup>) to estimate the reduction in number of convictions/recorded crime for each percentage point reduction in the number of youths with no qualifications.

<sup>52</sup> Machin et al (2011): The Crime Reducing Effect of Education

<sup>53</sup> Total reported crimes from Crime Survey for England and Wales, 2018 and divided by population for England and Wales taken from the ONS 2011 Census.

- We take convictions per capita from the average of figures for property crimes only<sup>54</sup> over the period 2008-2017 from the Criminal Justice System Quarterly Statistics<sup>55</sup>, and divide by England and Wales working age population estimates from the 2011 census<sup>56</sup>.

#### Unit cost per crime incident

- The monetary value of these savings is based on latest unit cost data (Home Office 2011<sup>57</sup>) weighted for different offences in line with the numbers of offences in each category in Criminal Justice System Quarterly Statistics.
- We weight the unit cost of different types of property crime by the prevalence of those crimes to generate average costs per incidence of convicted and recorded crime.
- Criminal justice costs are removed for recorded but not convicted crime.
- Multiplying all the above terms together gives the expected annual reduction in costs of crime per individual receiving Reading Recovery of £1,100 for recorded crimes and £1,400 per convicted crime.

#### Timing and discounting of crime cost savings

- We calculate the expected lifetime crime cost savings per Reading Recovery pupil using the assumption that annual crime cost savings are realised in each year of an individual's working-age life (16-64).
- We apply a discount rate of 3.5% for the first 30 years, and 3.0% thereafter, in line with Green Book guidance.

#### Limitations and caveats

- Our estimates of potential crime costs savings is based Hurry & Fridkin (2018). Hurry & Fridkin find that the reduction in the proportion of pupils with no GCSE qualifications is insignificant at the 5% level. This may be driven by the small number of pupils in this category (only two pupils in the Reading Recovery group and 10 in the Comparison group).
- Given this, our estimate of potential savings in the costs of crime should be treated with caution. However, assuming that this benefit is zero would not materially affect the value for money assessment given the very small contribution of crime cost savings in the total estimated benefit from Reading Recovery.
- The impact of qualifications on crime is likely to depend on certain characteristics. If Reading Recovery pupils vary on these characteristics compared to the population on which the

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<sup>54</sup> In line with the ONS definition of Property Crime we include: criminal damage, vehicle-related theft, domestic burglary, other household theft, theft from the person, other theft of personal property, bicycle theft and robbery

<sup>55</sup> Table Q3\_4 in March 2018 bulletin and available here:

<https://www.gov.uk/government/collections/criminal-justice-statistics>

<sup>56</sup> Available here: <https://www.ethnicity-facts-figures.service.gov.uk/british-population/demographics/working-age-population/latest/downloads/working-age-population-of-england-and-wales.csv>

<sup>57</sup> Table A2, found here:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/97813/IOM-phase2-costs-multipliers.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/97813/IOM-phase2-costs-multipliers.pdf)



Machin et al (2011) study is based, this will lead to errors in our estimated benefits, although the direction of any bias is unknown.

- More generally, there could be various channels through which Reading Recovery reduces crime, but our approach only considers the effect of a relatively crude measure of individual qualifications.

## Annex G: Costs of Reading Recovery

This annex explains the basis for the Reading Recovery cost estimates that we use. As explained below, the cost structure of the Reading Recovery programme varies across the pilot phase, national roll-out phase, and school-funded phase. Our estimates of unit costs of Reading Recovery per pupil therefore vary between these three periods.

### Approach

We calculate annual unit costs in each phase by amortising fixed costs over four years and dividing by the estimated numbers of Reading Recovery pupils in local authorities and schools<sup>58</sup>:

$$UC = \frac{F_S}{(4 \times N_S)} + \frac{R_S}{N_S} + \frac{F_L}{(4 \times N_L)} + \frac{R_L}{N_L}$$

Where

- $F_S$  = Fixed costs for per school.
- $R_S$  = annual running costs per school.
- $N_S$  = pupil numbers per school in a year.
- $F_L$  = fixed cost per LA.
- $R_L$  = annual running cost per LA.
- $N_L$  = number of pupils per LA in a year.

Table 24 summarises the values for each of the variables used to estimate costs in the equation above. The remainder of the annex discusses how costs have been estimated for each of the three phases in the ECaR programme.

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<sup>58</sup> We amortise fixed costs at local authority level over five years rather than four years for the pilot period, as in Every Child a Chance Trust (2009) report,

Table 24. Summary of key variables for Reading Recovery cost calculation

Period	Variable	Value
Pilot	F <sub>S</sub>	£3,546
	R <sub>S</sub>	£25,064
	F <sub>L</sub>	£99,803
	R <sub>L</sub>	£41,574
	N <sub>S</sub>	9
	N <sub>L</sub>	207
Government-funded	F <sub>S</sub>	£214
	R <sub>S</sub>	£31,770
	F <sub>L</sub>	£152,173
	R <sub>L</sub>	£101,378
	N <sub>S</sub>	11
	N <sub>L</sub>	132
School-funded	F <sub>S</sub>	£3,320
	R <sub>S</sub>	£19,403
	N <sub>S</sub>	8

## Estimation of costs by period

### Fixed and annual running costs of Reading Recovery at local authority and school level

- Table 25 shows the breakdown of Reading Recovery annual costs at local authority and school level in the three funding phases.
- Some costs, such as those associated with the initial training of Teacher Leaders and Reading Recovery Teachers, are 'fixed', and so are only incurred when the programme is starting up or being expanded in new areas or schools. All other costs are incurred in each year of the programme.
- Cost in the **pilot phase** are taken directly from Annex 3 in the Every Child a Chance Trust (2009) report, inflated to 2017/18 prices.
  - Note that the cost of training Reading Recovery teachers is counted twice in these figures: first in the ongoing Teacher Leader costs at local authority level, and then in the upfront training of Reading Recovery teachers at school level; hence the income that local authorities receive for training is netted off local authority costs.
  - This is not done in the two subsequent funding phases as there is no double counting of Reading Recovery teacher training costs.
- Costs in the **national roll-out phase** are taken from the Department for Education (2011) evaluation of the ECaR programme.<sup>59</sup> This study estimates the cost of all the interventions in

<sup>59</sup> Department for Education (2011): Evaluation of Every Child a Reader

the ECaR programme based on a survey of a sample of schools and local authorities in 2008/9-2009/10. At the time of the survey, pupils receiving Reading Recovery support accounted for around two-thirds of the total receiving any ECaR intervention.

- We derive an estimate of the cost of Reading Recovery in the national roll-out phase from the itemised cost data in Table 7.1 in the Department for Education (2011) study. We have reduced some of the reported cost items by a third to account for costs that relate to elements of the ECaR programme that are separate from Reading Recovery (based on advice from Jean Gross). This is done on a conservative basis and may not fully strip out all non-Reading Recovery costs.<sup>60</sup>
- Costs in the **school-funded phase** are based on information provided by the International Literacy Centre at UCL Institute of Education and using the methodology from the Every Child a Chance Trust (2009) study.<sup>61</sup> We have been assisted by Jean Gross, former Director of The Every Child a Reader programme, in preparing these estimates.

**Table 25. Estimated costs of Reading Recovery per year, per local authority/school**

Cost item	Pilot phase	Government funded <sup>62</sup>	School-funded
<b>Local authority level</b>			
Teacher Leader (TL) training (fixed)	£99,803	£152,173	-
TL salary and on costs	£34,682	£52,563	-
TL other costs	-	£23,045	-
Other running	£6,892	£25,770	-
Net off Reading Recovery teacher training income	-£37,595	-	-
<b>School level costs</b>			
Initial Training (fixed)	£3,546	£214	£3,320
Reading Recovery teacher time	£25,064	£26,932	£18,545
Reading Recovery teacher CPD	-	-	£858 <sup>63</sup>
Other running costs	-	£4,838	-

Costs are in 2017/18 prices.

- Table 26 shows the detailed assumptions underlying the estimated costs at school level in the school-funded phase that are shown in Table 25. Note that Table 26 shows the start-up costs and the running costs incurred at school level over four years, based on eight Reading

<sup>60</sup> The items from Table 7.1 in the Department for Education (2011) study that we applied a 1/3 reduction to are: Teacher Leader salary, admin support for Teacher Leaders, Teacher Leader travel costs, Link Support Person, Consultancy/other staff costs, 'Reading Recovery Teacher books and other interventions', 'other equipment' and 'other costs'

<sup>61</sup> See Appendix 3 of Every Child a Chance Trust (2009).

<sup>62</sup> During the government-funded phase, the costs of initial and continuing training of RR teachers fell on local authorities rather than schools.

<sup>63</sup> This figure is based on the CPD cost in Table 29 of £3,432, amortised over four years.

Recovery pupils each year served by 0.5 FTE teacher time per year (i.e. 32 children over four years).<sup>64</sup> The school cost per Reading Recovery pupil is therefore £2,529.

**Table 26. School costs over four years in school-funded phase**

Cost item	Value
<b>Start-up costs</b>	
Reading Recovery teacher training (IPD), including core texts	£2,940
Non-essential equipment: Children's books (£250), magnetic whiteboard and letters (£130)	£380
Total start-up costs	£3,320
<b>Running costs over four years</b>	
0.5 FTE M4teacher time for 1-1 teaching @£18,545 per year with on-costs over four years	£74,180
Essential: Reading Recovery Continuing Professional Development @£1,144 per year over three years	£3,432
Total running costs	£77,612
<b>Total school costs over four years</b>	<b>£80,932</b>

Costs are in 2017/18 prices.

- Note that in the school-funded phase schools were charged directly for Teacher Leader services on a full cost recovery basis. These costs are included in the initial training item (£2,940 of the £3,320) and the Reading Recovery teacher CPD items in Table 26.
- Table 27 shows how the training costs paid by schools cover total Teacher Leader costs (including travel and various 'non-staff' costs) for the time spent supporting Reading Recovery (see 'income from schools' row). This is estimated on the basis that the Teacher Leader provides Initial Professional Development (IPD) training to Reading Recovery teachers in 12 schools and Continuing Professional Development (CPD) training to Reading Recovery teachers in 24 schools.

<sup>64</sup> Start-up costs in this table correspond to the Initial Training (fixed) school level costs in Table 25.

Table 27. Breakdown of Teacher Leader Costs during school-funded phase

Cost item	Value
<b>Teacher Leader Costs</b>	
0.5 Teacher Leader time (97.5 days): 49 days spent on delivery of Initial Professional Development; 30 days spent on Continuing Professional Development; 13.5 days spent on daily teaching of RR children; five days at national Teacher Leader Professional Development Meeting (TLPDM)	£35,000
Service Level Agreement with UCL Institute of Education: Teacher Leader accreditation @ £4,335 plus VAT (Quality Assurance and five days of ongoing professional development per year)	£5,202
Travel, accommodation and subsistence for TL to attend five-day TLPDM (estimate)	£500
Non-staff costs for running IPD and CPD (Travel to schools @ £20 per visit per teacher (£960 IPD + £240 CPD); centre hire @ £100 per session (£2,000 IPD + £600 CPD); teacher registration fee @ £30 per IPD teacher (£360); school SLA at £138 per school (£4,968); resources @ £130 per IPD teacher (£1,560); £25 per CPD teacher (£300)	£10,988
Gross costs for TL provider per year	£51,690
<b>Income from schools</b>	
Income from schools: IPD teacher training @ £2,940 each x 12 schools = £35,280; CPD @ £1,144 each x 24 schools = £27,456	-£62,736
<b>Net Teacher Leader costs</b>	
Net costs for TL provider per year (-surplus) to cover profit (if TL self-employed), or the management costs to a school/group of schools/local authority of employing the Teacher Leader	<b>-£11,046</b>

Source: Information provided by the International Literacy Centre at the UCL Institute of Education. Costs are in 2017/18 prices.

#### Estimated pupil numbers per school and local authority

- Table 28 shows pupil numbers per school and local authority for the different periods.
- The **pilot phase** figures come from Every Child a Chance Trust (2009) report, with the local authority figure calculated as an average of pupil numbers over five years (the report assumed that pupil numbers would increase from Year 1 to 5, so we have taken an average).
- Since the Department for Education (2011) report does not provide pupil numbers per school and local authority, we estimate these for the **national roll-out phase**. Since the costs in this Department for Education study relate to the ECaR programme, we do this as follows:
  - We first estimate the number of ECaR pupils per school and per local authority assuming the ratio of ECaR pupils in schools and local authorities is the same for those surveyed as nationally. Using the average costs at school and local authority level we then calculate the pupil numbers that result in a unit cost that equals those stated in the Department for Education (2011) report.

- We then estimate the number of Reading Recovery pupils at school and local authority level by applying the ratio of Reading Recovery to ECaR pupils at a national level to the estimated numbers of ECaR pupils for the surveyed schools and local authorities.
- The pupils per school for the **school-funded phase** figure were taken from annual monitoring data collected by the International Literacy Centre at the UCL Institute of Education and are based on the average number of pupils per Reading Recovery teacher over the course of a school year. No assumption is required for pupils per local authority in this phase as all costs are borne at school level.

**Table 28. Estimated Reading Recovery pupils per school and local authority**

Reading Recovery pupils per year	Pilot phase	Government funded	School-funded <sup>65</sup>
Per school	9	11	8
Per local authority	207	132	-

### Estimated unit cost of Reading Recovery

Table 29 shows the breakdown of our estimated unit cost of Reading Recovery support per pupil across the three funding phases.

**Table 29. Estimated unit costs**

	Pilot	National roll-out	School funding
<b>Local authority level</b>			
TL training (fixed)	£97	£289	-
TL salary	£134	£399	-
TL other costs	-	£175	-
Other running	£27	£195	-
Net of training income	-£145	-	
LA costs	£112	£1,058	0
<b>School level</b>			
Reading Recovery teacher time	£2,765	£2,438	£2,318
Initial Reading Recovery training	£99	£5	£104
Reading Recovery teacher CPD	0	0	£107
Other running	0	£438	0
School costs	£2,883	£2,881	£2,529
<b>Total costs</b>	<b>£3,141</b>	<b>£3,939</b>	<b>£2,529</b>

<sup>65</sup> No estimate of pupils per local authority is required for the school-funded phase because, as explained above, there are no non-recouped costs at local authority level during this phase.

There are several reasons why the costs of Reading Recovery support differ across the three phases, including:

- The scale of Reading Recovery was rapidly expanded during the government-funded phase, which involved higher levels of fixed costs to train Teacher Leaders and Reading Recovery teachers, for example. These costs were not incurred again in the school-funded phase.
- Greater funding was available during the government-funded phase, which allowed for more money to be spent on items such as equipment and support costs for Teacher Leaders and Reading Recovery teachers.
- The Department for Education (2011) cost figures relate to the entire ECaR programme. As it was not clear which cost items were for Reading Recovery, we have been conservative in reducing total costs, which may have inflated the unit cost figure.
- In the school-funded phase, costs that were covered by local authorities (i.e. costs associated with Teacher Leaders, who provided training and guidance to Reading Recovery teachers) in the earlier phases were charged through to schools on a full cost recovery basis via the 'initial Reading Recovery training' and 'Reading Recovery teacher CPD' items. In addition, central infrastructure costs for Reading Recovery have been trimmed in recent years wherever possible to reflect a period of austerity.



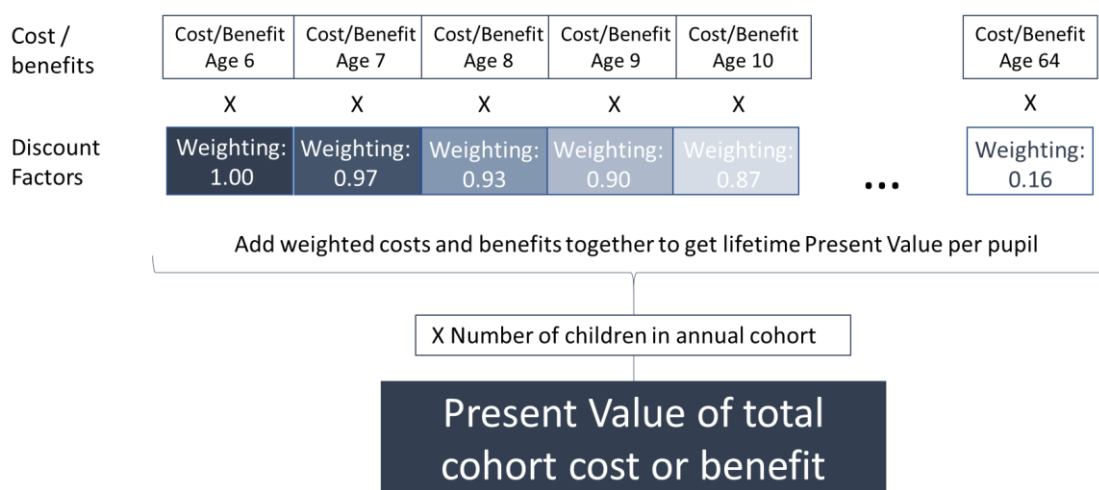
## Annex H: Approach to discounting

Our analysis takes a two-step approach to discounting the flows of costs and benefits that occur at different points in time:

- Step 1: Discount lifetime benefits to age six.
- Step 2: Discount cohort benefits to 2006/06.

In Step 1 we are weighting the flows of costs and benefits over the lifetime of a single individual using discount factors from the HM Treasury Green Book.<sup>66</sup> This provides a present value for the lifetime cost/benefit for an individual which is then multiplied by the number of pupils in each cohort to provide a present value of the costs/benefits for each cohort.

### Step 1 – Discount lifetime benefits to Age 6



We have chosen to evaluate the value for money of the programme from the perspective of the first year of the programme, 2005/06. This means that we must discount the costs / benefits from later cohorts as they would occur at a later point in time. Step 2 therefore discounts the costs / benefits for later cohorts so that they are expressed in present value terms for the year 2005/06. This provides the present value of the costs / benefits for the overall programme.

<sup>66</sup> Note that the discount factors shown in the diagram are those used for employment, SEN costs and crime. Health discount rates are different, in line with HM Treasury Green Book guidance.

## Step 2 – Discount cohorts to year 2005/06

Cost / benefits	Cost/Benefit 2005/06 cohort	Cost/Benefit 2006/07 cohort	Cost/Benefit 2007/08 cohort	Cost/Benefit 2008/09 cohort	Cost/Benefit 2009/10 cohort	...	Cost/Benefit 2016/17 cohort
Discount Factors	Weighting: 1.00	Weighting: 0.97	Weighting: 0.93	Weighting: 0.90	Weighting: 0.87	...	Weighting: 0.68

Add weighted costs and benefits together to get programme Present Value

**Present Value of total programme costs and benefits**

### Worked example

As a simplified worked example, if we have a benefit that provides £100 of value for each year from age six to age ten for a cohort of 1,000 students in each year from 2005/06 to 2009/10 then the costs and benefits would be discounted in the following way:

#### Worked example: Step 1 discounting lifetime benefits to age six

	Age 6	Age 7	Age 8	Age 9	Age 10
<b>Benefit</b>	£100	£100	£100	£100	£100
<b>Discount Factor</b>	1.00	0.97	0.93	0.90	0.87
<b>Present Value</b>	£100	£97	£93	£90	£87
<b>Lifetime Present Value per individual</b>	<b>£467</b>				
<b>Present Value of benefit per cohort</b>	<b>£467 X 1000 = £467,000</b>				

**Worked example: Step 2 - discounting cohort benefits to 2005/06**

	2005/06 Cohort	2006/07 Cohort	2007/08 Cohort	2008/09 Cohort	2009/10 Cohort
<b>Cohort Benefit</b>	£467,000	£467,000	£467,000	£467,000	£467,000
<b>Discount Factor</b>	1.00	0.97	0.93	0.90	0.87
<b>Present Value</b>	£467,000	£452,990	£434,310	£420,300	£406,290
<b>Programme Present Value of benefit</b>	<b>£2,180,890</b>				

## Annex I: Variables used in our analysis

Component	Variable	Description
Economic Output Benefits	$E_C$	The value of additional economic output per cohort of Reading Recovery pupils
	$G_{5RR}$	The proportion of pupils in the Reading Recovery group in Hurry & Fridkin (2018) that attained 5+ GCSEs A*-C including English and Maths
	$G_{5CG}$	The proportion of pupils in the comparison group in Hurry & Fridkin (2018) that attained 5+ GCSEs A*-C including English and Maths
	$V_G$	The additional output produced over an individual's lifetime as a result of achieving 5+ GCSEs A*-C including English and Maths rather than anything less, by gender
SEN cost savings	$C_{SEN}$	The unit cost per incidence of a pupil issued with a SEN Statement/EHCP
	$C_C$	The SEN cost savings per cohort of Reading Recovery pupils
	$A$	The one-off administrative cost of issuing a SEN Statement/EHCP
	$TC$	The annual running costs of support for high-needs SEN pupils in mainstream schools for all local authorities in England
	$N_{SEN}$	The number of pupils with a SEN Statement/EHCP in mainstream schools in England
	$S_{CG}$	The proportion of pupils in the comparison group in Hurry & Fridkin (2018) that received a SEN Statement/EHCP
	$S_{RR}$	The proportion of pupils in the Reading Recovery group in Hurry & Fridkin (2018) that received a SEN Statement/EHCP
Healthcare cost savings	$H_C$	The healthcare cost savings for cohort C of Reading Recovery pupils
	$G_{5RR}, G_{5CG}$	As above
	$\Delta Pr(U_G)$	The percentage-point reduction in the probability of being unemployed at any time during an individual's working-age life related to obtaining 5+GCSEs A*-C including English and Maths vs anything less, by gender
	$L$	The additional annual cost to the NHS of an individual moving from unemployment to employment
Avoided costs of crime	$A_V$	The expected reduction in costs of convicted crime per Reading Recovery pupil, over pupil lifetime
	$A_R$	The expected reduction in costs of recorded, but not convicted crime per Reading Recovery pupil, over pupil lifetime
	$NQ_{RR}$	The proportion of pupils in the Reading Recovery group in Hurry & Fridkin (2018) that received no qualifications at age 16
	$NQ_{CG}$	The proportion of pupils in the comparison group in Hurry & Fridkin (2018) that received no qualifications at age 16

	$E_C$	The elasticity of crime with respect to the proportion of individuals in a population with no qualifications
	$V_V$	The number of convicted crimes per person in England
	$V_R$	The number of recorded but not convicted crimes per person in England
	$C_V$	The average unit cost of convicted property crime in England
	$C_R$	The average unit cost of recorded but not convicted property crime in England
<b>Costs of Reading Recovery</b>	$F_S$	Fixed costs of Reading Recovery at school level
	$R_S$	Annual running costs of Reading Recovery at school level
	$F_L$	Fixed costs of Reading Recovery at local authority level
	$R_L$	Annual running costs of Reading Recovery at local authority level
	$N_S$	Average number of Reading Recovery pupils served per school per year
	$N_L$	Average number of Reading Recovery pupils per local authority per year
<b>General</b>	$N_{C,G}$	The number of pupils in cohort C, with C running from 0 (2005/6) to 11 (2016/17). In some cases, pupil numbers are also separated by gender, G.
	DF	The discount factor, calculated as $1/(1+D)$ where D = the discount rate in the Green Book (generally 3.5%)

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