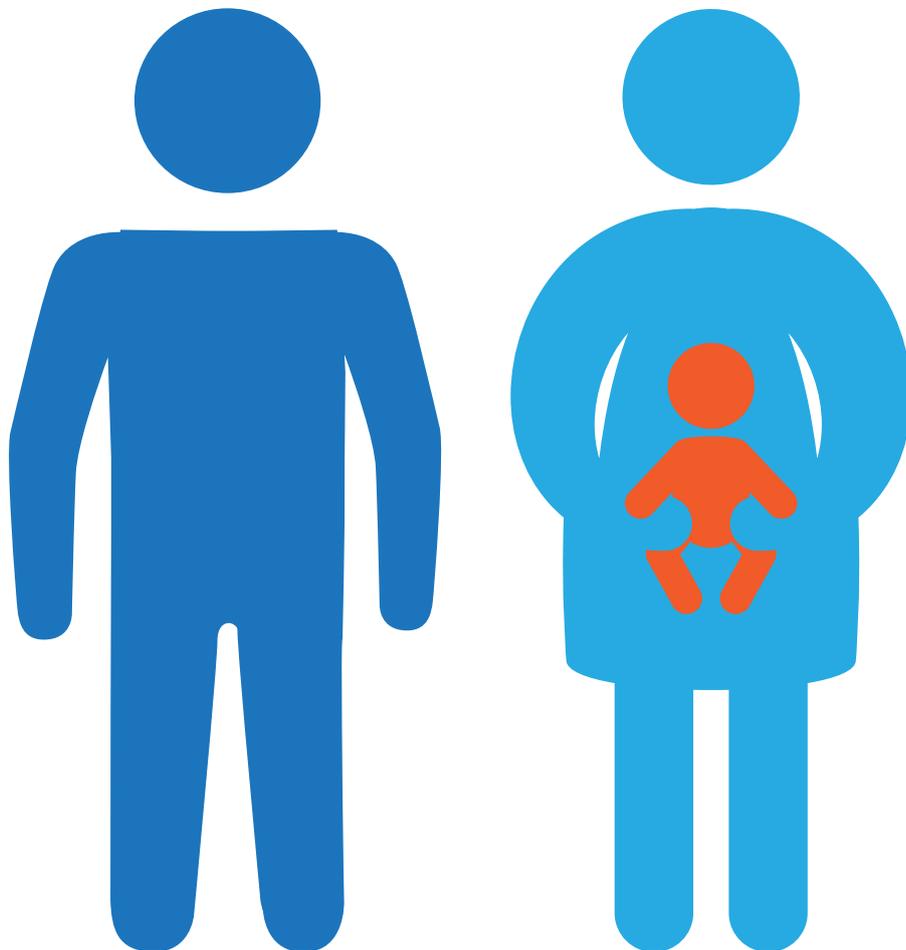


The costs of perinatal mental health problems

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The appendices are available online, see page 7.

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Foreword on behalf of the Maternal Mental Health Alliance

Perinatal mental illnesses are a major public health issue that must be taken seriously. If untreated, these illnesses can have a devastating impact on women and their families. They are one of the leading causes of death for mothers during pregnancy and the year after birth.

Between 10 and 20% of women develop a mental illness during pregnancy or within the first year after having a baby. Examples of these illnesses include antenatal and postnatal depression, obsessive compulsive disorder, post-traumatic stress disorder (PTSD) and postpartum psychosis. These conditions often develop suddenly and range from mild to extremely severe, requiring different kinds of care or treatment.

The good news is that, with the right help, women can recover from these illnesses. There is widespread agreement about what services are needed for women affected by perinatal mental illnesses, and, in some parts of the UK, women receive world-class care. However, in many areas perinatal mental illness goes unrecognised, undiagnosed and untreated, leading to avoidable suffering for women and their families.

The Maternal Mental Health Alliance (MMHA) is a coalition of more than 60 UK organisations, including professional bodies and organisations that represent, or provide care and support to, parents and families. We are all too aware of the avoidable destructive impact of perinatal mental illness, and we are not prepared to stand by as women's lives continue to be cut short, and families changed forever, as a result of these preventable and manageable illnesses.

There has been significant progress in knowledge and attitudes about tackling perinatal mental illness in recent years, and some areas of the UK have seen a growth in specialist services. However, the human costs of these illnesses have not been enough to convince all policy makers, commissioners and providers to take the required action:

recent research shows that just 3% of Clinical Commissioning Groups (CCGs) in England have a strategy for commissioning perinatal mental health services and a large majority have no plans to develop one. In almost half of the UK, pregnant women and new mothers do not have access to specialist perinatal mental health services, potentially leaving them and their babies at risk.

We commissioned this independent report to document the economic costs of perinatal mental illness for UK society. It shows that perinatal depression, anxiety and psychosis carry a total long-term cost to society of about £8.1 billion for each one-year cohort of births in the UK. We hope that this shocking statistic will motivate policy makers, commissioners and providers to act urgently. It is in their power to do something about this issue: if perinatal mental health problems were identified and treated quickly and effectively, many of these serious and long term human and economic costs could be avoided.

This report also shows the high level of costs falling on the NHS; perinatal mental illnesses cost the NHS around £1.2 billion for each annual cohort of births. In comparison, it would cost only an extra £280 million a year to bring the whole pathway of perinatal mental health care up to the level and standards recommended in national guidance. This is a case for investment that cannot be ignored.

This report is part of our Everyone's Business Campaign, www.everyonesbusiness.org.uk, which calls for all women throughout the UK who experience perinatal mental health problems to receive the care they and their families need, wherever and whenever they need it. Local and national providers, commissioners and governments must act now to begin to reduce the human and economic costs of perinatal mental illness to our families, to our society, and to our nations.

Dr Alain Gregoire,
Chair, Maternal Mental Health Alliance

Executive Summary

This report sets out the findings of a project on the economic and social impact of maternal mental health problems in the perinatal period, defined as the period during pregnancy and the first year after childbirth.

Perinatal mental health problems are very common, affecting up to 20% of women at some point during the perinatal period. They are also of major importance as a public health issue, not just because of their adverse impact on the mother but also because they have been shown to compromise the healthy emotional, cognitive and even physical development of the child, with serious long-term consequences.

This report seeks – for the first time in the published literature – to provide comprehensive estimates of the costs of maternal perinatal mental health problems, including the adverse effects of maternal mental illness on the child as well as the mother.

Much previous work on perinatal mental health has focused on postnatal depression. However, it is known that mental health problems often occur during the antenatal period and that problems go beyond depression, to include anxiety, psychosis, post-traumatic stress disorder and other conditions. All these problems warrant attention, whenever they occur in the perinatal period.

Maternal depression and anxiety, which often occur together, are at least as common during pregnancy as they are in the year after childbirth. Recent advances in neuroscience and other disciplines clearly suggest that psychological distress during pregnancy is a significant risk factor for a range of adverse outcomes in the child.

Because of limitations in data availability, our cost estimates are restricted to three major perinatal mental health conditions: depression, anxiety and also psychosis (mainly bipolar disorder and schizophrenia). Conditions such as eating disorder are therefore omitted. For this and other reasons, our figures under-estimate the scale and cost of perinatal mental health problems at the aggregate level. The most comprehensive and reliable estimates are those relating to depression.

Key findings in this report are:

- Taken together, perinatal depression, anxiety and psychosis carry a total long-term cost to society of about £8.1 billion for each one-year cohort of births in the UK. This is equivalent to a cost of just under £10,000 for every single birth in the country.
- Nearly three-quarters (72%) of this cost relates to adverse impacts on the child rather than the mother.
- Over a fifth of total costs (£1.7 billion) are borne by the public sector, with the bulk of these falling on the NHS and social services (£1.2 billion).
- The average cost to society of one case of perinatal depression is around £74,000, of which £23,000 relates to the mother and £51,000 relates to impacts on the child.
- Perinatal anxiety (when it exists alone and is not co-morbid with depression) costs about £35,000 per case, of which £21,000 relates to the mother and £14,000 to the child.
- Perinatal psychosis costs around £53,000 per case, but this is almost certainly a substantial under-estimate because of lack of evidence about the impact on the child; costs relating to the mother are about £47,000 per case, roughly double the equivalent costs for depression and anxiety.

Treatment and support for women with perinatal mental health problems are provided by a mix of universal and specialist services and there is long-standing agreement in guidance from NICE and other national bodies on how these services should be organised and what they should provide.

Despite this, the current provision of services is widely described as patchy, with significant variations in coverage and quality around the country. For example:

- About half of all cases of perinatal depression and anxiety go undetected and many of those which are detected fail to receive evidence-based forms of treatment.
- Specialist perinatal mental health services are needed for women with complex or severe conditions, but less than 15% of localities provide these at the full level recommended in national guidance and more than 40% provide no service at all.
- Just 3% of Clinical Commissioning Groups (CCGs) in England have a strategy for commissioning perinatal mental health services and a large majority have no plans to develop one.

A broad set of illustrative estimates suggests that additional NHS expenditure of around £280 million a year would be needed in England to bring perinatal mental health care up to the level and standard recommended in national guidance. This is equivalent to extra spending of around £1.3 million a year in an average CCG. In comparison, aggregate spending on the NHS in England is around £105 billion a year, or around £500 million a year in a typical CCG.

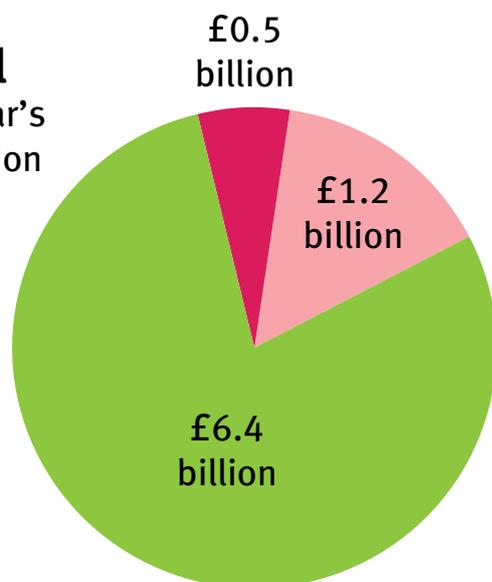
Put another way, the estimated cost of extra provision is equivalent to about £400 per average birth. Our estimates suggest that, in comparison, perinatal mental health problems impose costs of around £10,000 per birth for society as a whole, with costs of around £2,100 per birth falling on the public sector.

Because the costs of perinatal mental health problems indicate the potential benefits of intervention, even a relatively modest improvement in outcomes as a result of better services would be sufficient to justify the additional spending on value for money grounds.

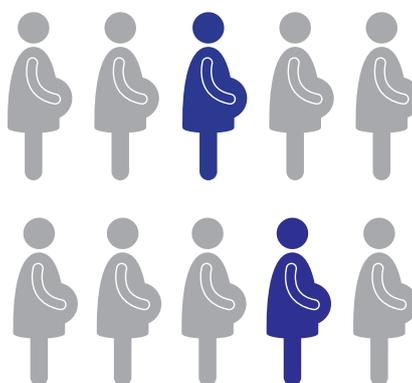
Key points from the report

Known costs of perinatal mental health problems per year's births in the UK, total: £8.1 billion

- health and social care ■
- other public sector ■
- wider society ■

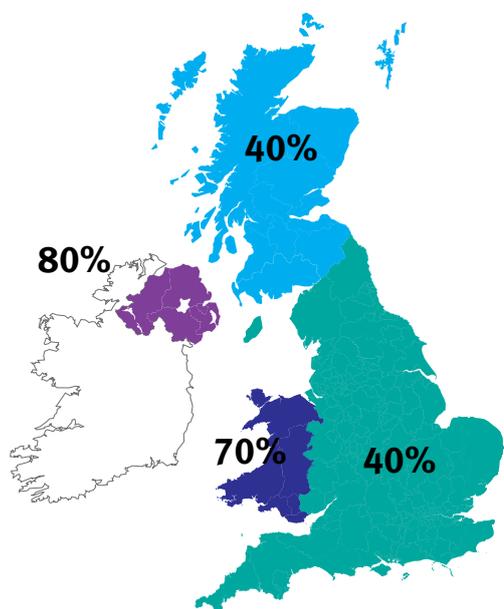


Of these costs
28% relate to the mother
72% relate to the child



Up to 20% of women develop a mental health problem during pregnancy or within a year of giving birth

Women in around half the UK have NO access to specialist perinatal mental health services



Suicide is a leading cause of death for women during pregnancy and in the year after giving birth



Costs v improvement
 The cost to the public sector of perinatal mental health problems is **5 times** the cost of improving services.

1. Introduction

This report sets out the findings of a project on the costs of maternal mental health problems in the perinatal period, defined as the period during pregnancy and the first year after childbirth. The project was undertaken by the Personal Social Services Research Unit at the London School of Economics and Political Science, in collaboration with the Centre for Mental Health. It was commissioned by the Maternal Mental Health Alliance, with funding from Comic Relief.

The material presented here falls into two main parts. The first of these, comprising Chapters 2 and 3, sets out in detail our analysis of the costs of perinatal mental health problems, including a description of the methods used, detailed cost estimates for three major conditions (perinatal depression, anxiety and psychosis), discussion of the main limitations in the analysis and a summary of the key findings.

A central feature of the analysis is that it seeks to measure costs on a comprehensive basis, taking into account not only the impact of perinatal mental illness on the women directly affected but also the increased risk of adverse effects on their children. The latter effects may take a variety of forms, including risks to healthy development in early life, with consequences that may in some cases extend throughout the life course. As far as is known, this is the first study which has attempted to measure the costs of perinatal mental illness on such a comprehensive basis.

The second part of the report, comprising Chapters 4-6, aims to set these findings in context. Thus Chapter 4 comments on the main uses and implications of the estimates, including for example their implications for the design of treatment interventions; Chapter 5 provides a brief description and analysis of current service provision for perinatal mental health problems; and Chapter 6 sets out some illustrative estimates of the costs of service improvements and relates these to our estimates of the costs of perinatal mental health problems, which provide a broad measure of the potential benefits of better services.

The report is written with a general readership in mind. Some aspects of our work on the costs of perinatal mental health problems are unavoidably complex, but we have sought to keep the amount of technical detail to a minimum. For those interested in further information, three technical appendices are available online, covering: (i) our search strategy for reviewing the published literature; (ii) details of how the individual cost calculations given in Chapter 3 have been put together; and (iii) the main sources of longitudinal data used in the analysis. These are available to download, along with copies of this report, at the following websites:

Personal Social Services Research Unit:
<http://www.lse.ac.uk/LSEHealthAndSocialCare/aboutUs/PSSRU/home.aspx>

Centre for Mental Health:
<http://www.centreformentalhealth.org.uk/>

2. Methods of analysis

Introduction

The primary purpose of our research was to produce estimates of the overall costs of maternal perinatal mental health problems and the distribution of these costs between different groups and sectors. We followed a number of steps to estimate these costs, linked to the wide-ranging impact of maternal mental health conditions during the perinatal period. Since this study used secondary data only, we carried out extensive searches for published literature in this field (for further details, see the appendices available online) and also used the knowledge of experts to identify particularly important studies and data, including any that were unpublished. We used simple modelling techniques to combine the different data sets and, where feasible, to extrapolate data beyond the end-points of studies, for example to include consequences for children that endure into adult life.

Literature review

First, we searched for evidence on different maternal mental health problems during the perinatal period and their consequences for mothers, partners and children, drawing on the published and unpublished literature, with a focus on the UK but also drawing on evidence from other developed countries with similar prevalence of mental health problems.

In particular, we looked for:

- studies which measured resource use or costs linked to perinatal maternal mental health problems;

- studies which measured the relationship between perinatal maternal mental health problems and family health and wellbeing outcomes; and
- studies, particularly systematic reviews and meta-analyses, on the prevalence and natural course of mental health conditions.

In addition, we searched for studies which quantified resource use or costs linked to adverse child outcomes. Priority was given to recent, peer-reviewed studies from the UK. We specifically looked for studies on the natural course of mental health conditions and on the impact of mental health conditions on employment and health-related quality of life.

We utilised the experience and knowledge of experts in this area, including members of the Maternal Mental Health Alliance and of our Expert Reference Group.

Economic modelling

In our economic modelling we took an incremental approach, looking at the additional costs associated with perinatal mental health conditions, i.e. costs over and above those which would have been incurred anyway (for example, mainstream education costs among children). Whilst some studies allowed us to extract incremental data, in other cases we had to derive these from other data sets, usually national averages. Sometimes incremental data on service use were not available and we could not establish these from other data. In such cases we took conservative values. Where feasible, we applied methodological principles and standards recommended and applied in this country by the National Institute for Health and Care Excellence (NICE) and other government bodies. This increased the opportunity for use of the data in other studies and comparability in the UK context.

We first established the additional probabilities that an outcome would occur in the affected group (mothers) or exposed group (children and partners) versus the non-affected or non-exposed group. These were expressed in terms of risk differences, i.e. the additional ‘absolute’ risk of an adverse outcome, expressed in percentage points. The data used for this purpose were usually adjusted effects that had been controlled for a range of factors such as mother’s socio-economic or demographic characteristics, previous history of mental health problems and co-existing mental health conditions.

We assigned costs, measured in 2012/13 prices, to the adverse consequences of perinatal mental illness, including increased use of public services, losses of quality-adjusted life-years (QALYs) and productivity losses. We attached: (1) unit costs to service use (if that had not been done already in the study), using national unit costs available from an annual compendium published by the PSSRU (Curtis, 2013) or NHS reference costs (Department of Health, 2014a); (2) mean weekly wage rates of £459 for full-time employment and £164 for part-time employment (ONS 2013b) to the time spent away from work; and (3) a willingness-to-pay value of £25,000 for a quality-adjusted life year, reflecting the mid-point of the £20,000 to £30,000 threshold range used by NICE. For a whole life lost through suicide or infanticide, we used the ‘value of a prevented fatality’, currently estimated at £1,722,000 per case, which has been developed in central government for assessing the benefits of saving lives through safety improvements in transport and other settings. For some areas, comprehensive lifetime cost estimates from the UK already existed, so we applied these directly to our risk data. In our calculations, we applied data on the prevalence and course of mental health conditions in order to: (1) present data not only per case of perinatal mental illness but also per woman giving birth, averaged over all births; and (2) project costs into the longer term depending on the course of the condition.

We looked at outcomes for the whole family and valued costs from two perspectives: the public sector and society as a whole. Public sector costs cover those that fall on health and social care, education and criminal justice budgets (and include the costs of services funded from these budgets which are provided by voluntary and private sector organisations). Wider costs to society include productivity losses, QALY losses, costs to victims of crime, out-of-pocket expenditure and unpaid care. Costs were either short-term, relating mainly to mothers during the perinatal phase but also costs linked to the child’s pre-term birth, or they were longer-term, typically those to the children but also mothers’ outcomes linked to long-term remission. We aimed to evaluate costs over the lifetime, if this was possible, based on the available data.

Concerning the remission of an episode of mental illness occurring during the perinatal period, we applied remission data over the 10 years after birth for each condition based on the relevant evidence but then - conservatively - set a cut-off point at 10 years, assuming that by that time all mothers had recovered from their initial episode. This assumption might under-estimate the episodic nature of mental illness in some mothers but also helped to reduce any potential error of double-counting mothers who give birth to one or more other children after the index child.

We assumed an average age for women at childbirth of 32 years and an average remaining life expectancy of 44 years (based on an average life expectancy of 76 years) and a retirement age of 65 years. We discounted costs accruing after the first year to the time of birth at an annual rate of 3.5% in real terms. For earnings, we assumed average growth of 2% a year over and above general inflation. In order to ensure robust results, the approach and assumptions we made were generally conservative.

We worked with a diverse range of literature and faced at times substantial data gaps. In response we chose a pragmatic approach in reviewing the large number of studies. We focused on areas for which there was consistent evidence of large economic impact and on papers published in recognised peer-reviewed journals. As far as possible, we used a consistent approach in the coverage and measurement of economic impacts. In addition, we aimed to exclude areas of overlapping economic impact for different mental health conditions. Necessarily, our approach was directed by the available evidence, meaning that the comprehensiveness of modelling was restricted by gaps in the data. As a result, time periods linked to different child outcomes and their projection into adulthood vary and sometimes do not extend to the full lifetime. Similarly, our results on costs do not always include the full set of costs, although we provide further information below on some of the main omitted items. These and other limitations in the available data mean that the figures set out below are likely to under-estimate costs of perinatal mental health problems.

3. The estimated costs of perinatal mental health problems

Introduction

Detailed cost estimates have been prepared for three main perinatal mental health conditions: depression, anxiety and psychosis. These are discussed in turn below, with supporting technical information given in the appendices online. Lack of data prevented the detailed quantitative analysis of other conditions.

Perinatal depression

From data on the prevalence and course of depression in women during the perinatal period we calculated probabilities including the estimated probability of recovery from an episode of depression. We found that the prevalence of antenatal depression ranged from 7.4% in the first trimester, 11.4 to 12.8% in the second trimester and 13.1 to 14.8% in the third trimester, while the prevalence of postnatal depression varied from 7.4 to 11.0% in the first 3 months after childbirth, 7.8 to 12.8% in the 3rd to 6th months and 8.5 to 12.0% in the 6th to 9th months (Heron *et al.* 2004, Bennett *et al.* 2004). It is known that approximately half of the affected individuals experience major depression (Gavin *et al.* 2005), but in our cost calculations we looked at the average impact across severities. The annual probabilities for remission after an episode of perinatal depression were assumed to be the same as for depression at any other time and taken from Mueller *et al.* 1996.

Impact on mothers

Health and social care use

We first estimated the additional costs of health and social care for mothers who were depressed during the perinatal period from cost data in Petrou *et al.* (2002) and then calculated costs linked to non-remitted depression up to 10 years after birth, based on cost estimates for depression in the general population (McMahon *et al.* 2012).

Productivity losses

We calculated reduced earnings over a ten-year period for mothers with subsequent remitted and non-remitted depression based on data from a study which provided data on levels of sickness absence among people with current and remitted depression compared to those who had not been affected by mental illness (Plaisier *et al.* 2010). We applied these estimates to probabilities that women would be in full-time or part-time employment after giving birth from data published by the Office for National Statistics (ONS 2005, 2013a; DWP, 2010).

Losses of quality-adjusted life-years (QALYs)

We estimated the QALY losses linked to depression during pregnancy and the postnatal period and for non-remitted depression up to 10 years after birth, drawing on studies which had assessed quality of life for individuals with these conditions in the UK compared with the general population. We also estimated the costs attached to an increased risk of suicide during the subsequent years based on ONS data and the costs of a life lost. Because of a lack of data, the possible costs of unsuccessful suicide attempts were not included. Estimated costs per case of perinatal depression are shown in Table 1 The final column headed 'Other' in this and other tables in this chapter includes, as appropriate, out-of-pocket expenditure incurred by families, costs of unpaid care and costs of crime falling on victims.

Table 1: Costs of perinatal depression, impact on mothers, £ per case

Public sector	Wider society			Total
Health and social care	QALY losses	Productivity losses	Other	
1,688	18,158	2,514		22,360

Impact on children

We found a number of UK longitudinal studies which measured depression in mothers during pregnancy and/or after birth and followed their children over time up to age 18 (see in particular Murray 1992 and Sharp *et al.* 1995). These studies measured a range of child development outcomes and established correlations between maternal perinatal depression and adverse child outcomes, controlling for other variables such as previous episodes of maternal depression, anxiety during this period and a range of socio-demographic characteristics.

We included the following child outcomes in our analysis:

- Pre-term birth (including cognitive impairment)
- Infant death
- Special educational needs
- School qualifications
- Depression and anxiety
- Conduct problems.

Pre-term birth (including cognitive impairment)

We estimated mean costs based on relative risk information from a meta-analysis (Grote *et al.* 2010) and cost estimates from a UK study which applied decision modelling to predict the costs of pre-term birth during childhood until age 18 (Mangham *et al.* 2009; Petrou & Khan 2012). This included costs for health and social care (primarily hospital inpatient costs), costs of education, parental out-of-pocket expenditure and productivity losses. Next, we modelled incremental QALY losses over the period from ages 5 to 18 based on the adverse health

effects experienced by children born extremely pre-term (less than 28 weeks), which to a large extent is caused by cognitive impairment but also physical disability. Values were taken from Petrou *et al.* (2009a). This did not capture QALY losses for the majority of children born pre-term which we costed separately using QALY values for children with moderate cognitive impairment (Petrou *et al.* 2010).

Infant death

We estimated the increased costs of infant death per case based on risk data for infant death in mothers with perinatal depression (Sanderson *et al.* 2002; Howard *et al.* 2007) and average infant mortality data in the general UK population. We applied the costs of a life lost for infant death to estimate the cost per case and then derived the costs per woman giving birth by multiplying this figure by the mean probability of perinatal depression.

Emotional problems

We first calculated health and social care costs, the costs of education and QALY losses during childhood from 5 to 16 years. Risk data were different for mothers with or without subsequent episodes of depression following the episode during the perinatal phase, so we carried out separate calculations for these two groups. Costs for child emotional problems were taken from Snell *et al.* (2013). We then estimated health and social care costs, QALY losses and productivity losses in adulthood from 17 years onwards, basing our calculations on a mean duration of persistent depression of 16 years (Grant *et al.* 2005) and assuming an equal distribution of costs over the lifetime. The estimates for public sector costs were based on data in McMahan *et al.* (2012).

Conduct problems

The lifetime costs for children with conduct problems were available from the literature (Parsonage *et al.* 2014) and included costs to the NHS, costs to the criminal justice system, other costs of crime, productivity losses and QALY losses. The scale of costs has been found to be substantially different for children whose conduct problems are sufficiently severe to be classified as a disorder (roughly 25% of children with conduct problems; Colman *et al.* 2009), so we applied this distinction in our calculation.

Special educational needs and leaving school without qualifications

Cost estimates for these two outcomes were available from previous work which had used risk data from the South London Development Study (Bauer *et al.* 2014); findings were in line with those from other studies (Sinclair & Murray 1998; Murray *et al.* 2010). Because of a substantial overlap of extra education costs with those calculated under pre-term birth and emotional problems, we excluded the latter from the aggregated costs.

Table 2: Costs of perinatal depression, impact on children, £ per case

	Public sector			Wider society			Total
	Health and social care	Education	Criminal Justice	QALY losses	Productivity losses	Other	
Pre-term birth	974	-	-	418	22	14	
Infant death	-	-	-	22,157	-	-	
Emotional problems	1,020	-	-	4,609	2,169	-	
Conduct problems	837	-	1,974	3,396	1,797	7,446	
Special educational needs	-	3,166	-	-	-	-	
Leaving school without qualifications	-	-	-	-	1,463	-	
Total	2,831	3,166	1,974	30,580	5,451	7,460	51,462

Perinatal anxiety

We valued the costs of additional use of public services, productivity losses and QALY losses for mothers with symptoms of perinatal anxiety following the same approach as for perinatal depression. Prevalence of anxiety disorder ranged from 11.8% to 15.3% during pregnancy and was 8% in the period after childbirth (Heron *et al.* 2004, Orr *et al.* 2007, Ramchandani *et al.* 2006, Vesga-Lopez *et al.* 2008, O'Donnell 2014). In our analysis we looked at anxiety across a range of classifications including generalised anxiety, panic disorders, phobias, obsessive-compulsive disorder and post-traumatic stress disorder.

We adjusted the prevalence rates when measuring the costs incurred by mothers, taking only a third of the original numbers so that they reflected the prevalence of anxiety without comorbid depression (Wisner *et al.* 2013, Lydsdottir *et al.* 2014, NICE 2014). This had the advantage that we were not double counting costs, but it also meant that some of the costs related to anxiety fall under the costs of depression and this needs to be considered when interpreting the findings. (This only applied to the costs incurred by mothers; for our calculations of costs incurred by children this distinction was not necessary as the longitudinal studies we used controlled for perinatal depression.)

Impact on mothers

For our analysis of the costs incurred by mothers, we estimated the additional public sector costs, QALY losses and productivity losses for mothers due to anxiety during the perinatal period and until 10 years after birth, following the same approach used in our estimates of the costs of perinatal depression. We based our calculations for QALY losses during the perinatal phase and subsequent years on values for anxiety in the general

population estimated in Saarni *et al.* (2007), as we could not identify values specific to the perinatal phase. We chose this particular source because it was the only study we found that covered all types of anxiety disorders, so we could apply a weighted mean; the values appeared broadly consistent with findings on particular anxiety disorders from other studies including those used by NICE (Rubin *et al.* 2000, Alonso *et al.* 2004, Allgulander *et al.* 2006 Revicki *et al.* 2008, NICE 2011).

Table 3: Costs of perinatal anxiety, impact on mothers, £ per case

Public sector	Wider society			Total
Health and social care	QALY losses	Productivity losses	Other	
4,320	10,975	5,499	-	20,794

Impact on children

Our calculations on the impact of maternal perinatal anxiety on children were based primarily on studies which analysed data from the Avon Longitudinal Study of Parents and Children (ALSPAC) (O'Connor *et al.* 2002; O'Donnell *et al.* 2014). These studies established correlations between symptoms of antenatal or postnatal anxiety and adverse child outcomes, controlling for other variables such as previous episodes of maternal depression or anxiety, depression during the perinatal period and a range of demographic and socio-economic characteristics. However, we did not identify studies from the UK which quantified the impact of anxiety during pregnancy on pre-term birth and instead took data from a large study in Baltimore, USA (Orr *et al.* 2007).

We included the following child outcomes in our analysis:

- Pre-term birth (including cognitive impairment)
- Emotional problems
- Conduct problems
- Chronic abdominal pain.

Pre-term birth (including cognitive impairment)

Orr *et al.* (2007) found an association between severe anxiety and pre-term birth. We derived risk differences from the study data and used probabilities of maternal anxiety as presented in the study. To estimate costs, we combined these data with the parameters used earlier for calculations on the costs of pre-term birth attributable to perinatal depression (Petrou 2009, Petrou & Kahn 2012).

Emotional and conduct problems

From the studies based on ALSPAC (O'Connor *et al.* 2002, O'Donnell *et al.* 2014), we derived risk differences for emotional and conduct problems from when the child was 4 to 13 years and applied these for the period 5 to 16 years. We applied the same parameters and methods used earlier to estimate the costs of emotional problems attributable to perinatal depression during childhood and adulthood.

Chronic abdominal pain

Postnatal anxiety has been linked to an increased risk for children to develop chronic abdominal pain (Ramchandani *et al.* 2006; ALSPAC) and we used probabilities of postnatal

anxiety from this study as well as their findings on effects to derive risk differences. We modelled costs between ages 5 and 16 based on existing cost data for children receiving treatment for this condition; for our calculation of public sector costs we assumed that 50% of

children with chronic abdominal pain accessed this type of treatment. A lack of data prevented us from estimating QALY losses during childhood and from projecting the costs of chronic abdominal pain into adulthood.

Table 4: Costs of perinatal anxiety, impact on children, £ per case

	Public sector			Wider Society			Total
	Health and social care	Education	Criminal justice	QALY losses	Productivity losses	Other	
Pre-term birth (incl. cognitive impairment)	2,435	13	-	1,044	54	34	
Emotional problems	273	176	-	535	440	-	
Conduct problems	236	-	558	960	508	2,105	
Chronic abdominal pain	1,531	140	-	-	736	2,239	
Total	4,475	329	558	2,539	1,738	4,378	14,017

Psychosis

Psychosis around the time of childbirth refers to bipolar disorder, schizophrenia or very severe forms of depression. Prevalence is much lower than for depression and anxiety (2 in 1,000 births; Kendell *et al.* 1987, Oates 2003, Blackmore *et al.* 2013) and this was also reflected in a serious shortage of data that could be used to calculate costs, particularly those relating to the impact on children.

Impact on mothers

Longitudinal studies show that some women experience their first episode of psychosis directly after childbirth and remain at high risk of experiencing further episodes (e.g. Robertson *et al.* 2005). We estimated an annual probability of a subsequent episode of psychosis over the next 10 years of 9.7% based on data in Robertson *et al.* 2005. Our calculations cover health and social care use, QALY losses including those associated with maternal suicide, productivity losses and costs of unpaid care.

Health and social care use

We first estimated the cost linked to an initial episode of psychosis during the perinatal phase which resulted in admission to a specialist mother and baby unit. We calculated the mean cost for mother and baby units in England based on NHS reference cost data and number of deliveries (HSCIC 2013). Next, we calculated the costs of health and social care for subsequent episodes over the next 10 years (again based on the annual probability of 9.7%) for the proportion of women with schizophrenia (37%). This was based on findings by Andrew *et al.* (2012), updating figures in Mangalore & Knapp (2007).

QALY losses

First, we estimated QALY losses during the perinatal phase based on data from a recent UK study by Blackmore *et al.* (2013). We calculated a mean duration of a postpartum psychotic episode of 37 weeks based on their data on time from onset to resolution. We applied data on adverse health effects for

psychosis in the general population from a UK source which pooled data from the Adult Psychiatric Morbidity Surveys (Roberts *et al.* 2014). Next, using the same data we estimated QALY losses linked to subsequent episodes of psychosis. As before, we applied the annual probability of a subsequent episode over the next ten years of 9.7%. In addition, we assumed that the mean duration of an episode was 52 weeks; this represents the average time that individuals with psychosis spend before accessing treatment and is therefore likely to be a conservative estimate (e.g. Loebel *et al.* 1992).

Concerning maternal suicide, we first calculated the costs of suicide for women during the perinatal phase based on the probability of developing perinatal psychosis, the risk of suicide among these individuals from data in the Confidential Enquiry into Maternal Death

(Oates 2003) and the costs of a life lost. Next, we calculated the costs of suicide due to the increased risk of psychosis in the next 10 years. To avoid an overlap with the costs already calculated for subsequent episodes of depression, we only considered the risk of suicide for individuals with a diagnosis of schizophrenia, comprising 37% of all individuals with psychosis (Brewin *et al.* 1997, Boydell *et al.* 2003, Mangalore & Knapp 2007).

Productivity losses and unpaid care

We estimated the costs of productivity losses and unpaid care for the proportion of women with schizophrenia who experienced subsequent episodes of psychosis based on the parameters already described and annual cost estimates from Andrew *et al.* 2012.

Table 5: Costs of perinatal psychosis, impact on mothers, £ per case

Public sector	Wider society			Total
Health and social care	QALY losses	Productivity losses	Other	
24,302	12,843	8,391	1,953	47,489

Impact on children

There is little evidence from longitudinal studies on the impact of maternal psychosis on children. The only studies we were able to identify measured short-term outcomes in the form of increased rates of pre-term birth and post-neonatal death.

Pre-term birth (including cognitive impairment)

We calculated the cost consequences of the additional risk among mothers with schizophrenia to have pre-term deliveries, but because we did not identify an appropriate UK source we based our analysis on a Swedish study that used two million records from birth registers (Nilsson *et al.* 2008). We applied the same methods and parameters used earlier in relation to perinatal depression and anxiety.

Infant death

We based our cost estimates on a study by Bennedson *et al.* (2001) which showed an increased risk of post-neonatal death (primarily sudden infant death syndrome) for infants of women with schizophrenia, a relationship that has been confirmed in subsequent studies (e.g. Howard *et al.* 2007). As before, costings are based on the assumption that 37% of women with psychosis have schizophrenia.

Table 6: Costs of perinatal psychosis, impact on children, £ per case

	Public sector			Wider Society			Total
	Health and social care	Education	Criminal justice	QALY losses	Productivity losses	Other	
Pre-term birth (incl. cognitive impairment)	347	7	-	171	7	5	
Infant death	-	-	-	4,585	-	-	
Total	347	7	-	4,756	7	5	5,122

Other perinatal mental health conditions

Eating disorder

For a number of reasons we were unable to estimate the costs of eating disorders during the perinatal period.

- Recent literature suggests an overall prevalence of 5-7% (NICE 2014, Easter *et al.* 2013, Watson *et al.* 2013) but this is new evidence and still uncertain.
- Generally, little is yet known about onset during the perinatal period (NICE 2014); this might be explained partly by a complicated interaction between eating disorders and pregnancy which makes it difficult to understand the onset of the condition; the condition itself might influence the probability that a woman becomes pregnant and pregnancy itself has been shown to impact on remission or worsening of symptoms (Watson *et al.* 2013).
- Research carried out so far suggests that it is more the history and nature of the condition than its onset during the perinatal phase that impacts adversely on birth outcomes. For example, women with anorexia nervosa have been found to be more likely to give birth to low weight babies, but this was linked to the previous history of the condition and lower pre-pregnancy body mass index (Micali *et al.*

2007, Solmi *et al.* 2014). Similarly, an increased risk of miscarriage has been linked to a history of bulimia nervosa rather than to current condition (Micali *et al.* 2007).

- There appears to be a high rate of comorbidity with perinatal anxiety and depression, with approximately one in five women with symptoms of eating disorder developing depression or anxiety during that time (Micali *et al.* 2011).
- Many studies have shown that women with eating disorders have significantly impaired quality of life but so far there has not been a method for establishing condition-specific adverse health outcome scores that could be used for economic analysis.

Stress

Literature on this topic refers mainly to environmental stressors. The studies we identified controlled only for basic socio-economic factors and it is unclear whether the effects of stress could be distinguished from those of other conditions such as anxiety or depression (e.g. Nkansah-Amankra *et al.* 2010). One recent large Australian study found that perinatal stress was linked to lower literacy test scores (Li *et al.* 2013), but findings from other studies which measured the effects of perceived stress on cognitive development did not confirm this adverse effect (e.g. Keim *et al.* 2011).

Post-traumatic stress disorder

Evidence suggests that approximately 2% of women develop post-traumatic stress disorder after childbirth (Ayers 2004; Olde *et al.* 2006) and that this is more likely among women who have already experienced anxiety and depression during pregnancy (Van Son *et al.* 2005; Zaers *et al.* 2008). Alcorn *et al.* (2010) find that, after controlling for previous traumatic events and anxiety and depression during pregnancy, rates of post-traumatic stress disorder were 1.2% at 4-6 weeks, 3.1% at 12 weeks and 3.1% at 24 weeks postpartum. Studies in this area evidence the wide range of negative impacts of a traumatic birth on mother-infant attachment, family relationships and future childbearing (Allen 1998; Ballard *et al.* 1995; Bailham & Joseph 2003; Soet *et al.* 2003; Davies *et al.* 2008). Aside from the impact on the family, traumatic birth and post-traumatic stress disorder could increase health service use (Switzer *et al.* 1999). However, the current evidence did not allow us to consider the economic impact of this disorder separately from anxiety and further research in this area is needed to evaluate the costs specific to this condition.

Obsessive-compulsive disorder

Obsessive-compulsive disorder was captured in our analysis as a particular form of anxiety disorder, but this is a condition that has been separately researched in recent years because of its probably important relevance to the perinatal period. Newly published research showed that prevalence was 2.1% during pregnancy and 2.4% during the postnatal period compared with 1.1% in the general female population (Russell *et al.* 2013), suggesting that pregnancy and giving birth might trigger the onset of the condition. However, further research would be required in order to understand these prevalence figures in relation to other perinatal mental health conditions (Challacombe & Wroe 2013).

Personality disorder

Perinatal personality disorder was not included in our analysis as a distinct category, mainly because of a lack of relevant research. It overlaps with all three of the conditions for which we estimated costs, i.e. depression, anxiety and psychosis. For example, for approximately one in five women with personality disorder this was linked to obsessive-compulsive behaviour (Conroy *et al.* 2012). It is, however, indicated in a recent study (Conroy *et al.* 2010) that personality disorder can exacerbate the adverse impact of depression on children. The costs we calculated for depression, anxiety and psychosis are likely to incorporate the costs of personality disorder, but it was not possible from the existing literature to determine the size of the attribution.

Omitted costs

Breastfeeding and mother-infant attachment

Difficulties in breastfeeding and infant attachment have been shown to be closely linked to perinatal depression and to contribute to adverse child development outcomes (Hahn-Halbrook *et al.* 2013; Borra *et al.* 2014). However, the relationship with perinatal depression appears to be bidirectional and it is difficult to determine the separate effects on child development outcomes.

Child's temperament

A small number of non-UK studies have investigated the correlation between maternal anxiety and child's temperament. These were mainly cross-sectional, which means that it was not possible to determine the direction of effect. We did find one recent longitudinal study from the USA (Blair *et al.* 2011) which found an effect of perinatal anxiety on child's temperament at age 2, but we were unable to find a method of assigning costs to this measure. Similarly, although there was a recent study (Buss *et al.* 2011) which showed the impact of perinatal anxiety on the child's executive functioning at

age 6-9, we were again unable to assign a cost to this outcome. Cookson *et al.* (2009) used data from ALSPAC to investigate whether perinatal anxiety has an impact on the child's asthma at age 7 but were not able to find evidence for the direction of the relationship.

Impact of maternal perinatal mental illness on partners

Studies show that the partners of mothers with postnatal depression are themselves more likely to experience distress and depression (Burgess, 2011; Goodman 2004; Matthey *et al.* 2000; Roberts *et al.* 2006). The incremental health service costs incurred by partners have been estimated at £170 during the year after childbirth (Edoka *et al.* 2011). Qualitative studies have explored the emotional impact on partners, including a wide range of feelings from being worried and concerned about the partner to anger and frustration (Goodman *et al.* 2008). In some cases this can even lead to marriage breakdown. For example, research by Blackmore *et al.* (2013) showed that 18% of marriages ended following a period of postpartum psychosis and similar trends have been found for perinatal depression. In addition, evidence has emerged on the negative impact of paternal depression on children (Paulson *et al.* 2006, Ramchandani *et al.* 2008). The ability of partners to be supportive also has an impact on maternal depression (Cox *et al.* 2008, Burgess 2011). Although it has been shown that maternal and paternal depression are correlated, it is possible that the link is bidirectional and thus further research would be needed in order to attribute the cost of paternal depression to the maternal condition.

Children being taken into care

A number of studies suggest that mothers with severe forms of mental illness admitted to mother and baby units are at high risk of losing their newly born child into care. For example, Seneviratne and colleagues (2003) reported from case records in one unit that less than 50% of mothers were discharged together with their newborn and at follow-up less than a third were still with their child. Howard *et al.* (2004)

observed that 30% of mothers left the mother and baby unit with their child being on the risk register, subject to a care order or already in care. However, these studies were not able to quantify the attribution of this outcome to the mother's mental illness and there were likely to be many other relevant factors such as substance misuse and social care needs (e.g. domestic violence, homelessness). Costs linked to children being taken into care are thus not included in our analysis.

Employment

Our estimates of productivity losses for depression and anxiety relate solely to reduced time at work among those in employment and do not cover any risk of unemployment attributable to these conditions. This is mainly because of the bidirectional nature of the relationship, i.e. unemployment may be a consequence of depression or anxiety but it may also be a cause.

Decision to have further children

Between 40 and 70% of women who experience postpartum psychosis decide not to have further children, often because of a belief that avoiding pregnancy can prevent them from experiencing further episodes of illness (Robertson *et al.* 2003). We were unable to assign a cost to this outcome.

Further research is needed in all these areas of omitted costs.

Discussion

The total costs of perinatal depression, anxiety and psychosis are summarised in Tables 7 and 8 below. Table 7 shows costs per case of perinatal mental illness, while Table 8 gives costs per average woman giving birth. The difference between the two reflects the prevalence of the condition concerned. For example, psychosis is very costly in terms of cost per case, but because the prevalence of this condition is low, the cost when averaged over all women giving birth is relatively small. The main figures in each table show the costs to society as a whole, while the ones in brackets separate out those

Table 7: Total costs per case, in £ (of which public sector costs in £)

	Total cost - mother	Total cost - child	Total cost - mother + child
Perinatal depression	22,630 (1,688)	51,462 (7,971)	74,092 (9,659)
Perinatal anxiety	20,794 (4,320)	14,017 (5,362)	34,811 (9,682)
Perinatal psychosis	47,489 (24,302)	5,122 (354)	52,611 (24,656)

Table 8: Total costs per woman giving birth, in £ (of which public sector costs in £)

	Total cost - mother	Total cost - child	Total cost - mother + child
Perinatal depression	1,676 (125)	5,172 (1,058)	6,848 (1,183)
Perinatal anxiety	1,020 (214)	1,957 (691)	2,977 (905)
Perinatal psychosis	94 (48)	10 (1)	104 (49)

costs within the total that fall specifically on the public sector.

A number of considerations need to be borne in mind when interpreting these figures.

In our approach we aimed to calculate costs for the different conditions in such a way that they could be added together without double-counting. Thus, in the case of anxiety, we considered the overlap in prevalence between perinatal depression and anxiety and only looked at the costs of perinatal anxiety in relation to cases without co-morbid depression. A similar approach was followed for psychosis and depression. Limitations in the available data may nevertheless mean that a small degree of overlap remains. In addition, differences in the nature and quantity of available evidence and variations in study designs affect the extent to which our cost estimates are comparable between conditions. In particular:

- A lack of longitudinal data relating to the impact of maternal psychosis on long-term child outcomes prevented us from modelling costs in this area. More generally, perinatal depression is the condition that has been most extensively studied in the literature, so our cost estimates for this condition should be considered as the most comprehensive and reliable.
- The studies on which our calculations are based used different methods to identify disease prevalence and this too may influence the relative scale of outcomes. For example, most studies of perinatal depression are based on clinical diagnoses of depression in fairly small study populations, whereas studies using ALSPAC data to investigate perinatal anxiety have used self-reported symptoms of anxiety to identify the numbers above a defined threshold or cut-off point.
- The conditions covered in our analysis, particularly perinatal depression, may include the costs of other, co-morbid mental health conditions such as personality disorder or eating disorder, to the extent that these have not been controlled for in the studies we have used.
- The studies we used have been carried out in different localities with different demographic and socio-economic characteristics and, while statistical analysis has usually been employed to control for at least some of these features, it is still possible that findings are influenced by underlying characteristics such as deprivation or social isolation.

Taken together, these considerations imply that, when assessing the implications of our analysis for decision making, the estimated costs of a particular condition should not be seen as an indicator for investment only in that condition but rather in a range of conditions and their underlying determinants, particularly those relating to the mother's social and economic circumstances.

Conclusions

Subject to these limitations, the main conclusions suggested by our analysis are as follows.

- Taking into account the impacts on both mother and child, the costs of perinatal mental health problems are extremely high. For example, the overall cost to society of a single case of perinatal depression is estimated at around £74,000. The high prevalence of this condition means that, even when averaged over all births, the cost is still nearly £7,000 for every woman giving birth in any one year.
- Perinatal psychosis also carries a very high cost when measured on a cost per case basis, despite the fact that because of data shortages our estimates make very limited allowance for possible adverse impacts on the child. The high cost of psychosis is mainly explained by the persistence of the condition and high public sector costs per case due to the use of mother and baby units and the costs of institutionalisation. Costs per average woman giving birth are much smaller, because of the relatively low prevalence of this condition.
- The costs of perinatal anxiety are estimated at just under half those for depression, whether measured in terms of cost per case or per average woman giving birth. However, because of the high degree of overlap between perinatal anxiety and depression, the costs of many cases of anxiety are already factored into those for depression. In addition, the data on which our estimates of the costs of anxiety on its own are based are less comprehensive than those for depression. It is noteworthy that public sector costs account for a significantly higher proportion of total costs among mothers with perinatal anxiety than among mothers with perinatal depression, mainly because of the higher persistence of the former condition.
- The share of total costs falling specifically on the public sector varies somewhat between conditions but is always less than half the total. Even so, the costs are still large when measured in absolute terms: nearly £10,000 per case of depression, the same for anxiety and nearly £25,000 per case of psychosis.
- Averaged over all births, the combined costs of perinatal depression, anxiety and psychosis amount to £9,929 for every woman giving birth, including costs of £2,137 falling on the public sector.
- As there were around 813,000 births in the UK in 2012, these figures imply a total cost to society of about £8,070 million, including costs of £1,740 million falling on the public sector.
- Nearly three-quarters (72%) of the total cost relates to adverse impacts on the child rather than the mother. As our study is believed to be the first that gives cost estimates for children as well as mothers, this is one of the central findings of our work.

4: Uses and implications of the cost estimates

Introduction

The previous chapter has set out new estimates of the costs of three leading mental health problems that may affect women during the perinatal period: depression, anxiety and psychosis. Of particular importance and novelty is that these estimates take into account not only the costs directly associated with maternal mental illness but also the indirect costs that result from the impact of maternal mental health problems on the child and the damaging and long-lasting consequences that this can have on emotional, behavioural and cognitive development in early life. The estimates also provide information on how the costs of maternal mental health problems are distributed between various broad groups in society, including, for example, the scale of costs falling on the public sector, and also some indication of whether costs are short-term or longer-term in nature. This chapter provides a short commentary on the main uses and implications of the figures.

The scale of the problem

Cost-of-illness studies have been undertaken for a wide range of different physical and mental health conditions, both in this country and elsewhere. Perhaps their main use is to provide a measure of the overall scale or importance of a problem, as a means of informing debate and decision-making on priorities and the use of resources in health care and in public policy more generally.

Although cost-of-illness studies do not make the case for intervention as such, it seems reasonable to argue that there should be a broadly proportionate relationship between the overall importance of a particular problem and the scale of the response made to it. In other words, the bigger the burden imposed on society by any given health condition, the bigger the scale of service provision which is appropriate for this problem. Specific interventions aimed at improving health must

of course be justified in their own right in terms of effectiveness and cost-effectiveness, but, subject to this condition, policy and funding priorities should always reflect to some degree the relative scale and importance of the different problems being addressed. Recent debates on the case for parity in funding between mental and physical health largely turn on this point.

As in other areas of mental health, there is a good deal of evidence to indicate high levels of under-provision for maternal mental health problems, particularly common problems such as depression and anxiety. For example, a review of the literature on perinatal depression sets out the following broad estimates (Gavin *et al.*, in press):

- of all cases of perinatal depression, only 40% are detected and diagnosed;
- of those recognised, only 60% receive any form of treatment;
- of those treated, only 40% are adequately treated; and
- of those adequately treated in real world primary care settings, only 30% achieve full recovery from their depression.

Taken in combination, these estimates imply that only about 3% of all cases of perinatal depression end up achieving full recovery. Given the very high costs of perinatal depression shown by our figures, both in aggregate and per case, it is hard to argue this represents an adequate response to the scale and importance of the problem being addressed.

As another example, because of the increased risks of medication during the perinatal period, psychological therapy is recommended by NICE as the first-line treatment for most mild to moderate cases of maternal depression and anxiety at this time (NICE, 2007a). The provision of such therapy is now mainly the responsibility of IAPT services, which currently have capacity to treat around 15% of all people in England with common mental health problems. However, a number of concerns about the current IAPT

system in relation to perinatal mental health have been noted by the Joint Commissioning Panel for Mental Health (2012). These include: lack of relevant training for IAPT workers; lack of treatment methods specific to the perinatal context; and some evidence of delays in access to treatment. Expert opinion also suggests that the priority given to women with perinatal mental health problems by IAPT services varies considerably around the country. All this is despite the fact that the costs of depression and anxiety are significantly higher in the perinatal period than at other times, because of the adverse impact of maternal mental illness on the child as well as the mother. Again this suggests a mismatch between the scale of a problem and the policy and service response to it.

The potential benefits of intervention

Our estimates provide a broad measure of the potential benefits to be achieved by reducing the prevalence or severity of maternal mental health problems during the perinatal period, whether by prevention or by more effective methods of treatment. This is on the straightforward principle that a cost saved is a benefit gained, from which it obviously follows that the bigger the scale of a problem as measured by its cost, the bigger the potential benefits of intervention.

The more useful measure of cost in this context is cost per case of maternal mental illness rather than cost at the aggregate level. The latter can in principle be interpreted as a measure of the total benefits that would accrue to society if maternal mental health problems were entirely eliminated, but the practical relevance of this is limited. More helpful is a measure of cost per case, not least because this is the basis on which benefits are – or should be – measured in the economic analysis of individual interventions.

It is important in this context to note that our estimates of costs do not represent the costs of inaction, i.e. doing nothing. Rather, they show the costs of perinatal mental health problems at the present time, including the costs of the action that is currently being taken to address them. This is the appropriate baseline, often

described in research studies as ‘service or treatment as usual’, against which assess the costs and benefits of new or improved interventions.

The main distinguishing feature of our estimates is that, subject to constraints of data availability, they seek to be comprehensive in their coverage, including all types of costs wherever and whenever they fall. For example, where there is good supporting evidence, the estimates include costs arising in the adult lives of children whose mothers were affected by mental health problems in the perinatal period.

This broad approach is in contrast to the way in which impacts are measured in most economic analyses of individual interventions relating to maternal mental health, including the economic modelling studies which have been undertaken by NICE to inform their guidance on antenatal and postnatal mental health (NICE, 2007a; NICE 2014). The literature is relatively sparse in terms of the overall number of studies available and most studies use a broadly similar framework of analysis which typically includes the following elements:

- all costs and benefits measured from a health-only perspective, i.e. no allowance for costs falling outside the NHS and social care or for benefits other than improved health outcomes;
- a short time horizon, usually one year; and
- an exclusive focus on the mother, without any allowance for the adverse impact of maternal mental health problems on the child.

As discussed further below, this relatively narrow approach largely reflects limitations imposed by the available data. At the same time, for fairly obvious reasons, all of the features identified above are likely to mean that the net economic benefits of interventions for maternal mental illness are under-estimated. In other words, the economic case for intervention would be significantly strengthened if studies were based on the more comprehensive approach to the measurement of potential benefits used in our analysis.

Implications for the design of interventions

Our estimates of the costs of maternal mental health problems relate to the incidence of these problems during pregnancy as well as in the year after childbirth and they cover the impact of these problems on the child as well as on the mother. Both these features have implications for the design of interventions, including their timing.

Drawing on longitudinal surveys such as the Avon Longitudinal Study of Parents and Children (ALSPAC), which has been tracking a cohort of children born in the Avon area in the early 1990s, a growing body of evidence suggests that maternal depression and anxiety in the perinatal period are at least as common during pregnancy as they are in the year after childbirth, and also that only a minority of cases of postnatal depression and anxiety are in fact new cases, i.e. cases which arise for the first time after childbirth rather than being a continuation of conditions which initially developed during pregnancy (Heron *et al.*, 2004). These studies also confirm a high degree of co-morbidity between depression and anxiety, as around two-thirds of all women with depression in the perinatal period have a co-existing anxiety disorder.

The fact that most cases of perinatal depression and anxiety are present during pregnancy sends a clear signal that the main focus of efforts to detect and treat these conditions should be in the antenatal period. This is in contrast to much existing practice, which tends to give most attention to problems in the postnatal period, particularly postnatal depression.

The case for very early intervention is further strengthened by recent advances in neuroscience, which have increased our understanding of the extent to which changes in the environment in the womb can critically alter neurological development in the fetus, with a permanent effect on the child. This is the so-called fetal programming hypothesis, initially developed in relation to physical disease (Barker, 1998) but now increasingly applied to psychological outcomes. Particular importance

is attached to the impact of maternal stress on the developing brain and there is now a growing body of evidence to suggest that stress exposure during pregnancy is a significant risk factor for a wide range of adverse outcomes in the child, including problems in emotional, behavioural and cognitive development. Anxiety disorders and other mental illnesses are major causes of maternal stress.

Other reasons for highlighting the importance of maternal mental health problems during pregnancy include the possibility that these problems may interfere with a woman's ability to seek antenatal care and also that they may be associated with unhealthy behaviours such as smoking, substance misuse and poor diet, which carry further risks to the fetus.

A number of different mechanisms may have a role in explaining the links between maternal mental ill health and developmental problems in the child. Fetal programming is an example in the antenatal period. In the postnatal period, psychological rather than biological factors are more relevant and particular importance attaches to the possibility that maternal mental illness may in some cases lead to parenting patterns or behaviours which have a damaging impact on mother-infant attachment, for example behaviours which are hostile or intrusive or disengaged. Some – but not all – forms of insecure attachment are, in turn, a risk factor for relationship problems in the child, with potentially adverse long-term consequences.

Taking into account such transmission mechanisms, our cost estimates confirm that the consequences of maternal mental health problems for the child are extremely important in quantitative terms. This is clearly a factor which should influence the design and choice of interventions. For the most part, however, the focus of previous research and guidance has been on the identification of measures which are effective in preventing or treating mental illness in the mother, without necessarily taking explicit account of the impact of these interventions on the child.

It is of course possible that the treatment of symptoms in the mother will in itself be sufficient to mitigate risks to the child, although the findings of research in this area are limited and conflicting. For example, the 2014 draft update of NICE guidance notes evidence from two studies that structured psychological interventions for depression and anxiety have positive effects on mother-infant attachment and that these are maintained over time; on the other hand, there is no clear evidence from these studies that intervention has any impact on behaviour management problems (NICE, 2014). However, at least two other studies find that while psychological interventions are moderately effective in treating maternal depression, they offer little or no benefit in relation to mother-infant interactions or infant outcomes (Murray *et al.* 2003; Forman *et al.* 2007).

Given this conflicting evidence, there is growing interest in the role of dyadic interventions, i.e. those which focus explicitly on the mother-infant relationship, particularly as there is some, albeit limited, evidence that these measures have a positive impact on maternal mental health. Also in support of this approach, emerging evidence suggests that the adverse impact of antenatal anxiety and depression on infant development can be significantly reduced depending on the quality of parent-infant attachment in the postnatal period (Bergman *et al.*, 2010). Our findings on the scale and importance of child-related costs add further weight. The main limitation is that, as yet, relatively little is known about the impact of dyadic interventions on child outcomes beyond the relatively short term. It should, however, be emphasised that this reflects absence of evidence rather than evidence of the absence of a positive effect.

The distribution of costs

Our findings suggest that the costs of maternal mental health problems are fairly widely distributed, both between different sectors of society and over time. Both these features have implications for the funding of perinatal mental health care by the NHS.

Aggregated over the three conditions covered by our analysis, the estimates reported in Chapter 3 indicate that costs falling on the public sector account for 21.5% of the total societal costs of the conditions concerned. Within the public sector sub-total, the bulk of costs (71.3%) relate to health and social care, followed by education (16.0%) and criminal justice (12.7%). Looking specifically at health and social care, the figures taken together imply that costs falling on the NHS and social services account for 15.3% of total costs. Although relatively small in proportionate terms, this still amounts to a very substantial sum when measured in absolute terms, estimated at around £1,235 million for every one-year cohort of births in the UK.

Further analysis of the data for health and social care reveals that 28% of these costs relate to the treatment of women with perinatal mental health problems and the remaining 72% to the extra costs of health care for the children of these women. Although the relationship is not entirely straightforward, most of the former costs are relatively short-term in nature, whereas the latter may be spread over many years.

Relating this to the funding of improved services for perinatal mental health care, it is perhaps inevitable at a time when public funds are under severe restraint that budget holders in the NHS – as in the rest of the public sector - will be very concerned with questions of affordability. In particular, they are likely to prioritise ‘quick wins’, i.e. services or interventions which rapidly pay for themselves through savings in the commissioner’s own budget, with relatively little weight being given to impacts on the budgets of other agencies or sectors, or to those arising mainly in the medium or longer term. (A further complication is that the costs of service

provision for perinatal mental health problems may fall on a number of different budgets within the NHS, including adult mental health, children's services and maternity services.) The risk is that such measures may not necessarily represent the most cost-effective use of resources when this is assessed from a long-term societal perspective.

The fact that the costs of maternal mental health problems are fairly widely distributed between sectors and over time implies that decisions on the funding of services are always likely to raise such a conflict or require a trade-off between short-term affordability and longer-term cost-effectiveness. There is no easy solution to this, but two points may be noted:

- First, our findings indicate that the cost-effectiveness case for intervention is almost certainly stronger than previously thought, particularly because of omitted benefits in earlier studies. Further work is needed to quantify the scale of this in relation to specific interventions, but in general it should help tilt the balance of argument in favour of investment in such interventions compared with other uses of the resources.
- Second, the omitted benefits just mentioned relate largely to the child-related impacts of maternal mental health problems, some of which extend over many years. The short-term costs of maternal mental health problems nevertheless remain substantial, including those falling on the NHS. To the extent that these costs can be reduced as a result of improved services, for example by avoiding admissions to psychiatric inpatient care, this lessens the risk of conflict between affordability and cost-effectiveness.

Implications for research

Because of gaps in the evidence base on the effectiveness and cost-effectiveness of interventions specifically relating to maternal mental health problems, many of NICE's recommendations in this area are based on their wider guidance relating to individual conditions such as schizophrenia, depression and eating disorders. The justification for this is that there is no evidence to indicate that the effectiveness of interventions for these conditions is any different in the perinatal period than at other times. The main drawback is of course that recommendations are based on evidence which necessarily leaves out of account any impact of maternal mental health problems on the child. As our analysis shows, this impact is of major significance in cost terms.

More research is therefore needed on the comparative effectiveness and cost-effectiveness of interventions taking into account the full range of outcomes associated with maternal mental health, particularly those relating to the child. Such studies are needed in order to address a range of unresolved questions such as the relative merits of mother-focused v. dyadic interventions. Related to this, there is also a major need for more evidence on the impact of interventions on child development which goes beyond the short-term, as very little is currently known about the extent to which improvements in outcomes observed during infancy extend beyond this phase. Such evidence may, for example, strengthen the comparative case for psychological interventions, to the extent that women are helped to develop generalisable skills that can be utilised in other situations such as birth of a subsequent child.

Finally, further research is needed to fill the various gaps in evidence, noted in Chapter 3, which have restricted our ability to produce comprehensive estimates of the costs of perinatal mental health problems. Some of these relate to specific conditions such as eating disorder and others to cross-cutting issues such as the impact of all forms of maternal perinatal mental illness on partners.

5: Current service provision

Introduction

The perinatal period provides a uniquely favourable opportunity for health services to reduce the scale of morbidity and mortality associated with mental ill health. This is for a number of reasons.

- First, the epidemiology of mental health problems during pregnancy and early motherhood is sufficiently well established to provide a basis for the planning and commissioning of services, both nationally and at the local level.
- Second, in contrast to the position in other mental health contexts, nearly all members of the relevant population at risk are routinely in contact with universal health services and professionals, including midwives, health visitors and GPs. Such contacts provide regular opportunities for the identification of those at greatest risk of developing mental health problems, for the early detection of these problems as they arise and for the timely provision of appropriate treatment.
- Third, the potential benefits of intervention are particularly high during the perinatal period, reflecting the evidence already reviewed in this report that maternal mental health conditions during pregnancy and early motherhood have major implications not just for the wellbeing of the mother but also for the healthy emotional, behavioural and cognitive development of the child.
- Fourth, as set out in NICE guidance, interventions of at least moderate effectiveness are available for the great bulk of mental health problems that arise during pregnancy and in the year after childbirth.
- Fifth, there is – and has been for some time – a broad measure of expert agreement on what services are needed and how these should be organised in order to provide an effective response across the full range of

mental health conditions affecting women during the perinatal period. Essentially this entails a mix of universal and specialist services organised in a stepped-care model, with strategic planning and oversight, in which the nature and intensity of support being provided vary according to the complexity and severity of the different conditions being treated.

- Finally, national policy is – and again has been for some time – strongly supportive of high-quality maternal mental health care, as evidenced most recently in ‘Closing the Gap: Priorities for essential change in mental health’ (DH 2014b), which explicitly identifies maternal mental health as a priority area for service improvement.

Despite this favourable context, it is widely acknowledged that the current provision of care for perinatal mental health problems is highly variable around the country, both in coverage and in quality. Key weaknesses are briefly reviewed below under three headings: universal services, specialist services and commissioning.

Universal services

A high proportion of cases of mental ill health during the perinatal period go undetected. This particularly applies to common mental health problems such as depression and anxiety, where rates of non-detection may be 50% or more, despite the opportunities for identification provided by routine contacts with universal health services. NICE guidance recommends that consideration should be given to asking all women simple questions about their mental health both during pregnancy and after childbirth, but it is clear that this is not done on a consistent or comprehensive basis. For example, in a recent survey for the NSPCC, 41% of new mothers said that their midwife or health visitor had never asked them about depression in their most recent pregnancy (cited in Hogg, 2013).

Underlying reasons for this failure to discuss and identify mental health issues during the perinatal period include a lack of mental health awareness and expertise among many staff working in universal services, in turn linked to inadequate training, and also concern at the possible additional pressure on already heavy workloads that may result from more mental health problems being identified.

In response to such concerns, the Government has announced a number of changes, highlighted in 'Closing the Gap', which should lead to some improvements in the future. These include investment in 5,000 more midwives, currently in training, and 4,200 more health visitors, together with arrangements for improved training in perinatal mental health for these staff and also for doctors in postgraduate training (DH 2014b). Among other things, these changes will ensure that there is enough training in perinatal mental health to ensure there are specialist staff available for every birthing unit by 2017. They may also enable staff to play an enhanced role in the provision of interventions for common mental health problems in the perinatal period. For example, there is some evidence that the provision of psychologically orientated sessions by health visitors with additional training is effective not only in treating postnatal depression but also in preventing it (Morrell *et al.* 2009; Brugha *et al.* 2010; Morrell *et al.* 2014, in press).

Another reason for the non-detection of mental health problems during the perinatal period is a lack of coordination and information sharing between services. For example, a major risk factor for the development of mental health problems in pregnancy or after childbirth is a previous history of such problems. However, a recent survey of midwives, health visitors and family nurse practitioners found that only half were confident that they would know if a woman had such a history, for example because of lack of information from other professionals and lack of a documented history in maternity notes (Boots Family Trust, 2013). Increasing numbers of midwives and health visitors now work in community teams, often based in children's centres, resulting in weaker links with GPs and increased difficulties of information sharing (Hogg, 2013).

Finally, some new or expectant mothers may be reluctant to disclose mental health problems, even if asked by a health professional. Evidence for this is given in a recent survey of women who had all experienced some form of mental health problem in the perinatal period (Boots Family Trust, 2013). The survey found that 30% of those in the sample admitted that they had never told a health professional that they were unwell, often because they thought their baby might be taken away. Lack of information and lack of trust in statutory services probably contribute to such high rates of non-disclosure, as do discontinuities in the provision of care which hamper the development of close relationships between new or expectant mothers and health professionals in universal service settings; for example, in one survey, 40% of women said that they saw a different midwife at every appointment during pregnancy (cited in Royal College of Midwives, 2013).

Low detection rates necessarily mean that a high proportion of cases of depression and anxiety go untreated during the perinatal period. Once problems are identified, psychological therapy is generally recommended by NICE as the first-line treatment for the majority with mild to moderate disorder, with cautious use of medication because of increased risks to the baby if medication is taken during pregnancy or when breastfeeding. NICE also recommends that women should receive psychological therapy within four weeks of assessment.

Although comprehensive up-to-date statistics are not available, it seems clear that current provision falls some way short of these standards. For example, a survey of women with postnatal depression carried out in 2011 found that among those in the sample who received professional treatment (around half of the total), as many as 70% were given antidepressants compared with only 41% receiving any form of talking therapy or counselling (4Children, 2011). The same study also reported instances of waiting times of up to six months for psychological treatment.

Specialist services

Among all women being treated for mental health problems during the perinatal period, over 90% are looked after in primary care, including IAPT (NICE, 2014). The remainder, i.e. those with more complex or serious conditions, require the support of specialist services, including specialist mother and baby units for all women who need psychiatric inpatient care in the perinatal period and also specialist community perinatal mental health teams providing treatment and support for women with severe mental health problems living in the community.

In the absence of specialist perinatal services, the care of women with severe mental illness during this period is provided mainly by general adult mental health services. This is widely regarded as a second-best alternative for a number of reasons, including lack of specialist knowledge of mental illness in the specific context of pregnancy and childbirth, higher thresholds for accepting referrals, slower response times and less well developed relationships with maternity services. Among other things, this is likely to mean slower recovery times for women with severe mental illness and increased separation of women from infants, leading to more attachment difficulties in the longer term. As one indicator of the need for specialist services, recent evidence from the national confidential enquiry into maternal deaths shows that nearly all such deaths resulting from psychiatric disorders were among women being cared for by non-specialist mental health teams (Oates & Cantwell, 2011).

Despite the strong case for specialist services, and long-standing recommendations in national guidance for the availability of such services, there remain major gaps in provision. In the case of mother and baby units, it is generally estimated that the number of available beds in these units needs to increase by up to 50% to meet the overall level of need at national level (NHS England, 2013; NICE 2014). Changes in geographical coverage are also required, as large areas of the country have no provision at all – see map A overleaf.

Gaps in the provision of specialist community perinatal mental health services are, if anything, even more pronounced, as shown by the findings of a recent audit carried out by the Royal College of Psychiatrists for the Maternal Mental Health Alliance (MMHA, 2014). This collected information on the availability of specialist community services in all 237 health localities in the UK (211 clinical commissioning group areas in England and 26 health board areas in Scotland, Wales and Northern Ireland), distinguishing between six levels of service ranging from no provision to provision at a level meeting the full standards set by the Royal College of Psychiatrists' Perinatal Quality Network.

Results are given in map B overleaf. In broad terms this shows that more than 40% of England's CCGs have no specialist service at all and the situation is the same for about 40% of health boards in Scotland, 70% of those in Wales and 80% of those in Northern Ireland. At the other end of the spectrum, less than 15% of localities in the UK offer comprehensive provision. There is also a great deal of variation even within well-defined geographical areas. For example, in London seven of the 32 CCG areas provide services at the highest level but nine provide none.

Overall, the provision of specialised perinatal mental health care is best described as patchy. Many women suffering from severe mental illness are unable to access services of the type and quality recommended in national guidance.

Commissioning

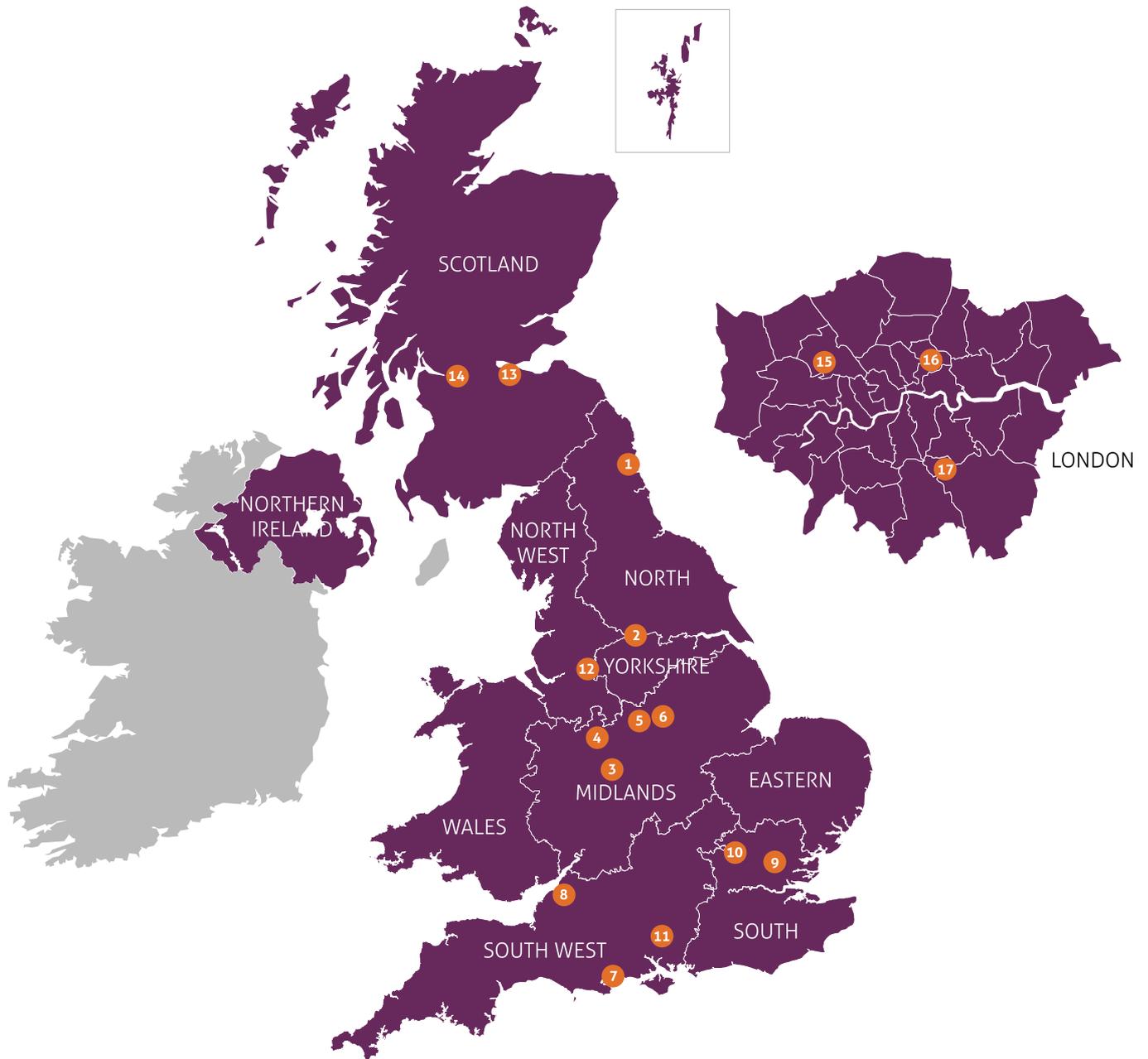
A substantial number of different agencies are involved in the commissioning and provision of mental health care during the perinatal period and this implies a clear need for a strategic approach to the planning of services, including the development of integrated care pathways within a stepped-care framework. In support of this, NICE recommend that regional clinical networks should be set up to advise local commissioners and providers and to assist in the development of local strategic plans and commissioning frameworks.

A recent survey carried out by the National Childbirth Trust (2014) suggests that little progress has yet been made in the development of a strategic approach among local commissioners. Freedom of Information requests were sent to 194 CCGs in England asking if they have a perinatal mental health strategy, with the following responses:

- 5 CCGs (3%) said they have a strategy for providing perinatal mental health services
- 34 CCGs (18%) said they were developing or planning to develop a strategy
- 117 CCGs (60%) said they have no plans to develop a specific strategy for perinatal mental health
- 30 CCGs (15%) were unable to offer any information and directed the charity to local NHS trusts or NHS England
- 8 CCGs (4%) did not reply.

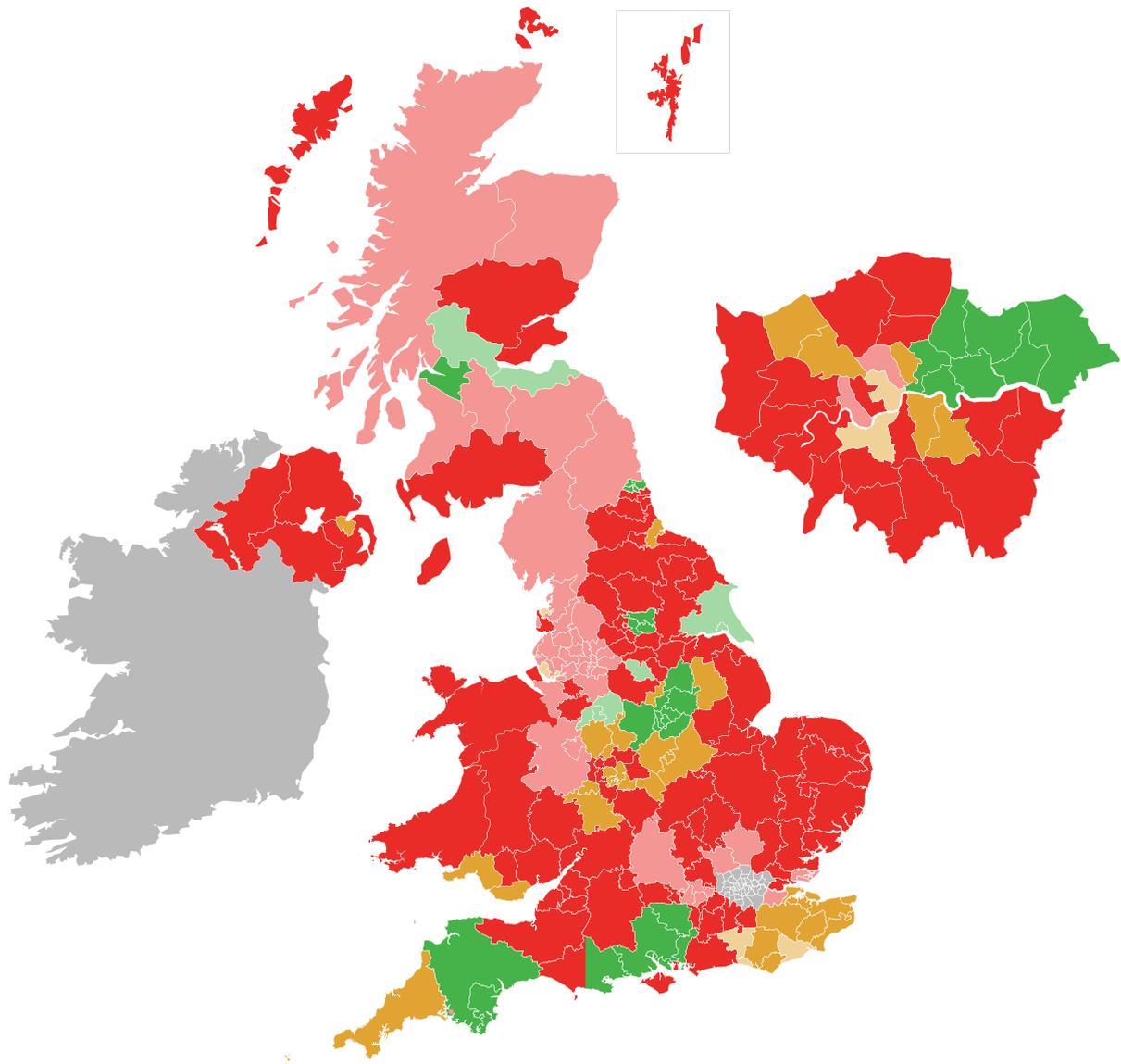
Taken together with the earlier evidence on local variations in service provision, these findings suggest that for many commissioners maternal mental health in the perinatal period is not yet seen as a priority area.

Map A: Mother and Baby Units



Disclaimer Levels of provision in this map have been assessed using the best information available to us from local experts but have not been independently verified. Please contact info@everyonesbusiness.org.uk if you suspect any inaccuracy or know of recent developments that may alter the level of provision level in any area listed here.

Map B: UK Specialist Community Perinatal Mental Health Teams (current provision in 2014)



LEVEL	COLOUR	CRITERIA
5	Dark Green	Specialised perinatal community team that meets Perinatal Quality Network Standards Type 1 http://www.rcpsych.ac.uk/pdf/Perinatal%20Community%20Standards%202nd%20edition.pdf
4	Medium Green	Specialised perinatal community team that meets Joint Commissioning Panel criteria http://www.rcpsych.ac.uk/pdf/perinataL_web.pdf
3	Gold	Perinatal community service operating throughout working hours with at least a specialist perinatal psychiatrist with dedicated time AND specialist perinatal mental health nurse with dedicated time, with access to a perinatal psychiatrist throughout working hours
2	Light Gold	Specialist perinatal psychiatrist AND specialist perinatal nurse with dedicated time
1	Pink	Specialist perinatal psychiatrist or specialist perinatal nurse with dedicated time only
0	Red	No provision

Disclaimer Levels of provision in this map have been assessed using the best information available to us from local experts but have not been independently verified. Please contact info@everyonesbusiness.org.uk if you suspect any inaccuracy or know of recent developments that may alter the level of provision level in any area listed here.

6: The cost of a good service: illustrative examples

Introduction

The previous chapter identified a number of gaps and shortcomings in the current provision of services for perinatal mental health problems. Against this background, this chapter seeks to provide broad estimates of the amount of additional NHS expenditure that would be needed to bring services up to the level and standard of provision specified in national policy guidelines, including in particular NICE guidance (NICE 2007a, 2014) and the guidance for commissioners of perinatal mental health services produced by the Joint Commissioning Panel for Mental Health (2012).

For many areas of service provision the translation of such guidance into estimates of additional expenditure necessarily involves making a number of assumptions and judgements. In doing this, we have drawn on various sources of expert advice, including advice from the external Reference Group which has overseen this study. The resulting estimates of additional expenditure should nevertheless be seen as illustrative orders of magnitude rather than precise figures and in most cases are deliberately set towards the upper end of a plausible range.

For reasons of data availability the expenditure estimates given below relate to England only, rather than the UK as a whole. They are however expressed in terms of £s per birth as well as total national expenditure and can therefore be applied broadly to other population aggregates. Relevant information for 2012 on population size and numbers of births in the UK and its constituent countries is given in table 9 below.

Within England the average population of a CCG area is around 250,000, which implies about 3,250 births a year if the local birth rate is the same as the national average.

Using a hypothetical example to illustrate the approach taken below, suppose it is determined that as part of a good service 5% of all women would benefit during the perinatal period from a specific mental health intervention costing £1,000 per recipient. Averaged over all births, the cost of providing this intervention is £50 per birth, i.e. $£1,000 \times 0.05$. Suppose further that half of the women who would benefit from the intervention are already receiving it. The cost of additional provision needed to contribute to a good service is therefore £25 per birth. Across England as a whole, the requirement for additional expenditure on the intervention in question would thus be around £17.4 million a year, i.e. $£25 \times 694,241$ births, while for a typical CCG it would be around £81,000 a year, i.e. $£25 \times 3,250$ births.

Table 9: Population and number of births in 2012

	population	numbers of births	births per 1,000 pop.
UK	63,705,000	812,970	12.8
England	53,493,700	694,241	13.0
Scotland	5,313,600	58,027	10.9
Wales	3,074,100	35,238	11.5
Northern Ireland	1,823,600	25,269	13.9

Source: ONS, 2013c.

For costing purposes we have identified seven main components of service provision. This is not meant to imply that there are or should be distinct boundaries between these different elements of provision or that care should be determined in a formulaic way, driven by narrow diagnostic categories and matching protocols. From the perspective of those using services, care should as far as possible be individualised and person-centred, with seamless transitions between services and good communications throughout. To the extent that such features of a good service are likely to be facilitated by increased overall levels of provision, their cost implications will be reflected in the figures given below. Recognition should also be made of the important contribution made by voluntary and community organisations to the overall perinatal mental health pathway, though this is not covered further in the costings below.

To ensure consistency with the basis on which we have estimated the costs of perinatal mental health problems, as described in Chapter 3, all expenditure figures are at 2012/13 prices.

Improvements in universal services

It was noted in the previous chapter that there are a number of shortcomings in the mental health care provided by the universal services which support women and their babies during the perinatal period. These include: failure to identify many cases of maternal mental ill health; discontinuities in the provision of support; and lack of expertise or confidence in discussing issues relating to mental health with new or expectant mothers.

It was also noted that a number of measures are in hand to improve these services, particularly the recruitment and training of 5,000 more midwives and 4,200 more health visitors. These are major undertakings and will add significantly to overall expenditure on NHS care for mothers and babies. Using data given in the annual compendium of unit costs published by the Personal Social Services Research Unit (Curtis, 2013), we estimate that, on a full-cost basis (i.e. including all overheads and relevant support costs), the on-going cost of funding these staff increases amounts to £710 million

a year. Averaged over all births in England in 2012, this implies additional expenditure of £1,023 per birth.

It would not of course be appropriate to assume that all of this increase is linked to improved care for women suffering from perinatal mental health problems. The extra provision is designed to improve maternity and related services for all women and their babies, not just the substantial minority with mental health conditions. Also, a significant part of the increase in staffing is to take account of demographic changes, particularly an increase in the birth rate which is now 18% higher than a decade ago.

In the absence of any explicit national guidance on how the extra resources should be deployed, we assume for illustrative purposes that 20% of the additional expenditure on midwives and health visitors can be linked to perinatal mental health. This is equivalent to £205 per birth.

Mental health assessments

It is assumed that the extra provision and training of midwives and health visitors described above will result in all women being asked the simple questions on mental health recommended by NICE for use during pregnancy and after childbirth. It is also assumed that all women who screen positive (i.e. give responses that indicate a possible mental health problem) will then be referred to their GP or an IAPT service for more detailed assessment, as a prelude to psychological therapy or other treatment if appropriate.

It is noted in the NICE guidance that, using the simple questions it recommends, nearly all women who genuinely have a mental health problem will screen positive, but so too will a substantial number who on further investigation turn out not to have any such problem. In other words, the method has a low rate of false negatives but a high rate of false positives. As a result of this, we assume as an upper limit that at some point during the perinatal period 25% of all women will be referred for a more detailed assessment.

For costing purposes we make the simplifying assumptions that all assessments are undertaken by IAPT services and that each assessment takes the same amount of time as one session of psychological therapy provided by an IAPT therapist. The full cost of this is estimated at £91 in 2012/13 prices (Curtis, (2013). On this basis, the cost of assessments averaged over all births is £23 per birth.

A further adjustment is required to allow for the fact that our estimates are designed to show the additional expenditure needed to provide a good service. Some women already receive proper diagnostic assessments, so the costs of this should be subtracted. A rough estimate is that 5% of women are currently assessed, implying that as a measure of additional expenditure the figure of £23 per birth for the cost of assessments averaged over all births should be adjusted downwards to £18.

Psychological or psychosocial interventions

For illustrative purposes it is assumed that half of all women who are referred for assessment go on to receive some form of psychological or psychosocial intervention. The other half includes those who turn out to be false positives and so not in need of further treatment and also those who decline the offer of talking therapy or drop out at an early stage.

Based on economic modelling undertaken for the draft update of NICE guidance (2014), women with common mental health problems who receive treatment are divided into two main groups: first, those with mild to moderate problems (around 72% of the total), who receive 6-8 sessions of facilitated guided self-help, at an estimated cost of £225 per case; and second, those with moderate to severe problems (the remaining 28%), who receive intensive psychological therapy in the form of 16 sessions of cognitive behavioural therapy, at an estimated cost of £1,456 per case.

The weighted average cost is estimated at £564 per case, which - averaged over all births - works out on the assumptions given at £71 per birth. As with the cost of assessments, this is a gross rather than net or additional cost, so allowance also needs to be made for expenditure already being made on these interventions. Expert advice suggests that current provision is only about 20% of the required amount, implying that the additional expenditure needed for a good service is £56 per birth.

Specialist community perinatal mental health teams

The availability of a specialist team in every locality is recommended in NICE and other guidance for the provision of treatment and support for women with complex or severe mental health problems in the community. However, as noted in the previous chapter, the availability of these teams is very variable round the country, with no service at all provided in over 40% of CCG areas.

In order to estimate the amount of additional expenditure needed for full national coverage, use is made of cost data provided by the community perinatal mental health service run by Southern Health NHS Foundation Trust in Hampshire, adjusted so that levels of staffing are in line with those recommended in a forthcoming update of guidance originally produced by the Royal College of Psychiatrists in 2000 (RCP, 2000).

The Hampshire service is provided by a multi-disciplinary team including specialist perinatal psychiatrists, psychologists, nurses and nursery nurses which offers a range of services to women in the community with severe mental health problems, including advice and support over the telephone, outpatient consultations in clinics, GP surgeries or at home, medication if appropriate and psychological therapies. The team won the UK Psychiatry Team of the Year Award in 2004 and again in 2013.

The total cost of specialist community services provided by this team, adjusted as described above, is estimated at around £1.45 million a year for a local population with 17,500 births a year. Average cost per birth is therefore £83.

As before, in calculating the need for additional expenditure at the national level, an adjustment is needed to allow for existing provision around the country and, on the basis of the findings of the MMHA survey (2014) reported earlier, we estimate that this is only around a third of the required level. Additional expenditure needed to make up the shortfall is therefore is £55 per birth.

Parent-infant interventions

These interventions support mothers who have parenting difficulties that may carry a risk to the infant's current and future mental health and focus mainly on psychological therapies and parenting interventions. According to the Joint Commissioning Panel on Mental Health (2012), "They are an important part of an overall perinatal mental health strategy and a necessary but not sufficient component of a perinatal mental health service". The provision of these services is, however, highly variable around the country.

Without implying any specific ideal model for service delivery, information kindly provided by the Infant-Parent Perinatal Service run by Oxford Health NHS Foundation Trust indicates that, including overheads, the annual cost of this service is around £190,000 for a local population with 7,400 births a year, or £26 per birth. However, the Oxford service also estimates that at current levels of provision only about a third of local need among mothers with mental health problems is being met. If so, the cost of a "good" service would be £78 per birth.

As before, a calculation of the need for additional expenditure at the national level requires an adjustment to allow for existing provision around the country. No reliable information is available on this, but expert opinion suggests that at best it is only about a quarter of the level required, implying an estimate of additional expenditure of £58 per birth.

It is possible that there is some overlap in the range of services provided by the Oxford team and the Hampshire community perinatal mental health team described in the previous section, although the latter is largely for women with severe mental health problems and the former more for women with moderate to mild disorders. To the extent that this is the case, combining the costs of the two services will overstate the estimated overall need for additional expenditure.

Mother and baby units

According to NICE there is a national shortfall of 60-80 beds in specialist mother and baby units and a costing report published alongside their 2007 guidance gives an estimate of £6.924 million a year for the cost of making up this shortfall, based on a mid-point of 70 more beds (NICE, 2007b). The calculation assumes that women treated in mother and baby units would otherwise be treated in general adult psychiatric hospitals. Updating this calculation using NHS reference cost data (DH, 2014a), it is estimated that the provision of 70 more beds in mother and baby units would cost £8.636 million a year at 2012/13 prices, or £12 per average birth.

Regional clinical networks

The NICE costing report of 2007 also includes an estimate of £1.673 million a year for the national cost of core staff to manage the regional clinical networks that are recommended for perinatal mental health services. This increases to £1.936 million a year when updated to 2012/13 prices, or £3 per birth.

The aggregate costs of extra provision

The following table gives our illustrative estimates of the amounts of additional expenditure needed to provide perinatal mental health care at the level and standard of provision recommended in national guidance.

On these figures the cost of improving perinatal mental health care thus comes to a total of around £280 million a year in England as a whole, equivalent to extra spending of around £1.3 million a year in an average CCG. In comparison, aggregate spending on the NHS in England amounted to £105 billion in 2012/13 (HM Treasury, 2013), or £500 million per average CCG.

The table also shows that the cost of service improvement is equivalent to extra spending of just over £400 per birth. In comparison, our estimates reported in chapter 3 suggest that, over time, perinatal mental health problems impose costs of around £10,000 per birth on society as a whole and costs of around £2,100 per birth on the public sector. Because the costs of perinatal mental health problems represent a measure of the potential benefits of intervention, these figures imply that even relatively modest improvements in outcomes that result from service improvement would be sufficient to justify the additional spending on value for money grounds.

Table 10:
Additional expenditure needed to provide recommended level of perinatal mental health care

	cost per birth	national total (England)
	£	£ million
Improvements in universal services	205	142
Mental health assessments	18	12
Psychological interventions	56	39
Specialist perinatal community teams	55	38
Parent-infant services	58	40
Mother and baby units	12	9
Regional clinical networks	3	2
All	407	283

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