



# Return on Investment: Prevention in mental health

## Psychological interventions for the prevention of post-natal depression

### Background

Maternal mental health has been recognised by the World Health Organization as a major public health issue (1). Post-natal depression (PND) (the onset of depression after giving birth and up to 12 months post-delivery (2)) affects 16% of new mothers in Australia (3). PND is associated with decreased enjoyment in life, social withdrawal, insomnia, self-harm, and in some instances infant harm (4). PND also impacts infants' cognitive, behavioural and social development (5) and can have damaging effects on the mental health of partners and other children (6). As the child of a mother affected by PND grows, additional healthcare and conduct disorder costs have been estimated at \$6.2M per year (7). New mothers experiencing PND are twice as likely to suffer future depressive episodes after birth (8) which can lead to long term disability and incapacity to work. PND is associated with higher use of health services and lost productivity directly impacting government costs. In 2012, the costs of PND in Australia were estimated at \$94 million per annum (9).

For the majority of women, PND starts within the first 12 weeks after delivery. Symptoms can include feeling depressed, mood swings, insomnia, confusion, guilt, and suicidal ideation. Around 8% of mothers will continue to experience depressive symptoms after the child's first birthday (10). If left untreated, PND can develop into severe clinical depression and, in a small number of cases, lead to suicide (11). The risk factors associated with PND include a history of depression, low social support, low self-esteem and low income (12, 13). Women with PND have a 6.6% increased probability of not returning to work up to five years after birth (14) resulting in associated turnover costs to employers. For women who do return to the workplace, costs may be incurred to the employer due to lost productivity (presenteeism) or absence (absenteeism) as a result of mental illness (15). There is also a financial and emotional impact on family or friends caring for those with PND who may have to take leave from paid employment, or lose time for their own health and wellbeing to care for the women with PND (16), with family breakdown another potential consequence of untreated PND (17).

### Intervention modelled

There is a growing focus on the prevention of PND. There are a number of high quality studies investigating the ability of different interventions, mostly psychological in nature, to prevent PND. The psychological intervention chosen for the analysis was based on research indicating that interpersonal psychotherapy for women who are at an increased risk of PND is an effective intervention (18, 19). Interpersonal psychotherapy emphasises the role of relationships and communication with others in the development and maintenance of psychological distress (19). Interpersonal psychotherapy makes a practical link between the patient's mood and life changing events (in this case, being pregnant and the prospect of parenthood) (20). The intervention consists of a brief screening contact undertaken early in the second trimester of pregnancy during a routine pregnancy care visit with either a midwife or obstetrician, followed by an average of five individual or group based therapy sessions lasting an hour for women identified as being at risk of developing PND. Therapy is delivered during the antenatal period (during pregnancy) at 15 to 32 weeks gestation, either by psychologists or counsellors. The intervention is analysed for women who delivered a baby in 2016 in Australia and meet the criteria for increased risk of PND.

The primary outcome of this evaluation is the return on investment (ROI) ratio. The ratio includes the cost of the intervention in relation to any cost savings (both healthcare cost savings and the monetary value of avoiding absences from work, staff not functioning fully at work and staff turnover). Cost effective interventions using this decision criterion have a ROI greater than \$1, this means that the cost savings are greater

than the costs of the intervention e.g. a ROI of \$1.50 means that for every \$1 invested, \$1.50 is gained.

### Assumptions

The evidence for the effectiveness of this intervention is based on a recent review of interpersonal psychotherapy for the prevention of PND which included eight trials with 2,552 women (19). The pooled results of the six group and two individual therapy trials reduced the risk of PND by 27%. These interventions focused on women who were pregnant and already exhibiting at least some low level symptoms of PND. The follow up period for the studies varied from 6 to 52 weeks after delivery.

The longer term effects of these interventions on PND are not well investigated. Therefore, the outcomes for women meeting the criteria for the intervention are reported using two time periods, one year and five years. The cost of the intervention includes screening and delivery of the therapy sessions. An additional training cost for midwives to screen participants has been included in the overall cost. The assumptions used to model the base case scenario are outlined below.

**Screening.** This takes place during pregnancy care visits either by a midwife or obstetrician. The cost of screening was assumed to be \$40. This cost is an average weighted cost of outpatient antenatal and Medicare Benefits Schedule (MBS) antenatal attendance based on the proportion of publicly and privately paid obstetric visits (21).

**Delivery of therapy sessions.** The cost of therapy delivered by a psychologist was based on a weighted average of MBS items for psychologist costs for individual and group therapy services. This included four therapy contacts and one booster session at a cost of \$190 per session to a total of \$950.

**Training.** Midwives would be trained to administer the PND screening instrument. Training was costed at one hour of their time.

**Cost savings.** We used two estimates of healthcare cost savings to calculate the return on investment. One estimate was based on a study that reports yearly costs of depression and includes antidepressant medication and mental health related service use of \$191.80 (15). The second estimate included hospital costs and community services, totalling \$1,475 per woman with PND (22).

Productivity cost savings include lost productive time and absence costs due to illness (23), taking into account average weekly wages of women, their employment status and the length of maternity leave taken after childbirth (24, 25). An employee replacement cost (when women do not return to work) of \$7,183 was included (15). Productivity costs savings including replacement costs amounted to \$8,270 in year one and \$9,710 in subsequent years due to more women returning to work one year after the birth.

### Alternative scenarios

Several scenarios were tested as alternatives to the base case intervention. The effectiveness of the intervention for each scenario was assumed to be the same as per the base case. The scenarios considered were:

#### Scenario 1) Intervention delivered by maternal child health nurses after the birth.

This scenario assumes that maternal child health nurses deliver the intervention in women’s homes based on a UK study (26) with an average of five visits by the nurse. Screening by the nurse would occur during the post-natal period (six weeks after birth) and would take 30 minutes. For delivery of therapy, nurses’ costs were based on 1.5 hours per session, including 30 minutes travelling time. Six clinical supervision

sessions per year by a psychologist are provided to ensure the nurses are competent in delivering the therapy as intended. These were costed based on two hour sessions in groups of five nurses.

#### Scenario 2) Psychologist run individual only sessions conducted outside the home.

#### Scenario 3) Psychologist run group only sessions conducted outside the home.

#### Scenario 4) Removing screening costs from the base case costs.

In some states, screening costs would not be incurred as it is part of routine practice by maternal and child health nurses. For example, in Victoria screening is included in the Practice Resource Manual for Victorian Maternal and Child Health Nurses (27).

#### Scenario 5) Determining the cost of individual psychologist sessions at which the ROI remains greater than 1.

## Results

### Cost effectiveness findings

For the base scenario, interpersonal psychotherapy to prevent PND has a positive ROI in both periods, with a ROI of 1.27 in the one year model and 1.63 in the five year model (Table 1). This means that for every \$1 paid to run the intervention there will be a saving of \$1.27 in the first year after the intervention, and \$1.63 after five years. The intervention costs a total of \$14.6M. Costs per person, that is costs per women screened, were \$94. The ROI would be even greater using less conservative healthcare cost savings.

Interpersonal psychotherapy for PND is estimated to prevent **2,673 cases of PND over five years**, with the majority prevented in year one. The larger returns (savings) in the fifth year reflect the increase in productivity cost savings due to reduced absenteeism and job turnover over five years.

**Table 1. Summary of results for interpersonal therapy to prevent PND**

	Based on conservative healthcare savings		Based on higher estimates of healthcare savings	
	1 year	5 years	1 year	5 years
<b>Intervention costs</b>	\$14.59M	*	*	*
Government	\$11.85M	*	*	*
Individual	\$2.74M	*	*	*
<b>Cost saving (total)</b>	\$3.53M	\$8.74M	\$6.25M	\$12.11M
Productivity cost savings	\$17.71M	\$22.82M	*	*
Healthcare cost savings	\$0.41M	\$0.5M	\$3.13M	\$3.88M
<b>ROI</b>	1.27	1.63	1.46	1.87
Cases of PND prevented	2,138	2,673	*	*
Depression free days	512,742	557,996	*	*
<b>Savings per case of PND prevented</b>	\$1,650	\$3,260	\$2,940	\$4,530

Notes: ROI: return on investment per \$1 invested, \* no change to costs or outcomes from the base case (conservative healthcare savings)

## Results from alternative scenarios

Summary results of the different scenarios analysed are presented in Table 2. Most scenarios were found to have a ROI greater than 1, with the exception of individual psychologist sessions. For this scenario to have a ROI greater than 1, the cost of a psychologist session would need to be less than \$80 – much less than the actual cost. Removing the screening costs from the base case halves the intervention costs and doubles the ROI.

**Table 2. Summary results of sensitivity analyses for interpersonal therapy to prevent PND**

Scenario	Cost per person*	Intervention costs	ROI - 1 year (low HC)	ROI - 5 year (low HC)	ROI - 1 year (high HC)	ROI - 5 year (high HC)
Base case (see Table 1)	\$94	\$14.59M	1.27	1.63	1.46	1.97
1. Maternal child health nurse visits	\$122	\$18.96M	0.96	1.23	1.10	1.41
2. Psychologist individual sessions	\$178	\$27.63M	0.66	0.85	0.76	0.98
3. Psychologist group sessions	\$79	\$12.26M	1.47	1.90	1.69	2.17
4. Removing screening costs from base case	\$47	\$7.32M	2.74	3.53	3.15	4.04

Notes: 'low HC' indicates conservative healthcare cost savings, 'high HC' indicates less conservative estimates. \*Average cost per woman screened.

## Implementation considerations

While evidence on cost effectiveness is the focus of this project, there are other criteria apart from cost effectiveness that can influence whether and to what degree interventions are likely to be rolled out in routine practice. These criteria are not captured in the technical cost effectiveness results but are very important from a decision making context. Some of these considerations are summarised in the Table below. The colour coding of each criterion is an attempt to visually summarise whether these secondary considerations impact on the results in a positive or negative way (red = negative, amber = uncertain, green = positive). A code of 'green' implies that the secondary consideration strengthens the case for investing in the intervention. A code of 'amber' means that the secondary consideration reduces certainty in the case for investing and a code of 'red' means that these considerations do not support investment in the intervention.

Implementation considerations		Overall Rating
Potential secondary effects	The results are conservative, as they do not capture all the potential consequences, such as improvements in anxiety in the mother. The physical, mental and cognitive health of the infant and subsequent potential impacts as they age (such as emergency department presentations, depression and conduct disorder) has been estimated at \$6.2M per year (7). The potential benefits to carers has also not been included. Any impacts on carers, in terms of less caring required, is likely to have a further positive impact given the estimated costs for informal carers in Australia is substantial (28).	Positive
Equity	This has the potential to reduce inequities due to the risk factors for PND being associated with more disadvantaged groups, such as those who are unemployed and have housing and financial difficulties. In Australia PND was found to be less common among women with higher levels of education and women who were working (29). Provision of therapy by maternal health nurses could further improve equity for disadvantaged groups, who would otherwise not have access to preventative psychological services.	Positive
Strength of evidence	The effectiveness is based on a meta-analysis of five good quality randomised control trials. However, the studies had short follow up durations (6 to 52 weeks post-birth) therefore the ongoing effectiveness of such interventions beyond 12 months is unknown.	Uncertain
Acceptability	The dropout rate from the studies averaged 25% indicating that the majority of women (75%) are willing to use the intervention.	Positive
Feasibility	Screening of women is feasible during pregnancy or at post-birth check-ups with very little additional resources given the screening is quick to administer with minimal training required. Group therapy during pregnancy could be included in routine childbirth education classes. However, there may be shortages in psychologists available to deliver the intervention in this format.	Uncertain
Sustainability	Screening for PND would need to become a routine aspect of pregnancy checks and maternal health checks in all states and territories. The MBS is currently targeted towards treatment of mental illness rather than prevention. In order for this intervention to be routinely available, governments would need to ensure that public provision of psychological services extends to evidence based and cost effective preventive interventions.	Uncertain

## Recommendations

Interpersonal therapy for PND is good value for money, with positive ROI in the short and medium term. Group therapy delivered by psychologists had the most favourable ROI. However, whilst the ROI for delivery of the intervention by maternal child health nurses is lower, it may be more beneficial because nurses can better target more disadvantaged groups and availability of the workforce is likely to be greater than for registered psychologists. Further, given the existing infrastructure, it would not be difficult to roll out a program such as the one described here. It is recommended that interpersonal psychotherapy be integrated with current physical health checks pre and post birth, and that greater promotion of screening in the context of prevention, not just treatment of PND, is conducted. This builds on previous treatment focussed campaigns such as the National Perinatal Depression Initiative.

## Take home messages

Investing in interpersonal therapy for prevention of PND is not only worthwhile for the individual but also appears to have economic benefits in the long term due to the improvement in productivity from reduced absenteeism and job turnover. Interpersonal therapy is an effective and cost effective preventative therapy for women at risk of PND that could either be delivered in a group or individual setting by psychologists or by maternal child health nurses during home visits. Funding to sustain the intervention and upskilling of midwives or child and maternal health nurses in the techniques of interpersonal psychotherapy would need to be sourced for successful implementation.

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