



The Benefits of Family Action:

An Economic Assessment of the Potential Benefits from Family Action Interventions for Women at Risk of Perinatal Depression

October 2014

Pro Bono Economics is delighted to introduce this report, the result of analysis undertaken by Ricky Taylor from the Department of Communities and Local Government (DCLG), Andrea Lee from the Department of Health (formerly at DCLG) and David Simmons from the Cabinet Office (formerly at DCLG).

Pro Bono Economics was founded in 2009 with the aim of bringing the skills of economists into the third sector, pro bono. Many charities could benefit from the skills of economists, particularly in helping with questions of measurement, impact and value. We hope that by bringing together economists and charities we can not only benefit individual charities but also publish economic analysis that can help the third sector more broadly.

Family Action has been a leading provider of services to disadvantaged and socially isolated families since its foundation in 1869. It works with over 45,000 children and families a year by providing practical, emotional and financial support through over 100 services based in communities across England. For Family Action it is important to demonstrate the benefits of its service compared to its costs and therefore its ability to justify what it does and to do it in the most efficient way. The work of our volunteer economists aims to make clear the economic case for this intervention, highlighting its value to society as whole.

We hope that this report will contribute towards a greater understanding and appreciation of the work of Family Action's Perinatal Support Programme to help those women who are vulnerable to perinatal depression.

Pro Bono Economics is grateful to Ricky Taylor, Andrea Lee, and David Simmons, and other colleagues in DCLG, for their time, skills and hard work throughout the project. They were supported by many people in the course of undertaking this analysis. Particular thanks are due to Clara Mukuria (University of Sheffield) and Chris Riley.

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Pro Bono Economics has supported this work as part of its mission to help charities measure their performance better and demonstrate the results of their work. The views expressed in this report are not necessarily those of Pro Bono Economics.

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Introduction

Family Action has been a leading provider of services to disadvantaged and socially isolated families since its foundation in 1869. It works with over 45,000 children and families a year by providing practical, emotional and financial support through over 100 services based in communities across England.

The Perinatal Support Project (PSP) grew from evidence on the benefits of providing social support to women assessed as vulnerable to perinatal depression. It was established in 2010 and completed in July 2013. Perinatal depression is an important issue for society – the research carried out for this report estimates that the cost to society in England and Wales to be in the order of £630m per year.

The term ‘perinatal’ is defined as ‘pertaining to the period immediately before and after birth’ (i.e. generally starting at around the 20th to 28th week of gestation and ending around four weeks after birth). The PSP comprises a service, during the perinatal period and continuing as needed up to the infant’s first birthday, for mothers who are either affected by, or at risk, of postnatal depression and other mental health problems.

For Family Action it is important to demonstrate the benefits of its service compared to its costs and therefore its ability to improve what it does.

There is surprisingly very little available evidence about the short and long-term benefits of perinatal services and even less evidence that attempts to put a monetary value on the benefits so that they can be compared with costs of providing the service.

On behalf of Family Action, Pro Bono Economics enlisted a team of volunteers from the Department of Communities and Local Government to help improve the understanding of the benefits and costs of the services. The results of the team’s work are reported here. The team used a variety of data sources, including evaluations, literature and research to establish the links between the Family Action interventions and beneficial outcomes for the women who participate in the programme and for society at large.

Background

This report covers four of Family Action's perinatal health centres in Oxford, Hackney, Swaffham and Mansfield.

The model of support for women in Family Action's PSP is based on:

- **Advocacy**
Through helping women to access the resources that they are entitled to e.g. GPs and counsellors;
- **Befriending**
By providing emotional support from a peer group of volunteers particularly to help mothers with mental difficulties where they feel less comfortable accessing mainstream services;
- **Practical assistance**
Through assisting mothers in day-to-day activities.

Approximately 100 women a year receive perinatal support services through Family Action, with the average length of the support being around 200 days. The women come to the service either as a self-referral, or are referred via the mid-wife or GP. In each case they already have mental health problems or are at risk of developing them. About half of the referrals are associated with women feeling isolated.

Approach

In order to determine the cost of providing the PSP and the economic and social benefits that result from the service, it is necessary to estimate:

- the cost of delivering the services;
- the impact of the services on women receiving the service and to society at large; and;
- the value of the impact in monetary terms.

To do this the team drew on information from a variety of sources including results from a randomised control trial (RCT) of the forerunner of the PSP, information provided by Family

Action and a study of the effectiveness of the PSP undertaken by the University of Warwick. The information is supplemented by analysis from the Millennium Cohort Study and a range of published literature and surveys.

The cost of delivering the services

The team has estimated that the cost of the PSP was £223,000 in 2012¹. This takes account of expenses on buildings, staff and utilities and is based on information provided by Family Action. Further details can be found in the Technical Annex.

The figure of £223,000 includes costs incurred by Family Action on training and supporting volunteers *but does not account for the value of volunteers' time*. This is an important point in economic terms as although the volunteers' contribution is free to Family Action, it does have a value and should not be underestimated. There are over 40 volunteers involved in providing the PSP, spending on average 10 hours a month with each woman participating in the programme². The project team have valued this contribution at around £60,000 a year. Further details can be found in the Technical Annex.

Other costs, such as those arising from women being helped to access public services that they wouldn't otherwise access, have been excluded in this study. It has not been possible to find information that would provide an estimate of the quantity and costs of these services.

Using a range of information from Family Action's services, it is estimated that the average direct financial cost of providing support is £2,230³ per woman.

The impact of the services and their value in monetary terms

There are both short- and long-term outcomes that result from successful interventions to reduce postnatal depression. The Family Action PSP is particularly focussed on increasing the well-being of mothers and their children. The task for the project team was to find evidence of where Family Action had made a positive difference and then seek ways to measure and monetise these benefits.

¹ At 2011/12 prices

² Figures supplied by Family Action

³ This is calculated from the annual total costs across Family Action's four centres of £223,000 divided by 100 women receiving services

A key source of information is a previous RCT, the strictest form of evaluation of the efficacy of a treatment or intervention. This was undertaken between 1999 and 2003 to investigate the preventative impact of the Newpin Project in Peckham South London. The Newpin Project – on which Family Action’s PSP interventions are based – used a combination of one-to-one befriending and the psycho-educational experience of attending a drop-in centre for pregnant women who were vulnerable to the onset of depression. The evaluation⁴ found that 27% of women in the Newpin Befriender Group suffered the onset of perinatal major depression compared to 54% in the Control Group. Therefore the interventions were effective in reducing the likelihood of major depression by 27 percentage points.

Whilst there is no recent RCT of Family Action’s current services, there is a “before support” and “after support” evaluation of the clinical effectiveness of Family Action’s perinatal services undertaken for Family Action by the University of Warwick⁵. This study shows that mothers’ psychometric scores improved following their participation in the PSP.

The Newpin and Warwick evaluations provide information on the effectiveness of the Family Action PSP. For the purposes of this study the team have based the assessment mainly around the results of the Newpin RCT because its evaluation design was considered to be more robust, but other studies that link postnatal depression and consequent outcomes have also been considered.

A review of the available research, evaluation evidence and data enabled the team to conclude that there were six positive outcomes that could be linked to successfully reducing postnatal depression. The key economic and social outcomes, and the approach adopted by this study to measuring them, are set out below. Further details can be found in the Technical Annex.

1) Increased chances of employment and higher earnings

⁴ Harris T, (2008) Putting Newpin to the test: A randomised controlled trial of the Newpin Antenatal and Postnatal Project, Chapter 11 in Mondy S and Mondy L, Newpin: Courage to Change Together, Uniting Care Burnside 2008

⁵ Barlow J, Coe C (2012) Family Action Perinatal Support Project, Research Findings Report. Warwick Medical School, available at www.family-action.org.uk

A bespoke analysis was undertaken of the Millennium Cohort Study (MCS) to estimate the effect of postnatal depression on employment rates and the earnings of depressed mothers who are successfully treated for the condition.

2) Increased well-being

Women who benefit from interventions like those of Family Action will experience individual benefits of improved mental and physical well-being. The Warwick Study captured the changes in the well-being from women on the PSP and these changes have been monetised using Quality Adjusted Life Years (QALYs).

3) Longer-term beneficial outcomes affecting children

Postnatal depression is recognised as an important marker of the mother's risk for subsequent depression and her child's risk for later depression and educational attainment. There is also evidence that children can develop longer-term behavioural problems. The MCS has been analysed to consider the long-term effects on children's cognitive and social development of a mother's postnatal depression. This was done by using the questions in the Survey from the Strengths and Difficulties Questionnaire (SDQ), a well-established screening tool for child psychiatric disorders. This evidence suggests that the benefits of avoiding postnatal depression could be substantial. However, during the course of this project, the team have not been able to find a way to link these benefits to Family Action services. This is a potential area for future data collection and research.

Alongside the economic and social outcomes set out above, the PSP can have potential impacts on public services. These are:

4) Reduced use of health and social care services. One particular study has been used to calculate the reduction in the use of health and social care services. This reduction represents a benefit to the services and potential users;

5) As a result of increased employment there are increased tax revenues. These have also been estimated from the MCS on a sample of postnatal depressed mothers.

However, in line with guidance for undertaking economic appraisals⁶, increased tax revenues are not included in the total economic and social costs on the grounds of being treated as transfers between taxpayers and government.

In addition to the benefits for women and their families there are also potential benefits for those who work on the programme:

6) Beneficial impact on the peer volunteers

There are both costs and benefits to the volunteer befrienders who play such a crucial role in the model of delivery. This research draws on information from Family Action's volunteers to place a value on this outcome.

Family Action interventions are effective in reducing post-natal depression and there is evidence to link this effectiveness to a wide range of short and long term beneficial outcomes affecting the women themselves, their children and society at large.

Estimating the Monetary Value of the Benefits of Family Action Interventions

Viewed from a broad economic perspective, the costs of perinatal depression should not be underestimated. Using the data and evidence found in the course of this study, it is estimated that the costs to the economy of perinatal depression in England and Wales are in the order of £630m per annum⁷.

The benefits arising from avoiding postnatal depression are likely to be long-term although the exact duration of benefits is difficult to assess. In the case of the potential benefits arising from increased earnings and employment potential, data from the Millennium Cohort Study suggests that these effects could be long-lasting – at least as long as five years. In the

⁶ The Green Book: appraisal and evaluation in central government, HMT 2013. Available at: <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

⁷ This is based on the evidence that there are around 724,000 live births per annum in England and Wales, and around 10 per cent of mothers experience depression between pregnancy and in the first year of motherhood. This gives a figure of 72,000 mothers. We then multiply the costs of postnatal depression identified in this study by the number of mothers.

case of well-being we do not have any clear evidence on the duration of the benefits and so have conservatively restricted these to one year only although they may last for longer.

Table 1 brings together the six outcomes identified above and where possible quantifies these on a per woman basis. The underlying calculations for the figures are set out in the Technical Annex.

There are two estimates: a financial one which includes the employment and earnings benefits and the reduction in public services use. These are the benefits which the team feel are most robust. Adding to these the benefits of well-being creates an estimate of wider economic benefits. This is potentially large and the calculations of well-being were novel and involved a range of estimates. For this reason there is more uncertainty around this figure.

It has not been possible to put a monetary value on the longer-term beneficial impacts on the children. If the known beneficial outcomes of lower risk of depression, obesity and behaviour in children could be linked to educational attainment and earnings, then it could be possible to attach a monetary value to them which could be significant over the lifetime of these children.

In terms of volunteer benefits, the approach has been to assume that the benefits of volunteering to the volunteers is at least equivalent to the value placed on their time – in other words the costs and benefits cancel each other out. This is probably a conservative assumption but the team was not able to establish a method of valuing the benefits to volunteers but accept that it could be higher than the £60,000 estimated costs.

The PSP's employment and earnings and health service benefits of £2,429 per woman outweigh the average programme costs of £2,230 per woman when the positive effect of the programme lasts beyond a year.

The wider economic benefits including increased well-being are significant – even for just a year – and demonstrate the potential importance of well-being. However, the estimation technique and the transfer of this outcome into monetary terms hold more uncertainty and should not be relied upon to make the case for Family Action's programmes.

Table 1: Estimated Benefits per Woman Participating in the PSP Taking into Account the Likely Duration of the Realised Benefits (Discounted to 2011/12 prices)

	Likely duration of benefits (years)	Estimated benefits	
		Financial	Economic
(1) Increased chances of employment and higher earnings	5	£2,292	£2,292
(2) Increased well-being	1	N/A	£1,954
(3) Longer-term beneficial outcomes affecting children	Potentially over a lifetime	N/A	Not possible to monetise but potentially substantial
(4) Reduced use of health and social care services	1.5	£137	£137
(5) Increased tax revenues	N/A	Excluded as a transfer	Excluded as a transfer
(6) Volunteer benefits	Potentially over the long-term	N/A	Benefits and costs assumed to be equal
TOTAL⁸		£2,429	£4,383

The estimates could be said to be conservative given the absence of any monetisation of the potentially long-term beneficial impact on children. This element should be the focus of further research to establish the size of the impact which could be substantial.

The quantified financial benefit of Family Action's PSP is estimated to be £2,429 for each woman who receives support and could rise to £4,383 under the wider economic measure when monetisation of well-being is included. These benefits could be considerably more in the longer term if the beneficial effects on children are taken into account.

At between £2,429 and £4,383, Family Action's estimated benefits exceed the average cost of providing support of £2,230. They would exceed the costs even more if the longer term effects on children and mothers were taken into account and monetised.

⁸ Increased tax and National Insurance contributions are not included because they are regarded as transfer payments.

Family Action might consider increasing the number of women who receive their service each year in order to improve the value for money of the service. If it were possible to increase the number of women participating in the PSP by expanding the current Family Action centres, then the marginal cost of each additional woman participating in the PSP is estimated to be £1,615 compared to a benefit of £2,429-£4,383. Further details of the costs of the current service and capacity are set out in the technical report.

Key Assumptions

Estimating the economic costs and benefits of Family Action's services has required making a number of assumptions. In the absence of a recent Randomised Control Trial to evaluate Family Action's PSP, estimates of the effectiveness have been drawn from a previous RCT of a similar service (Newpin) and a 'before and after' evaluation of Family Action interventions undertaken by Warwick University. These have provided a range of estimates for the effectiveness of the service.

The absence of a full evaluation and follow-up also means that the precise outcomes are uncertain. The link between prevention of post-natal depression and beneficial outcomes for women and society at large, have been inferred from experts and range of published literature.

One of the key unknowns, in the absence of a full evaluation and long-term follow up, is how long and extensive post-natal depression might be in the absence of any support such as that provided by Family Action. The analysis from the Millennium Cohort Study suggests that the labour market impacts alone could last for at least five years.

Wherever possible a conservative approach has been adopted. If the longer term benefits to children of improved educational attainment and reduced risk of behavioural problems and depression were monetised the benefits of the service would be likely to be significantly greater.

Implications of the research

- 1) The types of interventions provided by Family Action are effective and generate benefits in terms of improved health, employment and emotional state.**

A Randomised Control Trial of a similar service (Newpin) and an evaluation by Warwick University showed that the service model is effective in improving the wellbeing of women by reducing the risk of depression. These effects are highly likely to lead to a range of beneficial outcomes to women and to society at large.

- 2) Wide ranging economic and social benefits can be monetised**

This study has linked the effectiveness of the PSP to a range of benefits which accrue to the women on the programme as well as to the economy and society at large. The evidence which is most easily quantified and monetised relates to increased employment and earnings prospects. The women who benefit from the programme also experience increased well-being but the uncertainty of these estimates means that they should not be relied on too heavily to make the case for the service. Benefits to children could be very long term and therefore could be substantial. This is an obvious area for further research.

- 3) Costs could be lowered if more women could access the existing service**

Family Action might consider assessing the potential to increase the numbers of women participating in the programme. If this was done from the existing four centres then the marginal costs are lower and the cost-benefit case is more easily made.

- 4) More research in this area would be helpful**

As noted above, a big gap in this study is the quantification and monetisation of the impact on the children of mothers who benefit from the PSP. There is evidence that the benefits could be substantial and last for many years into adulthood. Understanding the scale of these benefits and potential savings would provide a very helpful evidence base against which to fully assess the kind of service that Family Action provides. Another area that it

would be helpful to research is the duration of the beneficial impact of the services on well-being, once peer-support has ended. In terms of research on the monetisation of well-being benefits, developing ways of attaching monetary values to health scales used in the medical profession would enable well-being to be incorporated in more cost and benefit assessments.

Technical Annex

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1. Measuring the effectiveness of the programme

The main source of existing evidence on the effectiveness of the Family Action PSP comes from an earlier published evaluation using a Randomised Control Trial methodology. This evaluation was of the Newpin programme in Southwark, which was a precursor to the Family Action PSP and followed a similar service model (see Harris, 2008). Additional information was also derived from a published evaluation by Warwick University Medical School in 2012 (Barlow, et al, 2012). This considered the clinical effectiveness of the PSP in a case control design, using a range of psychometrics.

The Warwick Study

The evaluation comprised two components and this study focussed on the first component:

- a. A service evaluation addressing the impact of the PSP on mothers psychological state, measured by changes in psychometric scores;
- b. Stakeholder interviews to explore perceptions about the PSP on the part of service providers and recipients.

All families who took part in the Family Action Perinatal Support Service were required by the project coordinator to complete a range of standardised measures on entry to the project (i.e. at baseline), and following completion of service delivery (i.e. post-intervention). The standardised measures were:

- Mental health and wellbeing: Hospital Anxiety Depression Scale (HADS).
- Mother-child relationship: Mother Object Relationship scale (MORS).
- Social isolation: Maternal Social Support Index (MSSI).
- Rosenberg's Self-Esteem Scale (RSE)

The Rosenberg's Self Esteem Scale was also completed by volunteers and is discussed further in the section on volunteering costs and benefits.

The results shown in Table 1 are taken from the Warwick Report: it shows the mean (standard deviation) scores pre- and post-intervention for the four key outcomes. The results show significant improvements in anxiety and depression ($p < 0.00$), social support ($p < .01$) and self-esteem ($p < 0.00$). There was also a significant improvement in the mother's relationship with the baby in terms of warmth ($p < 0.00$), but not invasiveness ($p = .109$).

Table 1: Mean scores for the key measures pre and post intervention

<i>(Standard deviation in brackets)</i> Measures	N	Baseline	Post-Intervention	Sig
Parental mental health	33			.000
<i>Anxiety</i>		11.8 (4.1)	8.4 (3.8)	.000
<i>Depression</i>		10.1 (4.3)	6.1 (2.7)	
Mothers relationship with the baby	35			.000
<i>Warmth</i>				.109
<i>Invasiveness</i>		22.9 (7.8)	29.0 (4.4)	

		12.1 (6.3)	10.3 (5.3)	
Social Support	42	18.7 (6.3)	20.6 (5.2)	.007
Self-Esteem (Volunteer Befrienders)	80	30.6 (4.8)	32.2 (4.4)	.000

Use of the Warwick Study data

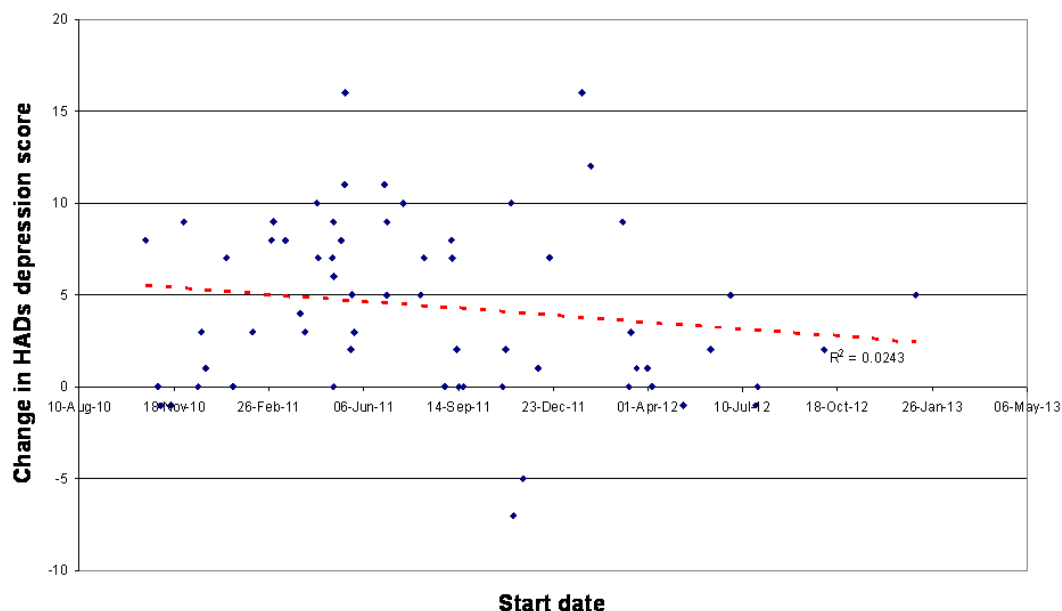
The initial data from the Family Action Perinatal Support Project (PSP) from Warwick University shows that from an initial sample of 33 mothers, the mean score on the Hospital Anxiety and Depression Scale (HADS) before peer-led support began was 10.1 for depression, with a standard deviation of 4.3. This information is important from a clinical perspective because in-depth work on the screening properties of the HADS suggests that a score greater or equal than 8 on the depression scale of the HADS indicates clinical depression (Bjelland, 2002).

Supplementary analysis on the effectiveness of the PSP

The team have updated the Warwick study with the most recent clinical data provided by Family Action.

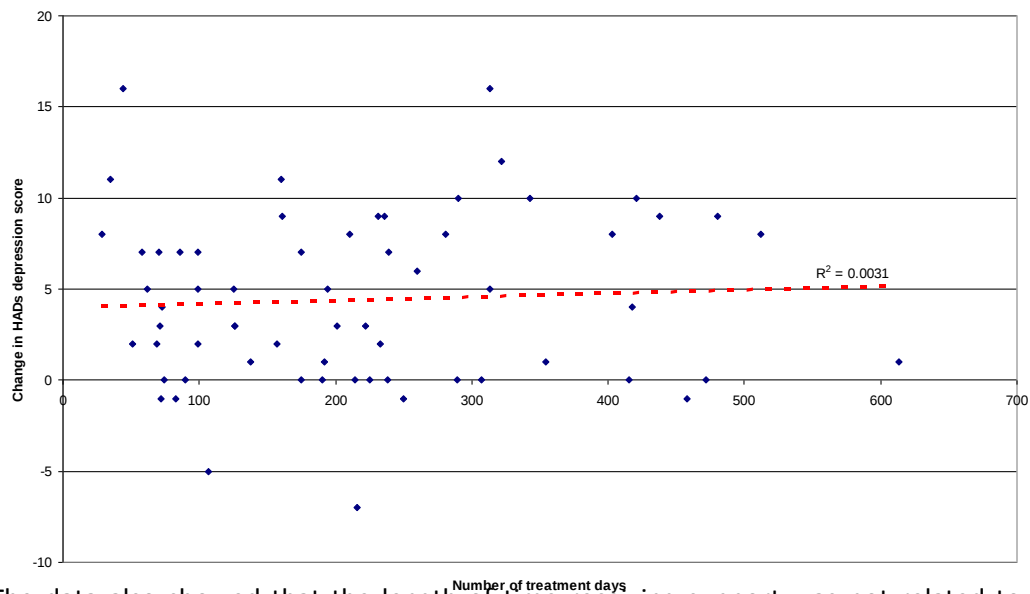
An analysis was undertaken to test if the effectiveness of the programme varied over time. The hypothesis was that the service may have become more effective over time as the service bedded down. Chart 1 suggests that this wasn't the case as there is only a very weak relationship between date of entry into the service and clinical change as measured by the HADs.

Chart 1: Relationship between date of entry into the service and change in depression scores



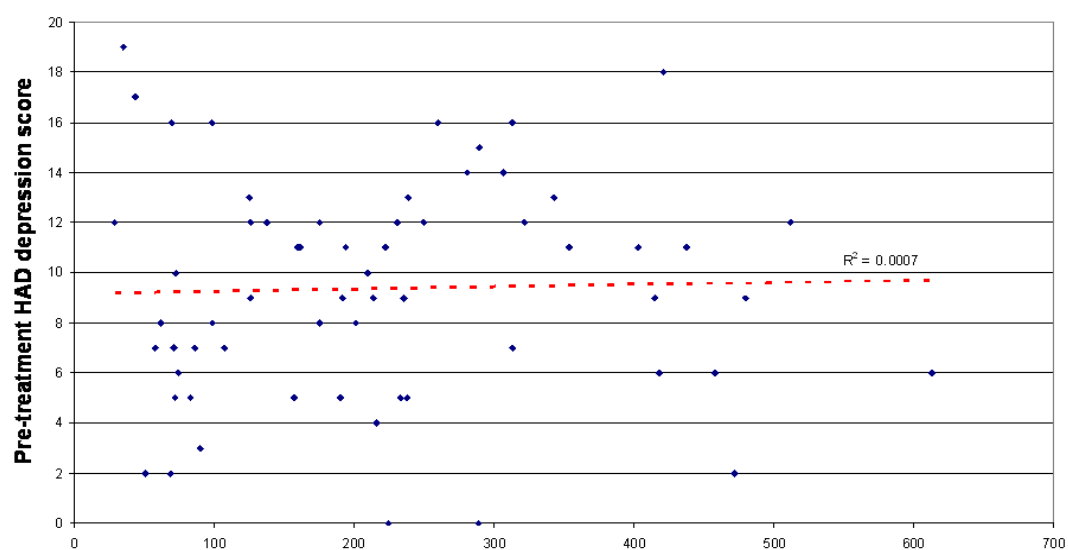
The team also looked at the data to investigate whether the length of time receiving support from the PSP improved the clinical results (see Chart 2). The length of time receiving support did not appear to be related to change in the HADS depression score.

Chart 2: Length of time receiving support and change in the HADs depression scale between the start and end of support



The data also showed that the length of time receiving support was not related to initial levels of depression (see Chart 3). The length of the intervention is determined more by the complexity of issues the service users presented with, and interventions are frequently targeted on other key outcomes areas, for example mother infant attachment, domestic abuse and isolation. However, this could be helpful to Family Action in considering improvements to their service. For example by discontinuing support earlier (if possible) and switching resources into new referrals. It is, however, noted that these are difficult decisions and will be influenced by the personal characteristics and circumstances of each woman.

Chart 3: Length of time receiving support and initial HAD depression score



The Newpin Programme

In 2005 Family Action merged with Newpin whose work, underpinned by Attachment Theory and emphasising peer support, was the basis for the development of the PSP.

A randomised controlled trial of the Newpin service found that women assessed as vulnerable to perinatal depression who received social support were half as likely as those in the control group to have experienced the onset of a depression sufficiently severe enough to warrant anti-depressants, or to have remained without recovery from depression throughout the 12-month study period (Harris 2008). That is, the change in the probability of the onset of severe depression was reduced from 54% to 27%.

In this study we have used the change of 27 percentage points to determine the estimates of quantifiable outcomes. We have assumed that mothers attending the Family Action PSP will, on average, reduce their risk of depression by 27 percentage points.

Although the evaluation of Newpin is not the same as an evaluation of the current Family Action PSP, it is a similar intervention. Additionally the RCT approach means that the results could be viewed as valid and reliable. Furthermore, the Warwick Study of the Family Action PSP using a different research design shows the PSP to be clinically effective and a subsequent evaluation of a pilot project - the Family Action Newpin Southwark Perinatal Project - demonstrated improved outcomes for participants (Lederer 2009). Taken together this evidence suggests that the Family Action PSP is likely to be effective in reducing the probability of a mother experiencing depression.

2. Estimating the increased chances of employment and higher earnings

Previous research has shown that mental illness influences labour market outcomes, with individuals suffering from these conditions being less likely to be employed and to have lower average wages. For instance, Bartel and Taubman (1986) found that mental illness significantly lowers individuals' earnings and does so over a long period of time. Similarly Ettner, Frank, and Kessler (1997) found that those with mental disorders were less likely to be employed, and those who were employed worked less hours and had lower incomes than healthy individuals.

Aside from the affect of mental illness on employment outcomes, research has also examined wage patterns of those employed with mental illness. Baldwin and Marcus (2007) analysed the wages of people with and without mental disorders and found significantly different patterns of wages over four subgroups of mental disorders (mood, anxiety,

adjustment, and psychotic disorders), with those with mood disorders having the lowest earnings when controlling for background characteristics.

Many potential reasons exist for these poor labour market outcomes. Social and cognitive skills are essential components of success in the workplace and individuals with mental illness are more likely to be deficient in these skills (Druss et al., 2000). For instance, depressive illness may affect mood, memory and motivation (Charterji et al, 2008), and the illness itself may result in prolonged periods of sick leave which limits opportunities for training and development; and in turn impacts on long-term human capital and productivity (Adler et al 2006; Bernt et al, 1998). Stigma may also play a role. Several U.S studies that examined the attitudes of employers toward individuals with disabilities have shown mental illness to be the disability that would be the most likely to result in prejudice against a potential employee (Royal and Roberts, 1987, Westbrook et al., 1993).

However, while these studies consider the impact of mental illness on labour market outcomes, few studies specifically consider the impact of postnatal depression on employment probabilities and wages. A rare exception is a longitudinal analysis by McMunn et al (2011) that used the Millennium Cohort Study (MCS) to consider the impact of maternal employment on children's later socio-emotional behaviour. As part of this study, analysis was carried out to show that the proportion of mothers in paid work was associated with whether or not they had experienced depression at each wave of the survey. However, the study didn't consider the impact of depression on mother's earnings, and it did not specifically consider the long-term labour market implications of mothers with postnatal depression.

The issue of postnatal depression is becoming an increasingly important policy issue as more and more mothers combine childrearing with paid work. For instance, recent government statistics show that more than half of mothers return to some form of paid employment when their child is under one year of age (DWP, 2012). However, postnatal depression is a common condition, with approximately 13% of women affected by the illness during the early months following childbirth (O'Hara & Swain, 1996). Given the evidence on the association between mental illness (particularly depression) and poor labour market outcomes it would be reasonable to assume that women experiencing postnatal depression are less likely to regain employment after childbirth and the earnings of those that return to work will be lower than for non-depressed mothers with similar background characteristics. If this hypothesis holds true then it implies that effective services and support for postnatal depression could have potentially large economic benefits.

This study used the MCS to examine the long-term labour market effects of postnatal depression and to measure the economic cost of the condition in terms of the mother's earnings up until the child is aged five, and old enough to go to school. More specifically the analysis considers:

- 1) the impact of postnatal depression on the proportion of mothers that return to work when their child reaches school age (when there is typically a step change in the mothers employment rate); and
- 2) the impact of the condition on a mother's earnings when their child is aged five, after controlling for background characteristics that could also influence earnings.

Methods

Data

The data comes from information collected in the first and third waves of the MCS. The MCS is a large-scale survey of babies born in the United Kingdom at the turn of the new century (Dex and Joshi, 2005). The first sweep (MCS1) was carried out during 2001–2 and contained information on 18,819 babies, collected from the parents when the babies were nine to 11 months old. The sample design allowed for over-representation of families living in areas of England with high rates of child poverty or high proportions of ethnic minorities. The families were followed up when the child was aged five years and the overall achieved response rate at this wave (MCS3) was 79 per cent of the target sample. Detailed information on the sampling strategy and response rates for the surveys can be found in Plewis et al. (2004) and Lewis (2007). Full details on the survey, its origins, objectives, sampling and content of the surveys are contained in the documentation attached to the data deposited with the UK Data Archive at Essex University.

Maternal employment

In wave 1 of the MCS mothers were asked if they had been employed during the time they were pregnant. This is taken as evidence of employment before the birth of the cohort child. In wave 3 maternal employment is measured by a question about whether the mother was in paid employment in the last week.

Mother's earnings and deductions for National Insurance and Income Tax

At wave 3 mothers are asked how much they earned in the last week and the number of hours that they worked. From these two variables an hourly wage rate is derived. This is measured in terms of gross pay.

Postnatal depression

The postnatal depression measure from the first wave, when the baby was nine months old, was derived from whether the mother responded positively or negatively to the question, '*Since (the baby) was born, has there ever been a time lasting two weeks or more when you felt low or sad?*'. This question is used to provide an indication of the mother's emotional history from birth to when the infant was nine months. One in three of the mothers responded in the affirmative to this question. It has been demonstrated that this simple

indicator correlates strongly with depression constructs, including clinically diagnosed depression (Kiernan and Huerta, 2008). In order to produce a more robust measure of postnatal depression, and to be consistent with previous studies (e.g. McMunn et al, 2011), this question was combined with the nine-item Malaise psychometric scale used in the MCS.

The Malaise Inventory includes questions on nine indicators of depression: feeling tired most of the time, feeling miserable or depressed, often getting worked up about things, often getting into a violent rage, often becoming scared suddenly for no good reason, being easily upset or irritated, being constantly keyed up and jittery, getting annoyed/worn out by every little thing, and heart racing like mad. Mothers experiencing four or more of these problems (13 per cent of the MCS sample) are defined as having maternal depression. Therefore mothers that score four or more on the Malaise inventory and recall feeling sad or low for two weeks or more since the birth of their child are defined as having postnatal depression at Wave 1, representing approximately 10 per cent of the mothers in the sample.

As noted by Kiernan and Mensah (2009) these measures are only indicators of postnatal depression. Ideally one would have preferred more concrete assessments, such as the Edinburgh Postnatal Depression Scale (Cox et al., 1987) but this was not included in the MCS. However, the team believe that the approach of using the depressive symptoms measured in the Malaise inventory and the question on feeling sad or low for more than two weeks following the birth of the cohort child is the closest measure of postnatal depression that can be constructed from the MCS.

Occupational status, skills, educational, family status and demographic variables

Maternal occupational status was classified according to whether the mother had a professional/managerial job in wave 1 or when she last held employment, whether her occupation was of intermediate skill, whether she was self-employed, whether it was a low technical occupation, or routine manual employment.

Maternal education and skill levels were defined as the highest academic/vocational qualification attained and reported between wave 1 and wave 3 of the survey. The qualifications were standardised in the MCS and placed on a five-point scale equivalent to National Vocational Qualification levels. Information was also collected on the mother's age. At wave 3 the number of children in the household was calculated, along with the number of children less than 5 years (i.e. the number of children born since the birth of the cohort child). The mothers family status was also recorded at wave 3 i.e. whether or not she was a lone parent at the time of the interview or living as part of a couple.

Statistical analysis

Due to the complex cluster sampling used in the MCS the data was weighted to be made representative of the general population, and to take account of non-response rates between waves. This was done using the SPSS Complex Sampling Module, following the procedure detailed by Jones and Ketende (2010). Weighted percentages, univariate and

adjusted analyses were calculated using survey and non-response weights. Univariate logistic regression analyses were conducted to calculate odds ratios for each variable with respect to mother's employment at wave 3 and Wald tests were used to obtain p-values. Ordinary Least Squares regression (OLS) was used to estimate mothers' earnings.

Probability of maternal employment at wave 3 when the cohort child is of school age

A logistic regression model was developed to estimate the probability of a mother being in employment when their child was of school age at wave 3. The dichotomous dependent variable was whether or not the mother had been in paid employment in the week of the survey. In order to control for factors that may influence this outcome, independent variables were added to the model in a stepwise procedure. These variables are described above and included educational and skill levels, employment before the birth of the cohort child, number of other children in the household, number of children under five years (i.e. new siblings), current or previous occupational group, and postnatal depression at wave 1.

The final sample used in the modelling was 11,631. This was lower than the initial MCS sample because mothers dropped out of the study between waves and because of missing variables between waves 1 and 3. Mothers who had multiple births were also deleted from the sample to remove the effect of having multiple births on rates of employment and earnings. The data was weighted to take account of non-response between waves 1 and 3, and the effect of sampling design factors in the MCS. Even though Wave 4 of the MCS was available to the team the modelling was restricted to the analysis of waves 1 and waves 3 because information on key variables was not available from wave 4 of the MCS or the wording of some questions had been changed between waves 3 and 4.

Wages of mothers employed at wave 3

The wage equation was estimated using OLS. The final sample included 7,001 mothers. This group only included mothers that were employed at wave 3 and who reported their earnings and number of hours employed. The dependent variable was the log of gross hourly earnings.

Results

The probability of mothers being employed when their child is of school age

Table 2 reports the results from the logistic regression model for a mother's employment at wave 3, when the cohort child is of school age. NVQ educational and vocational skill levels were a statistically significant predictor of mother's employment, along with employment before the birth of the child and the occupational status of the mother at wave 1 or when she last held a job. The number of children in the household and the number of children born and living in the family since the cohort child were also important variables in predicting the probability of the mother's employment. The key independent variable for this analysis was the variable defining postnatal depression in the period following the birth

of the child to when the child was around nine months. This variable had a negative coefficient and was statistically significant. In other words, mothers were less likely to be employed when their child reached school age if they had experienced postnatal depression at wave 1, even after controlling for the mothers previous employment, number of other children, skills/educational levels and family status.

The model correctly classified 70 per cent of the cases in the sample according to whether or not they were employed at wave 3, and had a Nagelkerke pseudo R^2 of .239 suggesting that the model was a reasonable fit to the data.

Table 2: Logistic regression model of paid employment when the cohort child was aged 5 (MCS wave 3)

	B	Std. Error	t	Sig.	Exp(B)
Constant	-1.994	.184	-10.824	.000	.136
<u>Highest educational/vocational qualification:</u>					
NVQ level 1	.225	.126	1.787	.075	1.252
NVQ level 2	.456	.106	4.323	.000	1.578
NVQ level 3	.617	.113	5.450	.000	1.853
NVQ level 4	.646	.120	5.366	.000	1.907
NVQ level 5	.978	.158	6.202	.000	2.660
Other qualification	-.323	.223	-1.449	.148	.724
<u>Occupational status:</u>					
Management & professional	.314	.071	4.439	.000	1.369
Intermediate skills	.124	.069	1.809	.071	1.132
Self-employed	.633	.145	4.379	.000	1.883
Low skill	.299	.107	2.796	.005	1.349
Two parents family	.412	.071	5.770	.000	1.509
Paid job before birth of cohort child	1.217	.058	20.804	.000	3.375
Other children at wave 1	-.282	.121	-2.336	.020	.754
Post natal depression	-.347	.067	-5.175	.000	.707
Age of the mother at Wave 1	.035	.005	6.846	.000	1.036
Total number of children	-.317	.028	-11.383	.000	.729
Number of children under 5 years	-.695	.050	-13.872	.000	.499

The wages of mothers in employment at wave 3

The OLS wage equation reported in Table 3 shows that the gross log hourly wage of mothers employed at wave 3 was determined by occupational group, the level of educational and vocational qualifications, family status, number of children, and whether or not the mother experienced postnatal depression. The fit of this model was good and the R^2 value was .32, suggesting that the model explained 32 per cent of the variance in log hourly wages.

Table 3: Log hourly wages for employed mothers when child aged 5 (MCS wave 3)

	B	Std. Error	t	Sig.
Constant	1.659	.021	80.875	.000
Lone parent	-.053	.020	-2.625	.009
Paid job before pregnancy in wave 1	.197	.022	8.872	.000
Post natal depression	-.061	.021	-2.881	.004
Highest NVQ level 4 or above	.219	.018	12.317	.000
Occupational status:				
Management & professional	.584	.022	26.753	.000
Intermediate skills	.230	.019	11.863	.000
Self-employed	.315	.072	4.387	.000
Low skill	.073	.033	2.250	.025

Note: The base category for occupational status is routine/unskilled job.

Simulations using the employment model and wage equation

The logistic regression model shows that the probability of a mother being employed when her child is aged five is reduced if the mother experienced postnatal depression before the child was aged around 9 months, controlling for the background characteristics of the mother.

The model can also be used to determine how the probability of employment might change had the mother not had postnatal depression. This is done by fitting the employment equation to each mother in the sample, but changing the postnatal depression variable from 1 if the mother was depressed to 0 to simulate the effect on her employment had she not been depressed, taking into account the mothers other relevant characteristics. The resulting probabilities are then averaged across the sample to give the expected probability of employment for a depressed mother had she not had depression. This is then compared to the actual average rate of employment at wave 3 for the depressed mothers. The difference between the two probabilities is assumed to be the employment effect of postnatal depression on the average mother with the condition at wave 1. This is taken to be the equivalent of saying that the average mother, representative of all mothers with postnatal depression, would have had an increased percentage probability of employment had she not had the illness.

The results of this simulation show that mothers with postnatal depression had a 50 percent probability of being employed when their child reached school age. However without depression the probability of employment for this group, controlling for all the other factors included in the model that also influence employment, would be expected to increase by 7 percentage points to 57 per cent.

A similar simulation was run on the employed mothers with depression. This showed that the gross hourly wage of mothers that had experienced postnatal depression was £8.83 at 2011/12 prices but this rate would be expected to increase to £10.67 had the mothers not experienced depression. This represents an increase of £1.84 in the hourly wage or a 20.8

per cent increase in the hourly wage of the mothers. Again it is important to note that these estimates control for the background characteristics of the mothers, and other variables that might be expected to determine hourly wage rates. Interestingly the mean number of hours worked by the mothers was around 24 hours per week. This was the same for depressed and non-depressed mothers.

Simulating the economic cost of postnatal depression

The results of the above simulations can be combined to give an estimate of the economic cost of postnatal depression in terms of the effect on the probability of the mother being employed and the effect on her annualised gross wages (or the value of her economic output).

Based on annualised earnings the average mother in work, and with postnatal depression, would be expected to earn £11,023. This is based on an hourly wage of £8.83 multiplied by a working week of 24 hours over 52 weeks per year. Given that the average postnatal depressed mother has only a 50 per cent probability of employment then this values the average economic output across all depressed mother at £5,512 per annum (£11,023 x 0.5). In comparison the simulation shows that had the mothers not had postnatal depression then their probability of employment would increase by seven percentage points and their gross earnings would increase by 20 per cent, after controlling for other variables that influence employment and wage outcomes (e.g. skills, education, previous employment etc.) These effects combined would mean that at an hourly wage rate of £10.67, working 24 hours per week for a year a mother without depression could earn £13,315 per annum. The increase in the employment probability from .5 to .57 would mean that the value of the average mothers economic output without postnatal depression could therefore be £7,590 (£13,315 x 0.57). This implies that the net annual cost to the economy is £2,078 per postnatal depressed mother. This is based on the assumption that depressed mothers, would see the average value of their output rise from £5,512 to £7,590 had they not had depression.

The economic impact of Family Action

Based on the evidence from the Newpin RCT, it is assumed that the Family Action PSP reduces the probability of a mother becoming clinically depressed by 27 percentage points. Given the estimate that the economy loses £2,078 of output for every postnatal depressed mother with a school age child, this implies that the Family Action PSP could produce benefit £561 (£2,078 x 0.27) for every mother that enters the programme.

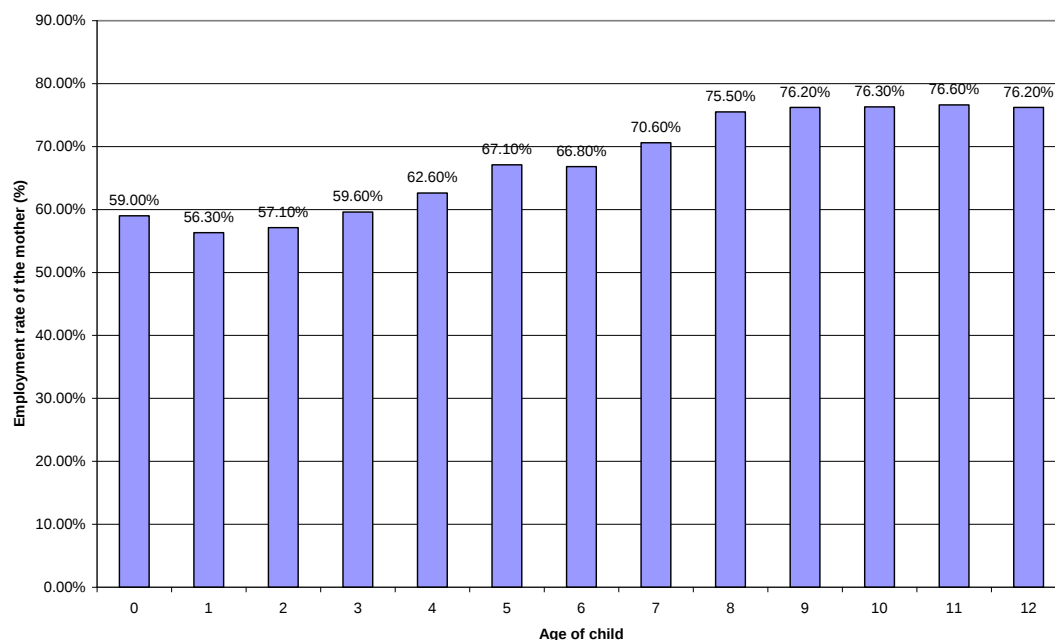
It is possible that some of the economic benefits from the treatment of postnatal depression will be substitution effects. Employment substitution effects occur if the mothers who avoid postnatal depression as a result of support take the jobs of other mothers seeking employment. Wage substitution effects could also occur if the return of postnatal depressed mothers into the labour market reduces the wages of other workers. The evidence on supply-side substitution effects – the type of substitution effect that would be expected of programmes that help mothers back into the labour market – suggests that these effects are

much smaller than for demand-side substitution effects whereby the government or some other organisation subsidises the employment of the target group. Demand-side substitution effects can be as high as 60 per cent while supply side effects can be between 20 per cent or zero (Greenberg, 2011). The assumption is made that Family Action would exert a supply-side substitution effect and that the effect would be small. Therefore no adjustments have been made to the economic benefits for wage or employment substitution effects.

Duration of the effect on wages and employment

The economic effect of Family Action though could be long-term. The estimates above are for just one year, when the mother's child is aged 5 and able to start school. However, this ignores the fact that mothers could return to work at any point in the proceeding period, and their post natal depression may also impact on their probability of employment and wages throughout this period. A crude approach would be to multiply the annual economic effect of depression by the age of the child up to when they start school. This would be an over simplification as a mothers decision to return to work is influenced by the age of their child. Chart 4 demonstrates this by showing employment rates for mothers in 2011 by the age of the youngest child (DWP, 2012).

Chart 4: Employment rates of all mothers, by age of youngest child (2011)



In order to estimate the duration of the economic benefit of Family Action, the team have assumed that mothers follow a similar employment pattern to that of all mothers reported in the more recent DWP statistics i.e. their probability of employment will gradually increase until the child reaches school age. Any effect after that is ignored as the analysis of the MCS only allows consideration of the effect of postnatal depression up to that point. The team have further assumed that while the rates of employment will change the real wage rate will not. These assumptions lead to a calculation of the economic impact of post natal depression over a five year period. The details are reported in Table 4.

Table 4: Calculation of average economic benefits for each mother supported by Family Action

Age of child	Employment % Depressed	Employment % Non-depressed	Mean gross earnings (non-depressed) - £	Mean gross earnings (depressed) - £	Net economic effect -£	Treatment effect (p=0.27) - £
Age5	50%	57%	7,590	5,512	2,078	561.07
Age4	45%	51%	6,791	4,960	1,830	494.18
Age3	40%	46%	6,125	4,409	1,716	463.24
Age2	40%	46%	6,125	4,409	1,716	463.24
Age1	40%	46%	6,125	4,409	1,716	463.24
Total	43%	49%	32,755	23,700	9,055	2,445

Applying a discount rate of 3.5% on the economic benefits, the present value of the Family Action wage and employment effects over five years is £2,292. This assumes that there are no further benefits once the child reaches school age.

Summary and discussion

According to the MCS, around 10 per cent of mothers experience post natal depression in the nine months following the birth of their child. The condition appears to be associated with a lower probability of a mother being employed by the time their child has reached school age. For those employed postnatal depression would also appear to lower their wages. The combination of these effects would suggest that postnatal depression results in a significant loss of economic output and that this could be as much as £2,078 per depressed mother in the year their child starts school. Furthermore, it is plausible that these effects impacted on the mother's employment and earnings from the onset of the depression to at least when the child turned five-years of age. The impact over a five year period could therefore be substantial. It is also possible that the effects could last beyond five years but we haven't been able to test that hypothesis with the available data, although this would be possible at more waves of the MCS become available.

The available evidence on the clinical effectiveness of Family Action would suggest that it can be successful in reducing postnatal depression and that the average effect on each mother receiving support through the PSP results in a significant economic benefit of £2,292 per mother, over a five year period.

3. Reduced health and social care costs

Stavros⁹ (2002) calculated that the mean cost of health and social care services to postnatal depressed mothers was £2,419 whereas for non-depressed mothers the cost was £2,026.9. This suggests that the additional cost of health and social care services for depressed mothers and their children was £392.1 at 2000 prices.

Table 5: Mean cost (£) of health and social care services at 2000 prices

⁹ Stavros et al (2002). Economic costs of post-natal depression in a high-risk British cohort in a high-risk British cohort. BRITISH JOURNAL OF PSYCHIATRY, 181, 505-512 <http://bjp.rcpsych.org/content/181/6/505.full.pdf+html>

	Post-natal depression	Non post-natal depression	Mean difference
Community mental health care	273.9	113.3	160.6
Other community care	512.40	392.40	120
Total community care	786.20	505.70	280.5
Mother: day care	8.50	7.40	1.1
Mother: hospital out-patient care	83.60	63.50	20.1
Mother: hospital in-patient care	521.90	473.50	48.4
Infant: paediatric and child care	1018.70	976.60	42.1
Total	2419.00	2026.90	392.1

Note costs: based on the period from delivery to 18 months post partum

The net cost of services to postnatal depressed mothers of £392 is up rated to 2011/12 prices in order to be consistent with the price base used in measuring the costs and benefits of Family Action. This gives a figure of £507 per postnatal depressed mother. Therefore, preventing or effectively treating postnatal depression in its early stages may benefit health and social care services up to £507 per mother.

The Family Action PSP is assumed to reduce the probability of post natal depression by 27 percentage points. This would imply that the Family Action PSP results in a benefit to health and social care services of £137 per mother that enters treatment over an 18 month follow-up period (£507 x 0.27). The benefit may be greater if a longer follow-up period was considered.

4. Mothers' improved mental health

This sections sets out the methodology for estimating the monetary value of the mothers increased mental health. These estimates carry the greatest degree of uncertainty in terms of the valuation technique and generate a wide range of estimates.

The evaluation of the PSP by Warwick University¹⁰ found significant improvements in four key outcomes following the provision of services and support. These were maternal anxiety and depression; social support; self esteem (volunteer befrienders) and; the mother's relationship with the baby (warmth). Improvement was measured through the before and after change in a number of individual metrics, namely, the Health Anxiety and Depression Scale (HADS), Mother Object Relationship Scale, Maternal Social Support Network and Rosenberg Self-esteem Index.

The team's analysis was only able to monetise the impact on anxiety and depression - a narrow component of mental health. This is because the other measures captured by the Warwick University Study cannot be monetised via conversion into QALY's (Quality Adjusted Life Years – see description below). The effect, as measured on the HAD scale, is replicated in the table below and shows an improvement in the average anxiety and depression scores across all participants (not just those treated for depression).

¹⁰ <http://www.family-action.org.uk/section.aspx?id=21509>, page 17

Table 6: HADS scale pre and post intervention (source: Warwick Report)

Measure	Baseline	Post intervention	Difference
Anxiety	11.8	8.4	-3.4
Depression	10.1	6.1	-4

This direct impact of an improvement in the anxiety and depression of mothers is likely to have further positive effects, not captured by this analysis; for example, improvements in the development of mother/ child relations, a reduction in the use of various medical services and potentially labour force participation

A method to monetise the identified impact on anxiety and depression is to convert the change in scores into Quality Adjusted Life Years (QALYs) - a standard measure of the value of health gain delivered by different interventions. However in the absence of a direct conversion from HADS to QALYs a number of steps need to be taken.

Firstly, a preference-based single index measure for health from the HADS scores using general population values is estimated. Both the SF-6D and EQ-5D are calculated based on advice from the University of Sheffield¹¹.

Secondly, standard conversions from these measures to QALYs¹² are used. These calculations result in the improvement in anxiety and depression in terms of QALYs of 0.02956 under SF-6D and 0.06512 under EQ-5D. Cautiously, it is assumed the impact lasts for only one year.

Finally, to monetise the impact a single QALY value from the NICE guidance is applied: £20-30,000 per QALY¹³. This value is used to assess the additional benefit of a new intervention over and above what already exists.

The final results reveal an estimated benefit of £591- £887 (using SF-6D) or £1,302- £1,954 (using EQ-5D) per woman treated.

Alternative monetary measures have been used, including the Department for Transport value of a prevented fatality (VPF) method. This includes not only individuals' willingness to pay to mitigate their own risk of death, but also estimates for lost net output (the excess of their output over their own expected consumption) and medical and ambulance costs. Willingness to pay for a QALY should exclude medical and ambulance costs (to avoid double-counting), for which DfT provides a separate figure (£970). No separate figure is provided for the lost of net output leaving a VPF net of medical and ambulance costs in June 2007 of

¹¹ Detailed calculation as follows: $EQ-5D = -0.0176 \times HADS \text{ Total} + 1.0264$; $SF-6D = -0.0107 \times HADS \text{ Depression} - 0.0048 \times HADS \text{ Anxiety} + 0.7945$

¹² By measuring the area under the curve - cautiously assuming the effect last for 1 year only.

¹³

<http://www.nice.org.uk/newsroom/features/measuringeffectivenessandcosteffectivenessstheqaly.jsp>

£1,637,420. The number of QALYs relating to road traffic deaths is then calculated, adjusted for life expectancies and discounted to provide an estimate of the willingness to pay per QALY of £60,000. This method generates a monetised well-being benefit of £1,967 to £4,332 per woman supported by the PSP (2012 prices).

5. Longer-term beneficial outcomes affecting children

Postnatal depression is now recognised as an important marker of a mother's risk for subsequent depression (Campbell and Cohn, 1997) and her child's risk for later psychopathology (Hay et al, 2003; Halligan et al, 2006).

A study by Hay et al in 2001 examined the long-term outcomes of children of mothers who were depressed at 3 months postpartum. In a community sample from two general practices in South London, 149 women were given psychiatric interviews at 3 months postpartum and 132 of their children (89%) were tested at 11 years of age. The children of women who were depressed at 3 months postpartum had significantly lower IQ scores. They also had attention problems and difficulties in mathematical reasoning, and were more likely than other children to have special educational needs. Boys were more severely affected than girls, with the sex difference most pronounced on Performance IQ. The links between postnatal depression and the children's intellectual problems were not mediated by parental IQ and were not accounted for by measures of social disadvantage nor by the mother's later mental health problems. The authors concluded that the findings show that adverse experiences in infancy predict cognitive ability and academic performance a decade later.

A further study by the same authors showed that mothers' depression in pregnancy significantly predicted violence in the children when they had reached adolescence, even after controlling for the family environment, the child's later exposure to maternal depression, the mother's smoking and drinking during pregnancy, and parents' antisocial behaviour.

Mothers with a history of conduct problems were at elevated risk to become depressed in pregnancy, and the offspring of depressed women had a greater chance of becoming violent by age 16 (Hay, et al 2003). However, it should be noted that the number of participants in the study was relatively small and limited to an inner-city cohort with high rates of socio-economic deprivation and a low level of literacy in some participants. The severity and duration of the mother's depression also seems to be an important factor. For instance, other research shows that maternal depression was no longer itself a significant predictor of depression in the adolescent offspring when account was taken of the chronic nature of the mother's depression, with the odds of the offspring being depressed at 16 years being increased by 1.74 for every period of maternal depression from pregnancy to when the offspring reached 16 years (Pawlby et al, 2009).

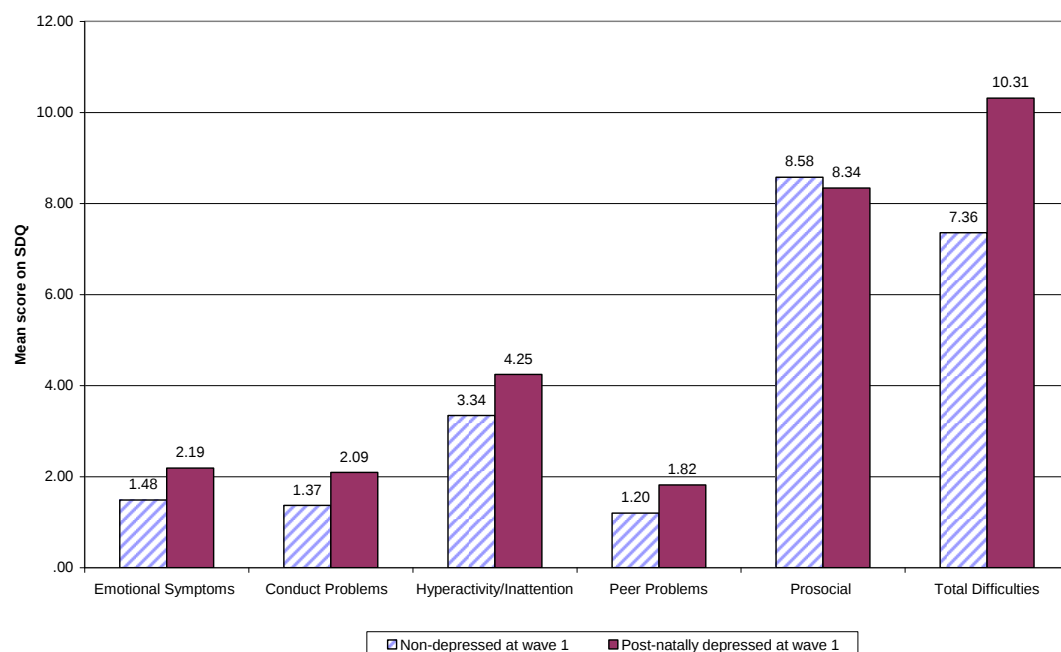
In view of this literature the team analysed the MCS to consider the long-term effects of a mother's postnatal depression on children's cognitive and social development. This was

done by using the Strengths and Difficulties Questionnaire (SDQ), a well established screening tool for child psychiatric disorders and included in the MCS.

The SDQ is a brief questionnaire that can be administered to the parents and teachers of 4- to 16-year-olds and to 11- to 16-year-olds themselves (Goodman, 1997, 1999; Goodman et al, 1998). Besides covering common areas of emotional and behavioural difficulties, it also enquires whether the informant thinks that the child has a problem in these areas and, if so, asks about resultant distress and social impairment.

A bivariate analysis of the SDQ on the MCS wave 4 data (i.e. when the children were aged seven years) shows that there were statistically significant differences ($p < 0.001$) between the postnatal depressed mothers and non-depressed mothers on all the domains of the SDQ (see chart 5).

Chart 5: Mean scores on the Strengths and Difficulties Questionnaire (SDQ) when children aged seven years



It is possible that these differences are due to differences in the characteristics of the mothers and it is clear from the literature that it is the chronic nature of the depression that leads to adverse consequences for the children overtime, rather than just one episode of depression and recovery.

In Table 7, the team conducted a regression analysis of the total number of social, cognitive, and behavioural difficulties experienced by children at the age of seven on the SDQ. This shows that the mothers postnatal depression and the number of subsequent depressive episodes (our proxy for chronic depression) was strongly associated with the children's total difficulties at the age of seven years, even after controlling for a whole range of other risk factors that are shown in previous studies to influence a child's development (see Sabates and Dex, 2012).

Table 7: Multiple regression model of total social, cognitive, and behavioural difficulties when children aged seven years

Dependent variables: total strengths and difficulties as measured by the SDQ		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	(Constant)	14.228			28.112	.000
	Mother postnatal depressed at wave 1 + number of depressive episodes in future waves	2.918		.124	12.923	.000
	Days mother spent in hospital post birth	.059		.017	1.824	.068
	Number of health problems suffered by baby at wave 1	.128		.044	4.618	.000
	Age mother left full-time education	-.200		-.105	-10.554	.000
	Mothers age at birth of cohort baby	-.097		-.105	-10.282	.000
	Cohort baby's birth weight in kilos	-.426		-.045	-4.670	.000
	Mothers parents separated during her childhood	.459		.038	3.932	.000
	Mother reports having violent rages	1.937		.049	5.105	.000
	Partner reports having violent rages	.903		.025	2.673	.008
	Family in poverty: McClements below 60% median income	.833		.089	8.913	.000
	Mother regular drug user	2.514		.031	3.301	.001
	Smoked during pregnancy	.695		.047	4.778	.000

6. The costs and benefits of volunteers

This section sets out the method used to estimate the costs and benefits of volunteers in the PSP. The overall approach taken is to assume that the benefits of volunteering to the volunteers is at least equivalent to the cost of the volunteers based on a shadow price. This could be viewed as conservative compared to a new study that estimates a monetary value that can be placed on the well-being that volunteers get from their activity.

Estimating the cost of volunteers

The use of volunteer “peers” is central to the model used by Family Action in its perinatal programme. Based on information provided by Family Action, there are just over 40 volunteers across all four PSP centres – about a third of Family Action’s workforce.

Three centres operate with 10 volunteers and 12 in Oxford.

Table 8 below shows the range of average time the volunteers spend with each woman on the PSP. The average (based on three centres Oxford, Hackney and Swaffham) is 10 hours per month. Including travel and admin time, volunteers are estimated to spend just under 15 hours a week working for Family Action. Across all four centres this adds up to a total of 608 hours a month.

The volunteers' time is a substantial contribution to delivering the PSP and to measure the true cost of providing the service, the volunteer input should be valued in monetary terms.

There are discussions in the literature about the best way to value volunteer input. Generally the techniques involve valuing volunteering using some form of proxy wage in the form of 'opportunity costs' or 'replacements wages'. Opportunity costs are normally viewed as the wages that volunteers could otherwise have received if engaged in their usual form of paid employment. Replacement wages are an estimate of how much it would cost to replace volunteers with paid employees compensated at market wages. Both valuation methods have pros and cons. A helpful review of the different methods can be found in a DCLG publication on the benefits of regeneration programmes¹⁴.

There is a consensus on using volunteer time and so-called 'shadow pricing', in this case, wages as a proxy for the monetary value of the volunteer input. In addition to wages it is usual to add an uplift for non-wage labour costs¹⁵ in order to reflect the true resource costs of employment.

The Institute for Volunteering Research has published the Volunteer Investment and Value Audit (VIVA) A Self-Help Guide to provide a measurement tool to assess the outputs and inputs of volunteers (June 2003). This is helpful checklist which suggests matching the wages of an "equivalent paid job" with the work that a volunteer does and then adding 20% to cover the costs of employment overheads, although typically in Government appraisals 30% is used.

In terms of valuing the 608 hours/month volunteer input provided by Family Action, it was not possible to find an "equivalent paid job" as Family Action does not have details of the characteristics of their volunteers. However, the model of the PSP is to provide peer support so as an approximation it has been assumed that volunteers are women who might otherwise work part-time. An average wage rate for part-time women of £8.12 has been used from the 2012 ASHE (Annual Survey of Hours and Earnings) - plus an uplift of 20% to allow for employment overheads.

Multiplying 608 hours/calendar months over 10 months (to allow for holidays) by the wage rate results in a total value of £59,270 per annum.

¹⁴ Valuing the Benefits of Regeneration Economics paper 7: Volume I - Final Report pages 90-9114 and Volume II pages 60-62 (DCLG December 2010)

¹⁵ Non-wage labour costs refer to employers' social contributions and other labour costs, over and above wages and salaries.

Estimating the benefits of volunteering

The University of Warwick Study includes an assessment of the well-being of volunteers. It used both a quantitative measure of self-esteem, the Rosenberg Self-Esteem Scale (RSE) and a qualitative information from interviews with Family Action volunteers.

The mean RSE showed a small but positive increase from the baseline suggesting that the programme had a positive impact on volunteers. We have been unable to find a suitable conversion of this scale into monetary terms, although there are other valuation methods that could be applied (see below).

The interviews with volunteers drew out themes relating to the supportive environment in which they worked, the positive feelings of empowerment to make changes and positive feelings of seeing the difference in women that they supported. Some volunteers described feelings of increased confidence to work and to undertake training.

Case Study

"It was a very positive experience for me... I suffered from PND [postnatal depression] [and] felt I could empathise and help to support others... training also gained a greater understanding of myself, which I feel allowed me to support others more effectively".

This volunteer recorded an improvement (from 29 to 32) in the Rosenberg Index from the start of training to the end of volunteering. The confidence she gained helped her obtain a place on a teaching degree course.

The literature also supports beneficial impacts for volunteers. Those who suffer from depression are less likely to volunteer (Prime, et al, 2002) but those that do achieve significant mental health benefits for themselves (Wilson and Musick, 1999; Musick and Wilson, 2003). For example, Luks (1991) made the connection between feelings of well-being and reductions in stress and depression, his survey of over three thousand volunteers found 95 per cent of respondents reported feeling healthier after their volunteering. Similar findings have been reported in a number of other studies, involving samples of volunteers suffering from a range of mental health conditions, from different countries and from studies using different research designs (Woodside and Luis, 1997).

A recent randomized controlled trial (Dennis, 2012) also found that mothers who volunteered to offer mother-to-mother peer support to mothers at high risk of postpartum depression, and who themselves had suffered and recovered from postnatal depression, gained significant mental health benefits themselves. For example, almost 9 out of the 10 mothers felt some mental health benefit as a result of supporting other mothers.

The results from this important study are also consistent with research linking depressive symptoms with smaller social networks, fewer close relationships, and lower perceived

adequacy of social support (Kawachi and Berkman, 2001). Furthermore, the findings provide evidence that lay people who have experienced a similar health problem or stressor can have a positive effect on psychological wellbeing (Barnett and Gotlib, 1988; Dennis, 2003).

There are several possible explanations as to why the peer volunteers prevented depressive symptoms in the first 12 weeks postpartum. Members of a social network can exert a salutary influence on mental health by role modelling health relevant behaviours. Integration in a social network might also directly produce positive psychological states, including a sense of purpose, belonging, and recognition of self worth. Being part of a broader social structure (such as involvement in social networks and immersion in close relationships) enhances the likelihood of accessing various forms of support, which in turn protects against distress (Cohen, Underwood, and Gottlieb, 2002).

In terms of placing a monetary value on volunteering, a recent working paper from DWP estimates the value of volunteering using subjective wellbeing data.¹⁶ This method uses self-reported levels of subjective well-being and estimates the increase in wellbeing associated with a particular good or service and then calculates the equivalent amount of money necessary to give the same boost to well-being. This results in an estimate of £13,500 per year at 2011 prices for the value that frequent volunteers place on their volunteering. Frequent volunteering is taken to be weekly or at least once per month.

With respect to Family Action's volunteers, we do not know their characteristics or details of their volunteering patterns. However, even if only 5 of the 42 volunteers in the PSP were to value their well-being from volunteering at £13,500 per annum then this would be sufficient to outweigh the estimated value of the volunteering of just under £60,000.

¹⁶ D.Fujiwara, P.Oroyemi and E.McKinnon *Wellbeing and civil society, estimating the value of volunteering using subjective wellbeing data*. 2013

Table 8: Estimating the cost of volunteers

Centre	Referrals (no. of women per year)	Number of volunteers	Average hours per calendar month per volunteer (excluding travel time)	Average hours per calendar month per volunteer (including travel/admin time)		Total volunteer hours per calendar month including travel and admin	Estimated total Annual costs £ (e)
Oxford	23	12	8.7	12.3	a	147.3	14,356
Hackney	20	10	12.0	16.0	b	160.0	15,590
Swaffham	28	10	9.3	15.5	c	155.0	15,103
Mansfield (d)	25	10	10.0	14.6	d	145.9	14,219
	96.0	42.0	10.0			608.3	59,269
			10.0	14.6			

a: includes inputted 50 minutes average travel/admin time per week based on the average of Hackney and Swaffham admin and travel times per volunteer

b: includes 1 hour of travel/admin time per week per volunteer

c: includes 40 minutes a week travel time per volunteer

d: information from Mansfield missing so used average of the other three centres

e: multiplied total volunteer hours per calendar month (including travel etc.) by wage rate £8.12 plus a 20% uplift and over 10 months (not 12 to account for holidays etc.)

7. Cost analysis

This section presents a summary analysis of the costs of the Perinatal Support Project and describes how the average cost figures have been derived.

Family Action currently operates four perinatal health centres in Oxford, Hackney, Swaffham and Mansfield. Detailed costs for each centre were provided by Family Action. These covered labour, rent, utilities, training, and costs relating to volunteers etc. In addition, each centre receives coordination support from a central team, the costs of which is proportionately distributed across the centres.

The total costs of each centre ranged from £53-63,000 p.a. (2011/12 prices) with the Hackney Centre costs the highest reflecting relatively higher labour and rental costs. One centre does not pay rent as it is hosted in a Children's centre. No imputed rental value has been included. The total cost of Family Action services across all centres was just under £223,000.

An analysis of the costs revealed that labour costs were by far the largest proportion of the total, accounting for about 70%.

The average costs of each Centre also varies based on the numbers of women participating in the programme, resulting in a range of £1,930 - £3,140 per mother and an overall average of £2,230 based on 100 women.

In order to look at the marginal costs of expanding the services, a variable cost was derived by excluding the following cost categories which had a fixed nature: central support costs (HR, finance, CEO), insurance, rent and central coordination. This resulted in a total cost for the PSP across all centres of £161,500 and an approximation to a marginal cost of £1,615 per mother based on 100 women being supported through the PSP.

References

- Adler DA, McLaughlin TJ, Rogers WH, Chang H, Lapitsky L, Lerner D. Job performance deficits due to depression. *American Journal Psychiatry*. 2006;163(9):1569-1576.
- Baldwin, M. L. and Marcus, S. C. (2007), Labor Market Outcomes of Persons with Mental Disorders. *Industrial Relations: A Journal of Economy and Society*, 46: 481–510.
- Barlow J, Coe C (2012) Family Action Perinatal Support Project, Research Findings report. Warwick Medical School, available at www.family-action.org.uk
- Barnett PA, Gotlib IH. Psychosocial functioning and depression: distinguishing among antecedents, concomitants, and consequences. *Psychol Bull* 1988;104:97-126.
- Bartel, A. and P. Taubman. 1986. "Some Economic and Demographic Consequences of Mental Illness." *Journal of Labor Economics*, Vol. 4, No. 2, pp. 243-256.
- Berndt ER, Finkelstein SN, Greenberg PE, Howland RH, Keith A, Rush AJ, Russell J, Keller MB: Workplace performance effects from chronic depression and its treatment. *J Health Econ* 1998; 17:511–535
- Bjelland, I; et al (2002). "The validity of the Hospital Anxiety and Depression Scale. An updated literature review". *Journal of Psychosomatic Research* 52 (2): 69–77.
- Chatterji, P., Alegria, M., Lu, M. and Takeuchi D. (2007). Psychiatric disorders and labor market outcomes: Evidence from the National Latino and Asian American Study. *Health Economics*, 16, pp. 1069 -1090.
- Cohen S, Underwood L, Gottlieb B, eds. Social support measurement and intervention: a guide for health and social scientists New York: Oxford University Press, 2002.
- Cox, J.L., Holden, J.M. and Sagovsky, R. (1987), 'Detection of Postnatal Depression -Development of the 10-Item Edinburgh Postnatal Depression Scale', *British Journal of Psychiatry*, 150: 782-786.
- Dennis CL. Peer support within a health care context: a concept analysis. *Int J Nurs Stud* 2003;40:321-32.
- Dennis, C. L. (2012). Peer support for postpartum depression: volunteers' perceptions, recruitment strategies and training from a randomized controlled trial. *Health Promotion International* (March, Vol 1), 2012
- Dex S, Joshi H, eds. *Children of the 21st Century: from Birth to Nine Months*. Bristol: The Policy Press, 2005.
- Druss, B.G., Rosenheck, R.A., Sledge, W.H., 2000. Health and disability costs of depressive illness an a Major U.S. Corporation. *American Journal of Psychiatry*. 157, 1274–1278.
- Ettner, S. L., Frank, R. G., & Kessler, R. C. (1997). The impact of psychiatric disorders on labor market outcomes. *Industrial and Labor Relations Review*, 51, 64–81.
- Goodman R, Ford T, Simmons H, et al. Using the Strengths and Difficulties Questionnaire (SDQ) to screen for child psychiatric disorders in a community sample. *Brit J Psychiatry* 2000;177:534-9.
- Goodman R, Scott S. Comparing the Strengths and Difficulties Questionnaire and the Child Behavior Checklist: Is small beautiful? *J Abnormal Child Psychology* 1999;27:17-24.
- Goodman R. The strengths and difficulties questionnaire: a research note. *J Child Psychol Psychiatr* 1997;38:581-6.
- Harris T, (2008) Putting Newpin to the test: A randomised controlled trail of the Newpin Antenatal and Postnatal Project, Chapter 11 in Mondy S and Mondy L, *Newpin: Courage to Change Together, UnitingCare Burnside* 2008
- Kawachi I, Berkman LF. Social ties and mental health. *J Urban Health* 2001;78:458-67.
- Kiernan KE and Huerta MC. (2008) Economic deprivation, maternal depression, parenting and children's cognitive and emotional development in early childhood. *British Journal of Sociology*, 59(4), 783-806.
- Kiernan KE and Mensah FK. (2009) Poverty, maternal depression, family status and children's cognitive and behavioural development in early childhood: a longitudinal study. *Journal of Social Policy*, 38, 569-588.

- Lederer, J. (2009) Family Action Southwark Perinatal Support Project Evaluation Report. London: Family Action, available on line at:
<http://www.familyaction.org.uk/uploads/documents/Southwark%20Perinatal%20Support%20Project%20Evaluation%231%23.pdf>
- Luks, A (1991) *The Healing Power of Doing Good. The Health and Spiritual Benefits of Helping Others.* With Payne, P. Fawcett Columbine: New York
- McMunn A, Kelly Y, Cable N, Bartley M (2011) Maternal employment and child socioemotional behaviour in the United Kingdom: Longitudinal evidence from the UK Millennium Cohort Study. *Journal of Epidemiology and Community Health*
- Musick, M and Wilson, J (2003) 'Volunteering and Depression: The Role of Psychological and Social Resources in Different Age Groups' *Social Science and Medicine* 56(2):259-269
- O'Hara M, Swain A. Rates and risk of postpartum depression—a meta analysis. *Int Rev Psychiatry* 1996;8:37-54.
- Plewis, I. (2007), 'Non-Response in a Birth Cohort Study: The Case of the Millennium Cohort Study', *International Journal of Social Research Methodology*, 10: 5, 325-334.
- Plewis, I., Calderwood, L., Hawkes, D., Hughes, G. and Joshi, H. (2004), *Millennium Cohort Study first survey: Technical report on sampling.* London: Centre for Longitudinal Studies.
- Prime, D; Zimmeck, Z and Zurawan, A (2002) *Active Communities: Initial Findings from the 2001 Home Office Citizenship Survey.* London: Research Development and Statistics Department, Home Office.
- Royal, G.P., Roberts M.C., 1987. Students' perceptions of and attitudes toward disabilities: a comparison of twenty conditions. *Journal of Clinical Child Psychology* 16 (2), 122-132.
- Westbrook, M. T., Legge, V. and Pennay, M. (1993) Attitudes towards disabilities in a multicultural society. *Social Science and Medicine* 36, 615–623.
- Wilson, J and Musick, M (1999) 'The Effects of Volunteering on the Volunteer'. *Law and Contemporary Problems* 62(4):141-168
- Woodside, H and Luis' F (1997) 'Supported Volunteering' *Psychiatric Rehabilitation Journal* 21(1):70-75