Investing in Arts on Prescription: an economic perspective

David McDaid $^{1,2}$ & A-La Park $^1$

1. Personal Social Services Unit, London School of Economics and Political Science, London, UK
2. World Health Organization European Observatory on Health Systems and Policies, Brussels, Belgium.

Correspondence: d.mcdaid@lse.ac.uk

May 2013.
Contents

Contents .......................................................................................................................... 2

Key Points ....................................................................................................................... 4

1. Introduction .................................................................................................................. 6
   1.1 Aims and objectives ............................................................................................... 7

2. Methods ....................................................................................................................... 8
   2.1 Estimating resource inputs and added value generated by Arts on Prescription .......... 8
   2.2 Threshold analysis ............................................................................................... 9

3. Results of resourcing analysis ................................................................................... 12
   3.1 Resources invested in Arts on Prescription .......................................................... 12
      3.1.2 Set up costs .................................................................................................... 13
      3.1.2 Recruitment of study participants ................................................................... 14
      3.1.3 Session costs .................................................................................................. 15
      Table 1: Direct costs of Arts on Prescription Sessions ............................................. 16
      Table 2: Overall direct costs for Arts on Prescription Sessions in Cambridge ............. 17
      Table 3: Direct costs for Arts on Prescription Sessions in Cambourne ....................... 18
      3.1.4 Launches and other events ............................................................................. 18
      Table 4: Resources invested in Arts and Prescription events ...................................... 19
      3.1.5 Administration costs ..................................................................................... 20

4. Modelling the cost effectiveness of Arts on Prescriptions .......................................... 21
   Box 1: Stepped care approach .................................................................................... 22
   Figure 1. Structure of decision model examining cost effectiveness of Arts on Prescription as an initial therapeutic option for people with moderate depression ...................................... 24
   Table 5: Parameters used in modelling analysis ......................................................... 25

5 Modelling results ...................................................................................................... 26

5.1 Results: Arts on Prescription plus low intensity IAPT versus IAPT alone ................ 26
   i) Health payer only perspective .............................................................................. 27
   Figure 2: Cost effectiveness analysis with a 37.5% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health Perspective) ...................................................... 27
   Table 6: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Low Intensity IAPT versus IAPT alone (Health Perspective) ........... 28
   Figure 3: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Low Intensity IAPT versus IAPT alone (Health Perspective) .......... 29
   ii) Health and productivity perspective .................................................................... 29
   Figure 4: Cost effectiveness analysis with a 12.5% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health and Productivity Perspective) ......................... 30
5.2 Results: Arts on Prescription plus stepped up intensity IAPT versus IAPT alone ............32

i) NHS only perspective .................................................................32

Figure 6: Cost effectiveness analysis with a 31.0% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health Perspective).................................33

Table 7: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Stepped Up Intensity IAPT versus IAPT alone (Health Perspective)...34

Figure 7: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Stepped Up Intensity IAPT versus IAPT alone (Health Perspective)..35

ii) NHS and Productivity Cost Perspective .........................................35

Figure 8: Cost effectiveness analysis with a 11.5% recovery rate using Arts on Prescription and stepped up intensity IAPT versus stepped up intensity IAPT alone (Health and Productivity Perspective)..................................................................................36

Figure 9: Cost effectiveness analysis with a 14.5% recovery rate using Arts on Prescription and stepped up intensity IAPT versus stepped up intensity IAPT alone (Health and Productivity Perspective)..................................................................................37

5.3 Sensitivity analysis........................................................................38

5.3.1 Health perspective only............................................................38

Figure 10 Two way sensitivity analysis varying recovery rates for Arts on Prescription and low intensity IAPT (Health Perspective) ..................................................................................39

Figure 11 Two way sensitivity analysis varying recovery rate for Arts On Prescription and Participation Rate in Arts on Prescription versus low intensity IAPT (health perspective) .......39

Figure 12: Three way sensitivity analysis varying cost of IAPT, a course of sessions of AOP and the minimum recovery rate of Arts on Prescription. (Health Perspective with cost of IAPT set at £412)..................................................................................41

Figure 14: Three way sensitivity analysis varying cost of IAPT, a course of sessions of AOP and the minimum recovery rate of Arts on Prescription. (Health Perspective with cost of IAPT set at £518)..................................................................................42

5.3.2 Health and Productivity Perspective ............................................42

Figure 15 Two way sensitivity analysis varying recovery rates for Arts on Prescription and low intensity IAPT (Health and Productivity Perspective)..................................................................................43

Figure 16 Two way sensitivity analysis varying recovery rate for Arts On Prescription and Participation Rate in Arts on Prescription versus low intensity IAPT (health and productivity perspective ..................................................................................44

Figure 17: Three way sensitivity analysis varying cost of IAPT, a course of sessions of AOP and the minimum recovery rate of Arts on Prescription. (Health and Productivity Perspective)......45

6. Discussion.................................................................................45

References...................................................................................49
Key Points

- At a cost of more than £40,000 to deliver to 44 individuals Arts on Prescription is a significant investment. About 8% of the value of Arts on Prescription was provided in-kind contributions.

- The cost effectiveness of Arts on Prescription backed up by Individual Access to Psychological Therapies (IAPT) was compared to IAPT alone. Two forms of IAPT have been considered: low-intensity IAPT and stepped-up IAPT.

- Looking at the low-intensity IAPT model, if a 37.5% rate of recovery from depression (defined as a return to a PHQ-9 score of less than 10) can be achieved rate then Arts on Prescription is modelled to have a cost per Quality Adjusted Life Year (QALY) gained of under £20,000. It will not save money; better outcomes will be achieved. For a cohort of 44 people these additional costs would amount to more than £19,000; if recovery rates of 50% can be achieved the cost per QALY gained is £12,345 and additional costs are reduced to just over £16,000.

- If productivity losses avoided are also considered then if a recovery rate of 16% is achieved the Arts on Prescription programme will be cost saving, that is it will cost less and have better outcomes than low intensity IAPT alone.

- From a NHS perspective and compared with the stepped up intensity IAPT model, if a 31.3% rate of recovery from depression is achieved, then Arts on Prescription is modelled to have a cost per Quality Adjusted Life Year (QALY) gained of under £20,000. With a recovery rate of 70% it becomes cost saving. If productivity costs avoided are also included then it becomes cost saving at a recovery rate of 40%.

- The results of our modelling analysis must be treated with caution; a larger study is required to get an accurate estimate of recovery rates and to demonstrate whether Arts
on Prescription can achieve the minimum rates of recovery needed to be cost effective from different perspectives.

- Longer term trials are needed to determine whether effects are sustained or whether boosters are required to maintain recovery

- We also need to know whether 12 sessions are indeed needed for benefit; can the programme be delivered in a more compressed format, without losing effectiveness?

- The analysis is sensitive to changes in costs, recovery and participation rates for in the models built from an NHS perspective. The findings of the models that include productivity losses are robust even when cost, recovery and participation data are varied considerably.

- The intervention would also need to be carefully targeted to those best suited to benefit in order to be cost effective.

- There are challenges around issues of uptake and continued participation. How can this intervention be more appealing to men? A related issue concerns rate of participation in sessions; sessions were poorly attended and it is important to learn more about what actions might be taken to reduce drop outs and increase sustained participation.

- The situation is fast moving; there is increasing evidence that many psychosocial therapies can be delivered effectively at low cost using e-health/m-health applications. This also has implication for the cost effectiveness of all group based actions.

- Our analysis is conservative as we have not included any benefits due to improvements in psychological wellbeing, improvements in anxiety or social inclusions. In addition there may be other benefits that accrue to the art sector through increased participation and awareness of artistic activities. We have not factored in any benefits to physical health as a result of improved mental health.
1. Introduction

Depression and anxiety disorders can have a profound impact, not only on the individuals concerned, but also for their friends, family and society. These stark impacts alone provide a powerful argument for actions to promote better mental health and wellbeing. The costs are substantial; with costs for major depression in 30 European countries estimated to be €92 billion in 2010 while costs for all anxiety disorders accounted for a further €74 billion (Olesen et al., 2012). All-cause mortality rates are higher by a factor of 1.65 in people with depression (de Hert et al., 2011). People with depression make more frequent use of health services and stay absent from their work more often, which has significant economic ramifications; at least 60% of all suicides are in people who are depressed (Marquet et al., 2005)

Art has been shown to have a potential beneficial impact on people with mental health problems, aiding in the recovery process (Staricoff, 2004); it has also been associated with improved wellbeing. Group based creative art programmes also provide opportunities for individuals to socialise with other people, potentially improving their inclusion within their communities.

Policy makers are however inevitably faced with many competing claims as to how they should prioritise available public funds for health and other concerns. At a time when health budgets are facing severe constraints it is important to be able to assess the economic case for taking actions to promote, protect and improve mental health and wellbeing (McDaid and Knapp, 2010). This we have done in the context of looking at an intervention which provides a course of creative art classes for people with mental health problems in the vicinity of Cambridge, England.
There are a number of questions that economics can help address when looking at the case for this intervention:

- What are the costs of depression disorders to individuals, families, health and social care services and the wider economy?
- What do we know about the resources required to implement Arts on Prescription and other interventions?
- What do we know about the potential cost effectiveness of any mental health related intervention, such as Arts on Prescription compared with investment in other activities?

This paper is focused on the latter two of these questions.

1.1 Aims and objectives

The Arts on Prescription intervention is described in detail elsewhere and we do not repeat this information here. Our aims were to identify not only budgeted resources that have been allocated to Arts on Prescription, but also to highlight some of the added value that the project has generated through in-kind contributions to programme implementation. This is important in order to identify the true economic cost of the programme.

Given that this is a small scale feasibility study, we then go on to consider the level of effectiveness that Arts on Prescription would need to achieve relative to no intervention and usual care in helping in the recovery process of people with clinically significant levels of
depression, which is defined as having a PHQ-9 score of over 10. Due to resource constraints we focus solely on the economic benefits of addressing depression here.

2. Methods

We have noted that detailed information on the study design, recruitment and participants is reported elsewhere; here we focus on the economic analysis.

2.1 Estimating resource inputs and added value generated by Arts on Prescription

Our initial objective was to identify all resource use associated with the implementation of Arts on Prescription, separating out costs associated with researching the intervention from the costs of implementation. We wanted to identify all resource use associated with Arts on Prescription. This not only includes the monetised project costs but also time given free of charge to the project and/or the provision of venues or other complementary resources, as for instance turned out to be the case with several of the social events and exhibitions delivered as part of the project. It is important to estimate these in-kind costs to help assess the level of resources required to implement the intervention in other settings and thus improve the generalisability of these study findings.

A bespoke questionnaire was designed to capture information on time and resources committed to the project. This was developed through consultation and iterative discussion with Arts on Prescription staff and researchers, as well as looking at videos of previous Arts on Prescription sessions and participant feedback. When initial feedback was received further questions and information was sought for clarification, with a supplemental questionnaire
sent for completion following the final exhibition and carol service at King’s College, Cambridge which took place in December 2012.

Where resources were provided in-kind or at a subsidised rate, we have identified the commercial rates that would have been charged for the use of the services, e.g. cost of venue hire or hire of projector etc. In the case of time provided free of charge by various individuals we have estimated the opportunity cost of their time by assuming that this is equivalent to the hourly wage rate that they would have received. All costs are reported in 2012 UK pounds sterling. In cases where local cost data were not available comparable data from other UK sources were used.

2.2 Threshold analysis

Given the limited data on effectiveness in this study, due to small sample size for intervention group, very limited data on controls and a heterogenous population with much variation in both their socio-economic status and in the severity of their mental health problems at baseline, we have conducted a threshold analysis to determine what level of effectiveness would be needed in order for Arts on Prescription to be considered cost effective compared to no action or treatment as usual for people with clinical levels of depression. We have referred to National Institute for Health and Care Excellence (NICE) guidelines on the management of depression for recommended clinical pathways for people with mild and moderate depression and who do not have physical health problems (NICE, 2011, NICE, 2009).

We have compared the use of Arts on Prescription as a step that proceeds formal entry into an Individual Access to Psychological Therapies (IAPT) programme. If Arts on Prescription is not effective we assume that individuals will be referred to IAPT. We have been conservative
in comparing Arts on Prescription with low intensity IAPT, which has a much lower costs than the average of IAPT as a whole. We have also modelled the use of a stepped up intensity IAPT, recognising that this will be necessary for some individuals. We have not made a comparison with the use of high intensity IAPT programmes only as we have assumed that individuals using this high intensity programmes would not be suitable for Arts on Prescription.

We have estimated the costs of delivering Arts on Prescription from our resource utilisation questionnaire and have assumed that the target population have mild/moderate depressive disorders with a PHQ-score of 10 and above. The pilot study identified statistically significant differences in PHQ-9 scores reported over time in the intervention group. Although this sample is too small heterogenous to any conclusions on effectiveness there was a decrease in mean PHQ-9 scores of 2.52 points between Time 1 and Time 2 – Mean Scores of 12.82 and 10.29 respectively (p < 0.05). We have thus focused on depression given our limited resources.

In England the cost effectiveness of health interventions is usually expressed in terms of cost per Quality Adjusted Life Years (QALY) gained. This allows policy makers to compare the relative cost effectiveness of very different interventions to tackle different health problems and diseases using a common metric. This can help service commissioner in prioritising how best to make use of their limited budgetary resources, taking account of other important concerns such as equity, infrastructure, population characteristics and local/national policy goals. We have looked at potential incremental cost per QALY gained used published UK estimates of quality of life scores associated with mild, moderate and severe depression. These scores have originally been calculated using the SF-6D quality of life instrument and then converted using to QALYs using a specific algorithm (Mann et al., 2009).
We have used Tree Age Pro 2012 decision modelling software to map out treatment pathways and synthesise data on costs associated with the delivery of Arts on Prescription and comparator treatments. Potential impacts on health care service use have been included in the analysis, as well as impacts on productivity from paid and unpaid labour using published estimates of resource use and costs associated with living with depression in a UK context (McCrone et al., 2008). Our analysis is conservative as we have assumed that none of the population have co-morbid conditions, although in reality there is higher risk of physical health problems in people with mental health problems; therefore any reduction in depression may also reduce the future risk of some of these problems occurring (de Hert et al., 2011). The same can be said of co-morbid mental health problems such as anxiety, social phobias, alcohol and substance abuse problems.

We have assumed that a complete course of Arts on Prescription takes 12 weeks and we have modelled the potential for cost effectiveness over this time period, assuming that impacts in terms of quality of life are sustained over a one year period.

For an intervention to be considered cost effective it usually needs to have a cost per QALY gained of less than £20,000; this is a value judgement, but it is one that has historically been an important consideration in decisions made by NICE in England. Our analysis is conservative as we have chose £20,000 rather than £30,000 as a threshold given that this threshold in more commonly used for health promoting interventions, and our objective here is to see if Arts on Prescription can prevent the development of severe depression and instead promote recovery.

In our threshold analysis we look at the minimum rate of recovery from depression that is needed to generate an incremental cost per QALY compared to do nothing and/or treatment
as usual below this cut off point. We define recovery as achieving a PHQ-9 score of below 10 at follow up.

In sensitivity analysis we also model the impacts on changing the cost of implementing Arts on Prescription, as well as varying estimates of the effectiveness of IAPT. We also will consider the impact on changing the uptake rate for Arts on Prescription and IAPT. The perspective we adopt in our analysis is that of the health and social care system. As this analysis covers a time period of less than one year we do not apply any discounting to either costs or effects achieved.

3. Results of resourcing analysis

3.1 Resources invested in Arts on Prescription

As noted above, data on resources invested in Arts and Prescription were based on the completion of a bespoke questionnaire, supplemented by provision of some data on expenses incurred. Overall resources invested in the project were estimated to be £40,131. 8% of these costs, £3,386, were in-kind contributions either of people’s time or discounted or free rates on venues, equipment and some refreshments.

In total 44 people enrolled in the Arts on Prescription trial; they made 338 attendances at Arts on Prescription Sessions. Therefore the mean resource invested by the programme per participant was £912 and the resource per programme attendance was £119. If there had been 48 people in the trial as originally envisaged then the resource per participant would have been £836. If there had been 100% attendance at all sessions, assuming that there were a maximum of 48 participants in the trial then the level then the resource per participant per
session would have been £70. Only 21 of the 33 individuals in the intervention group had PHQ-9 scores of over 10.

Resource breakdown

These resources can be broken down into: setting up the programme, running all the sessions of Arts on Prescription, putting on various events and exhibitions and administration costs.

3.1.2 Set up costs

In any project or programme there may be considerable efforts that need to be invested in activities in helping to get a programme set up. It is important to get some sense of the level of resources that need to be invested in getting a programme set up. Typically most of these costs are not covered by any grants or budgets from commissioners; moreover this set of resources is often overlooked in analysis, yet they can be vital for those considering replicating a programme in a different setting. Examples of these types of cost can include establishing and improving relationships with key local stakeholders in order to obtain their buy-in to the implementation of any public health programme. Fundraising and recruiting staff can also be a time consuming activity.

30 hours of time were devoted to these activities by Arts and Minds; applying a cost per hour of £11.20 this time has a total estimated value of £336. They include 12 hours allocated to fundraising, 8 hours for stakeholder meetings and 4 hours on staff recruitment. These inputs appear modest, but it should be remembered that Arts and Minds has been in operation since 2007 and had already established links with health and community organisations and local policy stakeholders. This means that these costs are likely to be very conservative compared to those needed to replicate the project in an area where an established community arts group was not in place. Moreover, the executive director had good local knowledge of the area due
to his long term residency, again making it easier to determine the geographical areas to be covered by Arts on Prescription.

3.1.2 Recruitment of study participants

Normally in assessing the costs of an intervention, the costs of recruitment into a trial would not be included, as these are research rather than implementation costs. In this case however these costs can serve as a proxy for the challenges in encouraging people to register for the Arts on Prescription course. For this project recruitment into the study was through referral from an individual’s GP or following self-referral. Word of mouth/ phone calls to GPs on the existence of Arts on Prescription was one key awareness raising strategy; this was backed up by flyers distributed in GP offices and website listings. Other ways that awareness was raised included participation in a festival hosted by Cambridge City Council. We have not included all of this resource use in our overall estimate of costs, but it is likely that some of this type of awareness raising activity would have to continue on a longer term basis in order to sustain local community interest in Arts on Prescription. (We have considered additional costs in our sensitivity analysis to the economic model)

There were also additional costs for self-referrals. 30 of the 44 eventual study participants were self referrals. In fact 37 individuals self-referred themselves for consideration for Arts on Prescription, but only 30 were eventually included in the study. There was a marked difference in methods of recruitment between study participants from Cambridge and from Cambourne. Nearly all participants from Cambourne were referred directly by their GPs based on their current medical condition, with only three people self-referring. In contrast, in Cambridge 16 of 18 individuals in the intervention or waiting list control group in Wave 1 were self-referrals, with 11 self-referrals from Cambridge in Wave 2. There are additional costs associated with self-referral which we have included in our analysis.
Everyone who self-referred had to be assessed by a counsellor at a fee of £80 per person prior to any enrolment in Arts on Prescription. The majority of these assessments 19/37 were performed at Cambridge City Library, which was hired at a reduced rate given to charities of £10 an hour compared with £15 an hour for commercial organisations. Some of the other assessments were conducted at Arts and Minds premises and other locations, but we have applied the commercial rate for venue hire costs to all assessments to reflect the opportunity costs of venue space. The total costs of these assessments was £3,515, although only £3,330 was paid out, with an in-kind contribution to the project from venues assumed to be £185.

3.1.3 Session costs

There were 48 sessions of Arts on Prescription, 24 in Cambridge and 24 in Cambourne. An artist and a counsellor were present at each session. A maximum of 12 people could attend any one session (above 12 people we were told it would be necessary to have additional staff at each session). Each session lasted approximately 2.5 hours. Light refreshments were provided at each session. In Wave 1 of Cambourne a mobile crèche service was provided to allow women with young children to participate in the sessions. This was not repeated in Wave 2 due to the cost. We asked for information on the time and resources required for preparation and clean up after each session; we documented additional time inputs where the venue manager in Cambourne helped with these activities, but we have not included these in our analysis, but if valued conservatively at the minimum wag rate these costs would have amounted to approximately £150 over the two Waves. In addition to the counsellor and artist, a researcher was also present at 20 of the 48 sessions; while we have documented these costs we have not included them in the costs of implementation as they research related costs.

As with many health promoting interventions their relative cost effectiveness will in part depend not only on the number of people who actually enrol for the course, but the frequency
with which they actually attend course sessions. Any health promoting intervention which
does not succeed in encouraging continued participation is unlikely to be cost effective,
regardless of how effective the intervention actually is. Overall, there was an attendance rate
of 64.02% over the two waves of the project – 338 attendances out of a possible 528. 64.58% in Cambridge (186 of possible 288) and 63.33% in Cambourne (152 of possible 240). Rates of attendance in Wave 2 were higher than in Wave 1 – Cambridge 69.44% versus 59.72% and Cambourne 65.63% versus 61.81%. Cumulative total costs for the sessions are shown in Table 1. Overall the 48 sessions cost £13,693 excluding any overhead costs associated with Arts and Minds. Of these total costs, £510 was an in-kind benefit provided by the venues who charged lower than commercial rates for venue hire, thus the total costs to Arts and Minds would be £13,183. The average cost per attendance was £40.51 with an average cost per participant of £311.21.

Table 1: Direct costs of Arts on Prescription Sessions

<table>
<thead>
<tr>
<th>Resource</th>
<th>Total Cost (£s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artist</td>
<td>4,800</td>
</tr>
<tr>
<td>Counsellor</td>
<td>4,800</td>
</tr>
<tr>
<td>Venue Hire</td>
<td>1,680</td>
</tr>
<tr>
<td>Sundry Materials</td>
<td>558</td>
</tr>
<tr>
<td>Childcare</td>
<td>1,375</td>
</tr>
<tr>
<td>Sundry Refreshments</td>
<td>480</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>13,693</strong></td>
</tr>
<tr>
<td><strong>Cost per attendance</strong></td>
<td><strong>40.51</strong></td>
</tr>
<tr>
<td><strong>Cost per participant</strong></td>
<td><strong>311.21</strong></td>
</tr>
</tbody>
</table>
If a 100% attendance rate could be achieved the cost per attendance would fall to just £25.93 and if there had been 12 participants in the Cambourne Wave 2 group then the cost per participant would fall to £285.28.

It is important to note that no money was spent centrally on transport to help service users get to the venue. There was a budget for this purpose, but no money was claimed. This may not be the case if implemented elsewhere, and again the provision of free transport might also help to increase the continued participation rate. This is not just a matter of cost, the provision of transport also helps to provide a reminder and encouragement to attend sessions. On two occasions, two of our artists drove participants directly from a workshop to an evening AoP social gathering. They offered participants a ride as a personal favour. In some circumstances, implementers also need to carefully consider whether the provision of child care is merited; this is a substantial cost, but it can promote inclusion depending on the target population.

Tables 2 and 3 provide a breakdown of these session costs in Cambridge and Cambourne, indicating that costs per participants were more than £100 greater in Cambourne. This was largely due to the provision of childcare costs and the lower rate of enrolment of 20 people in Cambourne compared to 24 in Cambridge. If childcare costs are removed then the cost per attendance falls to £39.14 and cost per participant to £297.46.

**Table 2: Overall direct costs for Arts on Prescription Sessions in Cambridge**

<table>
<thead>
<tr>
<th>Resource</th>
<th>Total Cost (£s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artist</td>
<td>2,400</td>
</tr>
<tr>
<td>Counsellor</td>
<td>2,400</td>
</tr>
<tr>
<td>Venue Hire</td>
<td>1,050</td>
</tr>
<tr>
<td>Sundry Materials</td>
<td>279</td>
</tr>
</tbody>
</table>
Table 3: Direct costs for Arts on Prescription Sessions in Cambourne

<table>
<thead>
<tr>
<th>Resource</th>
<th>Total Cost (£s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artist</td>
<td>2,400</td>
</tr>
<tr>
<td>Counsellor</td>
<td>2,400</td>
</tr>
<tr>
<td>Venue Hire</td>
<td>630</td>
</tr>
<tr>
<td>Sundry Materials</td>
<td>279</td>
</tr>
<tr>
<td>Childcare</td>
<td>1,375</td>
</tr>
<tr>
<td>Sundry Refreshments</td>
<td>240</td>
</tr>
<tr>
<td><strong>Total Costs</strong></td>
<td><strong>7,324</strong></td>
</tr>
<tr>
<td><strong>Cost per attendance</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>48.18</strong></td>
</tr>
<tr>
<td><strong>Cost per participant</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>366.21</strong></td>
</tr>
</tbody>
</table>

3.1.4. Launches and other events

In addition to the costs of delivering sessions of Arts on Prescription, substantial resources were also invested in initial launch event and other social events for both the first and the second wave of these courses. This is part raises awareness of the project, providing
opportunity to potentially network with stakeholders and also a way of making the local community aware of the possibility of getting involved with Arts on Prescription. Previous analysis of Arts on Prescription in Cambridge had recommended ‘putting more resources into publicity and marketing at the beginning of the project’ in order to increase the participation rate which in the 2010 project had been slow to obtain GP referrals (Aston, 2010). The final and mid session events provide opportunities for participants to display some of their works.

In total these events are estimated to cost £6,710; although a considerable amount of these costs were provided in-kind by the host organisations for these events, as well as by some additional unpaid time inputs both from Arts and Minds staff and the artists and counsellors. Overall we conservatively estimate that £2,691 was provided as in-kind contributions. This was about 40% of total launch and social media costs.

For example, looking at specific events, the initial launch event at the Fitzwilliam museum benefited from substantial in-kind support. 54% of the costs of the launch (£687) were provided as an in-kind contribution. This included hire of the venue, provision of a guided museum tour, arts materials, screen and projector and refreshments. In addition there were some unpaid contributions to the launch from Arts and Minds Staff. Financial costs consisted of fees for four artists and counsellors and some salaried time from Arts and Minds staff. Overall the cost of this launch was £1,254. Arts and Minds was able to generate substantial additional in-kind funding by securing this prestigious venue. They benefited from previous links with the museum and indeed other venues, having involved them in previous Arts on Prescription projects in 2010; the museum also had looked at the issue of Arts and Health as part of the Cambridge University Festival of Ideas in 2008. Table 4 provides an estimate of financial and in-kind costs for all the events held as part of the project.

Table 4: Resources invested in Arts and Prescription events
### Event Costs

<table>
<thead>
<tr>
<th>Event</th>
<th>Paid costs</th>
<th>In-kind costs</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Launch Event Wave 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitzwilliam Museum</td>
<td>567</td>
<td>687</td>
<td>1254</td>
</tr>
<tr>
<td>Halfway event Wave 1</td>
<td>555</td>
<td>112</td>
<td>667</td>
</tr>
<tr>
<td>Michael House Exhibition Wave 1</td>
<td>785</td>
<td>212</td>
<td>997</td>
</tr>
<tr>
<td><strong>Launch Event Wave 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Halfway Event Wave 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Closing Event Pitt Building and Concert</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kings College</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Cost of Events</strong></td>
<td>4019</td>
<td>2691</td>
<td>6709</td>
</tr>
</tbody>
</table>

3.1.5 Administration costs

In addition to costs associated with sessions of Arts on Prescriptions and the various events, administration costs including staff costs and rent, heat and lighting for premises for the project came to a further £15,300.
4. Modelling the cost effectiveness of Arts on Prescriptions

In addition to looking at resources invested in Arts on Prescription, we have also undertaken some exploratory economic analysis to look at the potential cost effectiveness of the programme. While there is a growing literature on the economic case for investing in protecting mental and wellbeing there has been little focus on the arts (McDaid and Park, 2011, Mihalopoulos et al., 2011). In doing this we have assumed that the programme is targeted only at people with persistent subthreshold depressive symptoms or mild to moderate levels of depression. We assume this to be PHQ-9 score levels of 10 or more. Our analysis here focuses solely on the impact on a cohort of people with depression; we do not look at the impact on anxiety due to resource constraints.

We have made use of NICE guidance on the intervention and management of depression to determine the most appropriate comparator strategy to the use of Arts on Prescriptions (NICE, 2011, NICE, 2009). It recognises that the vast majority of cases of depression are managed in primary care. We are assuming that a stepped care approach to the management of depression will be in place in primary care (Box 1) and have taken the IAPT approach as our comparator programme.
**Box 1: Stepped care approach**

<table>
<thead>
<tr>
<th>Step 1 Known and suspected Presentations of depression</th>
<th>Identification, assessment, psychoeducation, active monitoring; referral for further assessment and interventions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 2 - Persistent subthreshold depressive symptoms or mild to moderate depression;</td>
<td>Individual facilitated self-help, computerised CBT, structured physical activity, antidepressants, self-help groups.</td>
</tr>
<tr>
<td>Step 3 - Persistent subthreshold depressive symptoms or mild to moderate depression that has not responded to a low-intensity intervention</td>
<td>CBT, IPT, behavioural activation, behavioural couples therapy, counselling*, short-term psychodynamic psychotherapy*, antidepressants, combined interventions, self-help groups.</td>
</tr>
</tbody>
</table>

Source: (NICE, 2011)

We have assumed in the model (Figure 1) that Arts on Prescription could be an initial alternative to low intensity psychosocial interventions for those in Step 2 of this model; we assume that if unsuccessful then the standard process of the stepped care pathway found in the Individual Access to Psychological Therapies programme would be followed. As Figure 1 indicates we have distinguished between GP referred and self referred cases to Arts on Prescription. We have also built in uptake rates in the model recognising that not everyone will participate in Arts on Prescription or in IAPT. This participation rate is based upon the rate of continued participation in the study. As some individuals will recover from depression
without intervention we have included an estimate of benefits without participation or intervention in either programme.

We consider the impact on costs to the NHS and also impacts of productivity from both paid and unpaid activities. We looked at the potential return on investment of Arts on Prescription using an approach that is similar to that we used to look at a range of interventions to promote and protect mental health in analysis for the Department of Health in England (Knapp et al., 2011).

Table 1 provides information on parameters used in the model. Data on the costs and effectiveness of Individual Access to Psychological Therapies are taken from several sources including using resource and cost data from health services commissioners in the East of England (Radhakrishnan et al., 2011) and a recent published economic analysis of IAPT (Mukuria et al., 2013). All costs are in the economic analysis are reported in 2012 prices, making use of the International Monetary Fund World Economic Outlook Database 2012.

We measure outcomes in terms of quality adjusted life years gained using values for mid, moderate and moderate severe depression obtained through algorithmic change from responses to the SF-6D quality of life instrument (Mann et al., 2009). We use the SF-6D scores rather than the more commonly used EQ-5D quality of life scores, as the latter are subject of much debate on their appropriateness for mental health (Brazier, 2010). The SF-6D scores are more conservative.

We considered the use of Arts on Prescription for individuals who might otherwise receive low intensity IAPT therapies, as well as individuals who would receive stepped up low to high intensity IAPT treatments. If recovery i.e. a PHQ-9 score of less than 10 was not achieved then individuals would be referred on to either low intensity or stepped up IAPT.
We did not look at individuals who would only receive IAPT high intensity treatment as we considered that this population group would not be suitable for prior Arts on Prescription.

Figure 1. Structure of decision model examining cost effectiveness of Arts on Prescription as an initial therapeutic option for people with moderate depression.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline value (Sensitivity Analysis Range)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SF-6D QALY mild depression</strong></td>
<td>0.728</td>
<td>(Mann et al., 2009)</td>
</tr>
<tr>
<td><strong>SF-6D QALY moderate depression</strong></td>
<td>0.614</td>
<td>(Mann et al., 2009)</td>
</tr>
<tr>
<td><strong>SF-6D QALY moderately severe depression</strong></td>
<td>0.556</td>
<td>(Mann et al., 2009)</td>
</tr>
<tr>
<td><strong>Recovery rate – low intensity IAPT intervention</strong></td>
<td>0.55</td>
<td>(Radhakrishnan et al., 2013)</td>
</tr>
<tr>
<td><strong>Recovery rate – stepped up IAPT intervention</strong></td>
<td>0.53</td>
<td>(Radhakrishnan et al., 2013)</td>
</tr>
<tr>
<td><strong>Cost of IAPT low intensity intervention per participant – Cambridge</strong></td>
<td>£475 (£421 - £518)</td>
<td>(Radhakrishnan et al., 2011)</td>
</tr>
<tr>
<td><strong>Cost of IAPT stepped up intervention per participant – Cambridge</strong></td>
<td>£1,557 (£1,367 - £1,682)</td>
<td>(Radhakrishnan et al., 2011)</td>
</tr>
<tr>
<td><strong>Participation rate in Arts on Prescription sessions</strong></td>
<td>0.64 (0.5 – 1)</td>
<td>Observational data Arts on Prescription 2012</td>
</tr>
<tr>
<td><strong>Recovery rate with no intervention</strong></td>
<td>0.18</td>
<td>(Radhakrishnan et al., 2011)</td>
</tr>
<tr>
<td><strong>Cost of AoP sessions per</strong></td>
<td>£311 (£250 - £400)</td>
<td>Observational data Arts on</td>
</tr>
<tr>
<td>Cost of Exhibitions and Events for AoP per participant</td>
<td>£152 (£91 – £200)</td>
<td>Observational data Arts on Prescription 2012</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Cost of assessment following self referral to AoP</td>
<td>£95 (£50 – £150)</td>
<td>Observational data Arts on Prescription 2012</td>
</tr>
<tr>
<td>Cost of GP consultation</td>
<td>£43</td>
<td>(Curtis, 2012)</td>
</tr>
<tr>
<td>Fixed administration costs AoP</td>
<td>£15306 (£10,000 - £20,000)</td>
<td>Arts on Prescription data 2012</td>
</tr>
<tr>
<td>Costs of poor mental health due to depression</td>
<td>£1563</td>
<td>(McCrone et al., 2008)</td>
</tr>
<tr>
<td>Costs of lost employment due to depression</td>
<td>£11,847</td>
<td>(McCrone et al., 2008)</td>
</tr>
</tbody>
</table>

## 5 Modelling results

### 5.1 Results: Arts on Prescription plus low intensity IAPT versus IAPT alone

With all our baseline data in place we looked at the minimum rate of recovery that would have to be achieved by Arts on Prescription for the intervention to generate an incremental cost per QALY ratio of less than £20,000; which is a value often used for preventative interventions. Given that we are uncertain about the effectiveness of Arts on Prescription, albeit in this pilot study a significant improvement in PHQ-9 scores was observed, as discussed earlier we have conducted a threshold analysis. This looks to see what would be the
minimum level of recovery rate – i.e. the proportion of people whose PHQ-9 scores would fall to below 10 after completion of the Arts on Prescription course. We looked at this from two perspectives: that of a health service commissioning body such as a Clinical Commissioning Group, and also from a broader perspective which took account of the impact on depression on participation in both employment and unpaid activities.

i) Health payer only perspective

Our threshold analysis indicate that in the baseline scenario a minimum recovery rate of 37.3% for GP referred Arts on Prescription plus IAPT would have to be achieved to have an incremental cost effectiveness of less than £20,000 per QALY gained compared to IAPT alone.

Figure 2: Cost effectiveness analysis with a 37.5% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health Perspective)
As Figure 2 shows, if there is a recovery rate to PHQ-9 scores of below 10 of 37.5% initially using GP referred Arts on Prescription then the total cost of this strategy for a cohort of 44 people would be £63,448. These costs would be higher than those of IAPT alone by £19,748 but there would be a gain of approximately 1 QALY for the whole cohort. This would lead to an incremental cost effectiveness ratio of £19,839 per QALY gained, a value that would normally be considered cost effective in an English context. Self referrals to Arts on Prescription would still have a cost effectiveness ratio above £20,000 compared to IAPT alone because of the higher costs of assessment and would not be considered to be cost effective. As Table 6 and Figure 3 indicate, with an increasing recovery rate the incremental cost effectiveness ratio falls quickly. With a 50% recovery rate the cost per QALY gained is £12,245.

Table 6: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Low Intensity IAPT versus IAPT alone (Health Perspective)

<table>
<thead>
<tr>
<th>Recovery Rate</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Incremental Cost</th>
<th>Incremental Effectiveness</th>
<th>ICER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>71,139</td>
<td>28.15</td>
<td>27,439</td>
<td>0.27</td>
<td>103,369</td>
</tr>
<tr>
<td>20%</td>
<td>68,342</td>
<td>28.42</td>
<td>24,642</td>
<td>0.53</td>
<td>46,416</td>
</tr>
<tr>
<td>30%</td>
<td>65,546</td>
<td>28.68</td>
<td>21,846</td>
<td>0.80</td>
<td>27,432</td>
</tr>
<tr>
<td>40%</td>
<td>62,749</td>
<td>28.95</td>
<td>19,049</td>
<td>1.06</td>
<td>17,940</td>
</tr>
<tr>
<td>50%</td>
<td>59,952</td>
<td>29.21</td>
<td>16,252</td>
<td>1.33</td>
<td>12,245</td>
</tr>
<tr>
<td>60%</td>
<td>57,155</td>
<td>29.48</td>
<td>13,455</td>
<td>1.59</td>
<td>8,448</td>
</tr>
<tr>
<td>70%</td>
<td>54,358</td>
<td>29.74</td>
<td>10,659</td>
<td>1.86</td>
<td>5,736</td>
</tr>
<tr>
<td>80%</td>
<td>51,562</td>
<td>30.01</td>
<td>7,862</td>
<td>2.12</td>
<td>3,702</td>
</tr>
<tr>
<td>90%</td>
<td>48,765</td>
<td>30.27</td>
<td>5,065</td>
<td>2.39</td>
<td>2,120</td>
</tr>
<tr>
<td>100%</td>
<td>45,968</td>
<td>30.54</td>
<td>2,268</td>
<td>2.65</td>
<td>854</td>
</tr>
</tbody>
</table>
ii) Health and productivity perspective

Our Threshold analysis indicate that in the baseline scenario a minimum recovery rate of 12.45% for GP referred Arts on Prescription plus IAPT would have to be achieved to have an incremental cost effectiveness of less than £20,000 per QALY gained compared to IAPT alone. It would need to have a recovery rate of at least 16% for GP referred Arts on Prescription plus IAPT to have both lower costs and better outcomes compared with IAPT alone.
As Figure 4 shows if there is a recovery rate from moderate to mild depression of 12.5% using GP referred Arts on Prescription then the total cost of this strategy for a cohort of 44 people would be £303,029. These costs would still be higher than those of IAPT alone by £6,515 but there would be a gain of 0.33 QALYs for the whole cohort. This would lead to an incremental cost effectiveness ratio of £19,634 per QALY gained, a value that would normally be considered cost effective in an English context. Self referrals to Arts on Prescription would still have a cost effectiveness ratio over £20,000 compared to IAPT alone because of the higher costs of assessment and would not be considered to be cost effective.
Figure 5 shows incremental cost effectiveness with a 16% recovery rate. At this stage GP referrals to Arts on Prescription becomes dominant over the other options. This means that it has the lowest overall cost, being £127 less than IAPT alone, with no change in the relative cost difference between self referrals and GP referrals to Arts on Prescription. If GP referrals were not available, with this level of recovery rate self-referral to Arts on Prescription would have a favourable cost effectiveness ratio of £5,088.

Figure 5: Cost effectiveness analysis with a 16.0% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health and Productivity Perspective)
5.2 Results: Arts on Prescription plus stepped up intensity IAPT versus IAPT alone

As with the comparison to low intensity IAPT with all our baseline data in place we looked at the minimum rate of recovery that would have to be achieved by Arts on Prescription for the intervention to generate an incremental cost per QALY ratio of less than £20,000. Given a lack of robust evidence on the effectiveness of Arts on Prescription we have again conducted a threshold analysis. This looks to see what would be the minimum level of recovery rate – i.e. the proportion of people whose PHQ-9 scores would fall to below 10 after completion of the Arts on Prescription course.

i) NHS only perspective

Our threshold analysis indicate that in the baseline scenario a minimum recovery rate of 30.9% for GP referred Arts on Prescription plus IAPT would have to be realised to have an incremental cost effectiveness of less than £20,000 per QALY gained compared to IAPT alone. It would need to have a recovery rate of at least 70.2% for GP referred Arts on Prescription plus IAPT to have both lower costs and better outcomes compared with IAPT alone.
Figure 6: Cost effectiveness analysis with a 31.0% recovery rate using Arts on Prescription and low intensity IAPT versus IAPT alone (Health Perspective)

<table>
<thead>
<tr>
<th>Category</th>
<th>Strategy</th>
<th>Cost</th>
<th>Incr Cost</th>
<th>Eff</th>
<th>Incr eff</th>
<th>Incr C/E (ICER)</th>
<th>C/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominant</td>
<td>referred to IAPT</td>
<td>67270.63</td>
<td>27.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominant</td>
<td>GP referred to Arts on Prescription Programme</td>
<td>84180.22</td>
<td>18889.59</td>
<td>28.61</td>
<td>0.85</td>
<td>15996.77</td>
<td>2541.36</td>
</tr>
<tr>
<td>Predominant</td>
<td>referred to IAPT</td>
<td>67270.63</td>
<td>27.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominant</td>
<td>GP referred to Arts on Prescription Programme</td>
<td>84180.22</td>
<td>18889.59</td>
<td>28.61</td>
<td>0.85</td>
<td>15996.77</td>
<td>2541.36</td>
</tr>
<tr>
<td>Predominant</td>
<td>Self referred to AoP</td>
<td>86448.22</td>
<td>22988.00</td>
<td>28.61</td>
<td>0.00</td>
<td>0.00</td>
<td>3021.53</td>
</tr>
<tr>
<td>All referencing common baseline</td>
<td>referred to IAPT</td>
<td>67270.63</td>
<td>27.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominant</td>
<td>GP referred to Arts on Prescription Programme</td>
<td>84180.22</td>
<td>18889.59</td>
<td>28.61</td>
<td>0.85</td>
<td>15996.77</td>
<td>2541.36</td>
</tr>
<tr>
<td>Predominant</td>
<td>Self referred to AoP</td>
<td>86448.22</td>
<td>22988.00</td>
<td>28.61</td>
<td>0.00</td>
<td>0.00</td>
<td>3021.53</td>
</tr>
<tr>
<td>All by Increasing effectiveness</td>
<td>referred to IAPT</td>
<td>67270.63</td>
<td>27.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predominant</td>
<td>GP referred to Arts on Prescription Programme</td>
<td>84180.22</td>
<td>18889.59</td>
<td>28.61</td>
<td>0.85</td>
<td>15996.77</td>
<td>2541.36</td>
</tr>
<tr>
<td>Predominant</td>
<td>Self referred to AoP</td>
<td>86448.22</td>
<td>22988.00</td>
<td>28.61</td>
<td>0.00</td>
<td>0.00</td>
<td>3021.53</td>
</tr>
</tbody>
</table>

As Figure 6 shows if there is a recovery rate from moderate to mild depression of 31.0% using GP referred Arts on Prescription then the total cost of this strategy for a cohort of 44 people would be £84,160. These costs would be higher than those of IAPT alone by £16,890 but there would be a gain of 0.85 QALYs for the whole cohort. This would lead to an incremental cost effectiveness ratio of £19,956 per QALY gained, a value that would normally be considered cost effective in an English context. Self referrals to Arts on Prescription would still have a cost effectiveness ratio above £20,000 compared to IAPT alone because of the higher costs of assessment and would not be considered to be cost effective. As Table 7 and Figure 7 indicate with an increasing recovery rate the incremental cost effectiveness ratio falls quickly. With a 50% recovery rate the cost per QALY gained is £6,381 and by 70% it is cost neutral.
Table 7: Impact of change in recovery rate on incremental cost effectiveness ratio of GP referred Arts on Prescription and Stepped Up Intensity IAPT versus IAPT alone (Health Perspective)

<table>
<thead>
<tr>
<th>Recovery Rate</th>
<th>Cost</th>
<th>Effectiveness</th>
<th>Incremental Cost</th>
<th>Incremental Effectiveness</th>
<th>ICER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>93,201</td>
<td>28.04</td>
<td>27,439</td>
<td>0.27</td>
<td>94,984</td>
</tr>
<tr>
<td>20%</td>
<td>88,896</td>
<td>28.31</td>
<td>24,642</td>
<td>0.55</td>
<td>39,607</td>
</tr>
<tr>
<td>30%</td>
<td>84,591</td>
<td>28.59</td>
<td>21,846</td>
<td>0.82</td>
<td>21,148</td>
</tr>
<tr>
<td>40%</td>
<td>80,285</td>
<td>28.86</td>
<td>19,049</td>
<td>1.09</td>
<td>11,918</td>
</tr>
<tr>
<td>50%</td>
<td>75,980</td>
<td>29.13</td>
<td>16,252</td>
<td>1.37</td>
<td>6,381</td>
</tr>
<tr>
<td>60%</td>
<td>71,675</td>
<td>29.40</td>
<td>13,455</td>
<td>1.64</td>
<td>2,689</td>
</tr>
<tr>
<td>70%</td>
<td>67,369</td>
<td>29.68</td>
<td>10,659</td>
<td>1.91</td>
<td>52</td>
</tr>
<tr>
<td>80%</td>
<td>67,271</td>
<td>27.77</td>
<td>7,862</td>
<td>-2.18</td>
<td>-1,926</td>
</tr>
<tr>
<td>90%</td>
<td>67,271</td>
<td>27.77</td>
<td>5,065</td>
<td>-2.46</td>
<td>-3,464</td>
</tr>
<tr>
<td>100%</td>
<td></td>
<td></td>
<td>2,268</td>
<td>-2.73</td>
<td>-4,695</td>
</tr>
</tbody>
</table>
ii) NHS and Productivity Cost Perspective

Our threshold analysis indicate that in the baseline scenario a minimum recovery rate of 11.39% for GP referred Arts on Prescription plus IAPT would have to be realised to have an incremental cost effectiveness of less than £20,000 per QALY gained compared to IAPT alone. It would need to have a recovery rate of at least 14.3% for GP referred Arts on
Prescription plus IAPT to have both lower costs and better outcomes compared with IAPT alone.

As Figure 8 shows, if there is a recovery rate from moderate to mild depression of 11.5% using GP referred Arts on Prescription then the total cost of this strategy for a cohort of 44 people would be £335,455. These costs would still be higher than those of IAPT alone by £5,987 but there would be a gain of 0.31 QALYs for the whole cohort. This would lead to an incremental cost effectiveness ratio of £19,070 per QALY gained, a value that would normally be considered cost effective in an English context. Self referrals to Arts on Prescription would still have a cost effectiveness ratio above £20,000 compared to IAPT alone because of the higher costs of assessment and would not be considered to be cost effective.

Figure 8: Cost effectiveness analysis with a 11.5% recovery rate using Arts on Prescription and stepped up intensity IAPT versus stepped up intensity IAPT alone (Health and Productivity Perspective)
Figure 9 shows incremental cost effectiveness with a 14.5% recovery rate. At this stage GP referrals to Arts on Prescription has become dominant over the other options. This means that it has the lowest overall cost, being £339 less than IAPT alone, with no change in the relative cost difference between self referrals and GP referrals to Arts on Prescription. If GP referrals were not available at this level of recover self-referral to Arts on Prescription would have a favourable cost effectiveness ratio of £4,925.

Figure 9: Cost effectiveness analysis with a 14.5% recovery rate using Arts on Prescription and stepped up intensity IAPT versus stepped up intensity IAPT alone (Health and Productivity Perspective)
5.3 Sensitivity analysis

We undertook a range of sensitivity analysis and found our results to be robust even when varying parameter variables considerably. We only report sensitivity analysis results for the low intensity intervention here, as that is the most conservative option. Our findings are even more robust for the stepped up intensity IAPT comparison group because of the much higher costs of care, making it easier for Arts on Prescription to justify its use.

5.3.1 Health perspective only

We looked at the impact of improving the rate of recovery from low intensity IAPT; as Figure 10 indicates the model is sensitive to the different rates of recovery although there are more scenarios where it is cost effective to invest in Arts on Prescription first. The reason for this is because even with a high rate of IAPT effectiveness not everyone will participate in IAPT. Certainly below a recovery rate of 30% for Arts on Prescription there are very few scenarios where it cost effective to invest in Arts on Prescription. We also looked at the impact of a reduction in the participation rate in Arts on Prescription from the baseline assumption of 64% participation rate. The model is sensitive to the participation rate and suggests that it is important to have a good rate of continued participation in the Arts on Prescription programme to maximise the potential number of people who can benefits from improvements in quality of life (Figure 11).
Figure 10 Two way sensitivity analysis varying recovery rates for Arts on Prescription and low intensity IAPT (Health Perspective)

Sensitivity Analysis on $p_{\text{improve \_AOP}}$ and $p_{\text{recovers \_IAPT}}$ (Net Benefit, WTP=20000.0)

Figure 11 Two way sensitivity analysis varying recovery rate for Arts On Prescription and Participation Rate in Arts on Prescription versus low intensity IAPT (health
In Figures 12 and 13 we conducted a three way sensitivity analysis. It again illustrates that the model is sensitive to assumptions on cost. Even if the costs of low intensity IAPT were £412 rather than £475, only in a minority of scenarios with recovery rates for AOP of less than 15% and costs of AOP sessions of more than £400 would IAPT alone remain the most cost effective option to take. These results are also robust.
Figure 12: Three way sensitivity analysis varying cost of IAPT, a course of sessions of AOP and the minimum recovery rate of Arts on Prescription. (Health Perspective with cost of IAPT set at £412.

Sensitivity Analysis on cost_AOP_sessions and p_improve_AOP (Net Benefit, WTP=20000.0)
Figure 14: Three way sensitivity analysis varying cost of IAPT, a course of sessions of AOP and the minimum recovery rate of Arts on Prescription. (Health Perspective with cost of IAPT set at £518.

5.3.2 Health and Productivity Perspective

We looked at the impact of improving the rate of recovery from low intensity IAPT; as Figure 15 indicates, in the majority of scenarios it still remains cost effective to invest in Arts on Prescription first. The reason for this is due to the fact that even with a high rate of IAPT effectiveness not everyone will participate in IAPT. Again we also looked at the impact of a reduction in the participation rate in Arts on Prescription from the baseline assumption of 64% participation rate. This increases the area in the Figure where IAPT alone is most cost
effective, but again in most scenarios it remains cost effective to invest in Arts on Prescription (Figure 16).

**Figure 15** Two way sensitivity analysis varying recovery rates for Arts on Prescription and low intensity IAPT (Health and Productivity Perspective)
Sensitivity Analysis on $p_{\text{improve}_{\text{AOP}}}$ and $p_{\text{participate}_{\text{AoP}}}$ (Net Benefit, WTP=20000.0)

In three way sensitivity analysis, as Figure 17 shows, even if the cost of low intensity IAPT were £412 rather than £475 only in a minority of scenarios with recovery rates for AOP of less than 15% and costs of AOP sessions of more than £400 would IAPT alone remain the most cost effective option to take. These results are also robust.
6. Discussion

At a cost of more than £40,000 to deliver to 44 individuals Arts on Prescription is a significant investment. About 8% of the value of Arts on Prescription was provided in-kind contributions.

Potentially our economic analysis suggests that the intervention may have scope to be cost effective and be a component of a strategy to intervene to reduce the risk of persistent moderate/severe depression. It has been compared to an established clinical pathway protocol targeted at the same population group, where data on effectiveness and cost effectiveness are now emerging.
From a health system perspective compared to low intensity IAPT alone, if a recovery rate of 37.5% can be achieved. This however will increase costs to service commissioners but better outcomes will be achieved. If the perspective is broadened so that productivity losses avoided are included in the analysis then the model becomes cost saving when a 16% recovery rate is achieved. All these figures are more favourable when Arts on Prescription is compared to stepped-up intensity interventions. The cost effectiveness of the intervention may well also improve if it is possible to scale up the intervention further.

The results of our modelling analysis must be treated with caution; we have had to look the potential cost effectiveness of Arts on Prescription given the lack of robust information on the effectiveness of the intervention. Nonetheless we have found that the level of effectiveness that it needs to have in promoting recovery appears plausible compared to rates of recovery that have been identified with low intensity IAPT which relies on psychosocial interventions.

In the empirical study 10 of the 34 intervention participants in the intervention group made a recovery from depression; if 13 individuals who did not have PHQ-9 scores above 10 at enrolment are excluded from the analysis then the recovery rate increases to almost 50%. However a larger study is required to get an accurate estimate of recovery rates and to demonstrate whether Arts on Prescription can achieve the minimum rates of recovery needed to be cost effective from different perspectives.

Another challenge that needs to be explored in empirical analysis concerns the sustainability of any positive effect gained by Arts on Prescription and how this compares to the sustainability of the effectiveness of IAPT. The empirical study was conducted over a short time period. Longer term trials are needed to determine whether effects are sustained or whether boosters are required. We also need to know whether 12 sessions are indeed needed for benefit; can the programme be delivered in a more compressed format, without losing
effectiveness? This is also something that needs to be considered in analysis, as it also has implications for the cost effectiveness of the intervention. With a larger sample it would be meaningful to compare outcomes for service users relatively to the number of sessions they attended.

Our analysis has tried to be conservative in terms of costs; we have placed a monetary value on in-kind inputs received, so that we are better measuring the full intervention costs. This is important as these resources may not always be possible to provide in-kind. Nonetheless in doing this we have not included of these costs as there are, for example, examples of additional goodwill and transportation costs from artists that we have not monetised. Nonetheless we have in sensitivity analysis varied these costs substantially; moreover it is not unreasonable to think that the fixed costs associated with the administration of the programme could be used to administer more than two courses which would reduce the overall costs of the intervention.

The intervention would also need to be carefully targeted to those best suited to benefit; we have already noted that the pilot study included people with very minor depressive problems who would not be referred for additional care. How this process of better targeted can be achieved remains to be seen. In the pilot study we have also noted that most of the participants came through a self-referral process; care needs to be taken with these assessment procedures.

There are also challenges around issues of uptake and continued participation. How can this intervention be more appealing to men? While the prevalence of depression is lower for men in the population that for women, only about a quarter of participants were men. It would also be interested to see the continued rate of participation by gender to see if this was different between men and women. A related issue concerns rate of participation in sessions; sessions
were poorly attended and it is important to learn more about what actions might be taken to reduce drop outs and increase sustained participation. We have seen in our sensitivity analysis that this can have an impact on the overall likelihood that Arts on Prescription can be cost effective.

Another important issue to consider is a reduction in the costs of psychosocial therapies through their delivery on the internet. There is a growing body of evidence suggesting that many can be delivered with the same level of effectiveness, but at much lower costs boosting their cost effectiveness (Smit et al., 2013, Warmerdam et al., 2010, Warmerdam et al., 2008, van Straten et al., 2008). This could have an impact on the cost effectiveness of interventions that rely on a face to face approach such as art groups.

Finally it should be noted that our analysis is conservative in terms of benefits as we have not included any benefits due to improvements in psychological wellbeing, improvements in anxiety or social inclusions. In addition there may be other benefits that accrue to the art sector through increased participation and awareness of artistic activities. We also have not factored in any benefits to physical health as a result of improved mental health.
References


