1. Background

The Royal Australian and New Zealand College of Psychiatrists (RANZCP, the College) is the principal organisation representing the medical specialty of psychiatry in Australia and New Zealand.

During 2010 the RANZCP Faculty of Child and Adolescent Psychiatrists (FCAP) undertook a project to promote and develop cohesive evidence-based prevention and early intervention strategies with the aim of decreasing the prevalence and harmful impact of mental illness in infants, children and adolescents. In October 2010 a report was published entitled *Prevention and early intervention of mental illness in infants, children and adolescents: Planning strategies for Australia and New Zealand*, along with two accompanying position statements. These documents are intended to provide information on prevention and early intervention for mental illness in this age group, and to allow development and implementation of effective strategies at local level, especially in lobbying and advocating for service delivery improvements. The report can be accessed here.

To reinforce the key messages of the report, the FCAP has developed this further paper that comments broadly on the cost effectiveness of prevention and early intervention. The findings of this paper highlight the cost effectiveness of investing in prevention and early intervention strategies for infants, children and youth. Early intervention in Psychosis in young people is outside of the scope of this paper as it has been addressed recently in a number of publications [1, 2].

2. Introduction

In a climate where efficiency in health-care service delivery is a key priority, the economic evaluation of clinically effective prevention and early intervention strategies is increasingly important. Nevertheless the current body of research on costs, cost-effectiveness, and cost-benefits of preventative mental, health interventions in children and adolescents is limited. However, where evaluation of interventions have included economic analysis, most demonstrate that intervention benefits exceed costs, often by substantial amounts [3]. Certainly there is evidence that some prevention and early intervention strategies can prevent cascading mental health problems, and associated costs, in later life, and this paper examines these in more detail.

In addition this paper identifies the role that psychiatrists can play both in promoting the implementation of cost-effective service delivery in Australia and New Zealand and in establishing a scientific basis for demonstrating the effectiveness of efficient approaches. There are 3 key developmental areas covered by this paper: early childhood; school age; and adolescence.

3. What are the costs of mental health problems during childhood and adolescence?

The economic, social, and personal costs of mental, emotional and behavioural disorders among young people are now extraordinarily high [1, 4]. Mental health problems experienced by infants and families during the perinatal and early childhood period are of concern as they can have serious, long-lasting, and potentially intergenerational consequences. For example untreated maternal perinatal depression or other psychiatric disorder is associated with higher rates of emotional and behavioural disturbance in offspring and higher risk of school failure, which is itself associated with poorer physical and mental health outcomes in adolescence and adulthood. Juvenile delinquency, with all its societal costs, is predicated upon the early development of conduct disorder, association with a deviant peer group and lack of educational attainment.

Young people with mental illness or disorders may diminish the productivity of others closely involved in their lives, particularly family members. Also, to the extent that mental disorders in childhood impair fulfilment of potential in adulthood, the economic costs of mental illness or disorders in childhood may be lifelong. Economic costs include lost productivity, health care costs, reduced earning capacity and tax revenue and increased rates of welfare payments.

The diagram below highlights the multi-faceted costs associated with mental disorders in infants, children and adolescents.
4. Are prevention and early intervention strategies cost effective?

Studies have shown that even best practice treatment applied to 100% of the population with mental illness, would still only avert 40% of the burden of disease [5]. This underscores the importance of prevention and early intervention. Kessler Berglund et al [6] report that 50% of all serious mental health and substance use disorders commence by age 14. Thus, prevention and early intervention orientated strategies targeted to young people have the potential to generate greater personal health, social and economic benefits than interventions at any other time of the lifespan. The economy of early investment is highlighted in the graphs below by Nobel prize winning economist and psychologist James Heckman.

Early and preventative interventions show promise in reducing the burden of mental illness, particularly in young people [7]. While there have been comparatively few studies of the cost effectiveness of prevention of mental illness in children and youth in Australia and fewer still for early intervention, much of the strongest evidence to date is for interventions that improve protective factors or reduce risk factors demonstrably related to mental disorders. Overall, considering the available costs data, there seems to be a good return on investment, particularly for high-risk families. Further research is needed, particularly to determine the cost-effectiveness of universal interventions. Of course the implementation of strategies shown to be successful in the prevention or early remission of mental illness in young people is arguably warranted even in the absence of specific cost.
effectiveness data. Further information about how cost effectiveness is measured in mental health can be found in appendix A.

The following provides an overview of costs, cost-effectiveness, and cost-benefits of preventive and early intervention initiatives for mental, emotional, and behavioural problems within a developmental framework. This highlights where the maximum cost benefit can be achieved, and also explores areas for further research.

Perinatal and early childhood interventions

One key to helping families prevent negative mental health outcomes for their children is to work with them from the early stages of parenthood and childcare.

Whilst all women should have access to advice on the effects of nutrition, smoking and antenatal care on birth outcomes [9] there is evidence for the cost effectiveness of further targeted interventions for at risk mothers during pregnancy and the first two years of the child’s life. For example Aos and Lieb et al (2004) [10] reported on intensive home visiting programs conducted by nurses able to support new parents and guide their parenting skills. In their meta-analysis the authors found that such programs demonstrated significant cost-effectiveness, with the highest cost-benefit ratios of around 3.

Other programs targeting at risk groups in infancy and early childhood, have achieved results known to predict better health outcomes in children but have not been subject to cost-benefit analysis. The Strong Women, Strong Babies, Strong Culture initiative (SWSBSC) exemplifies such a program for Indigenous women in the Northern Territory. The program commenced in 1993 and incorporated both Aboriginal and Western medical practice, resulting in increased birth weights and other outcomes due to better health care for the mothers [8]. Similarly, since untreated post-natal depression in mothers predicts higher rates of emotional and behavioural disturbance in their children, Australia’s beyondblue have a national perinatal mental health action plan that screens pregnant women and follows up on those at risk of or experiencing post natal depression [9]. A version of the program ran between 2001 and 2005 with a follow up from 2008 to 2010, but was not evaluated for cost effectiveness. The current program runs until 2013.

Childhood mental health problems affect one in every seven children; if not treated early as many as half of these children will continue to manifest emotional and behavioural symptoms as they grow older, affecting both their school performance and family well-being. Cost beneficial outcomes can be gained by identifying proven preventative behavioural and emotional interventions, directed at the wider population, [10]. Heckman [11] notes the cost savings to be made by investing in the development of children’s early social skills, leading to enhancement of their later working capacity and economic contribution to their community. In Australia, research by Zubrick et al [12] illustrated the cost effectiveness of early behavioural intervention programs for children aged 3 - 4 years. The Positive Parenting Program (Triple P) involves 4 two hour weekly group parenting sessions with follow up phone support for parents. This study found Triple P had a beneficial impact on child behaviour as well as parental mental health, marital adjustment and child rearing conflict levels. The Program has also been modified for targeted intervention with population groups at higher risk of childhood emotional and behavioural disorder.

School age

Some conditions become more prevalent during the school years, including Oppositional Defiant Disorder (ODD), Attention Deficit Hyper-activity Disorder (ADHD), and Conduct Disorder (CD). Although comprehensive interventions in early childhood have received more attention, interventions for older (school-age) children and adolescents also appear to be cost-effective. Aos, Lieb et al. [13] found that five of the six youth development programs reviewed, whose aims include improving parent–child relationships and reducing problem behaviours, such as substance use and violence, are cost-beneficial, with benefit-cost ratios ranging from 3 to 28.

Children from chronically disturbed family environments have an increased risk for the development of Conduct Disorder (CD). CD which manifests prior to adolescence is more likely to progress to anti social personality disorder (ASPD) [14] in later adolescence and adulthood. As both CD and ASPD feature violent or aggressive behaviour, with criminal propensity [15], prevention of significant behavioural problems before they reach the threshold for a diagnosis could yield sizeable savings [12].

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1 A cost-benefit ratio is the dollar benefit gained per dollar benefit of cost – for example a program that costs $7000 to implement but delivers $21,000 of benefits would deliver a cost-benefit ratio of 3. More information about cost-benefit analysis is addressed in section 3 of this report.
A child’s disruptive or violent behaviour, can strain the relationship between parent and child and this inability to cope with the child’s behaviour, especially when combined with other psychosocial stressors (e.g. poverty, domestic violence, parental mental illness or substance abuse) may result the child being placed in out of home care. The unsettling of the parenting process is a key factor in children developing anti social behaviour (ASB) often combined with other forms of mental ill-health. [16]. A recent Australian study of children in long term foster care found increased rates of depression, suicidal ideation, and behaviour disturbance, including inattention and aggression [17]. The number of children in state care has increased since 2000 with 34,069 Australian children living in out-of-home care as of June 2009. A total of 12,883 children aged from birth to 17 years were taken into care in the 2008/2009 financial year, costing $1.4 billion [18]. Given the increasing cost factors involved and the detrimental effect it has on children, it would be pertinent to intervene early and reduce the possibility of a child being removed from their home.

Apart from parenting programs previously described (Triple P, Incredible Years, Parent-Child Interaction Therapy) there is evidence for the cost-effectiveness of school-based universal and targeted programs, in preventing or ameliorating disruptive behaviours early in the primary school years. The Good Behaviour game is one example of early intervention for behaviour change; a classroom management strategy aims to decrease aggressive/disruptive behaviour and prevent later criminality. This is a universal program that can be applied to general populations of early school children and indicates a cost-benefit ratio of 25 [19]. Targeted interventions for children from at risk families who display significant disturbance of behaviour – such as the Fast Track program, may require more intensive school and family based interventions over longer periods of time or need to factor into their cost analysis the need for repeat (pulse) intervention at key points in the child and family’s development.

**Adolescence**

Disruptive behaviour disorders are the most prevalent mental health problems for children and teenagers [20]. Because of their disturbed behaviour, inability to concentrate and defiant attitude, such children are more likely to fail at school, itself a risk factor for unemployment and poor mental health in adulthood. It is estimated that each youth with conduct disorder costs the public more than $70,000 over a seven-year period, with costs incurred by the juvenile justice, education, and general health care systems in addition to the mental health system. Scott and colleagues reported in the British Medical Journal in 2001 [23] that children diagnosed with CD by the age of 10 had by age 28 cost the public purse 10 times more than those with no significant behavioural problems.

In addition there is strong evidence that children with CD have high rates of co-morbid depression, anxiety, and substance dependency [21]. Major depression is an important and costly problem among adolescents, yet evidence to support the provision of cost-effective treatments is lacking [22]. Smith and Smith [23] found adults who had suffered from childhood psychiatric disorders, including substance abuse or depression, had 10 or 20 times greater chance of reduced employment, educational and relationship outcomes. Lynch and Hornbrook et al [24] found that the cost per individual intervention was $1632, with a total $610 for direct and indirect costs, meaning a $10 per depression-free day in base-case analysis. This would equate to $9275 over the life time of the individual per quality-adjusted life-year.

With the known connection between drugs and crime and a high rate of substance use occurring during incarceration, a case is made for limiting or curtailing adolescent substance abuse. By investing in early intervention drug treatment programs for youth, a reduction in later criminality could be made [25].

D.A.R.E is well-known drug use preventative program for school children used extensively in the 1990’s that attempts to moralise and inform students of the dangers of drug use. DARE has proven to be ineffectual, although the re-modelled version has not yet been evaluated [26]. Key to DARE’s failure is the universal (non-targeted) nature of the program. An example of a targeted program comes from Canada; Project SUCCESS works with 14 to 18 at-risk adolescents in an alternative education setting [26]. The program brings trained specialists into the classroom and uses a variety of prevention and early intervention services, aiming to reduce substance abuse. Research suggests that early drug experimentation, along with risk factors including positive beliefs regarding drug use and deviant peers, increases the likelihood of later substance related criminality [26].

CLIMATE Schools (CS) is an Australian program that has proven effective in educating teenagers on the dangers of alcohol, methamphetamine, cannabis and psycho-stimulants [27]. The program uses harm minimisation techniques, with current statistics that show most adolescents (their peers) do not use drugs, thus decreasing the peer pressure element in drug experimentation. The use of a computer based lesson and class activities actively engage the students in learning. CS has been empirically proven to be effective in reducing drug use in youth; financial analysis is not current available.
5. Conclusion

With child and youth incidence of mental illness and disorder increasing, plus the financial and social cost to society that result, the importance of prevention and early intervention would seem obvious [20]. Poor parenting practices, in tandem with mental health problems, can contribute to the child’s likelihood of poor social and educational outcomes. By working with at-risk children and their parents early, their mental health needs can be identified and the family supported to more positive outcomes.

Behaviour disorders such as Conduct Disorder and ADHD have been linked to later criminal tendency, especially early on-set conditions [16]. Juvenile crime brings high social and economic costs as recidivist offenders become entrenched in the criminal justice system into adulthood. The correlation between criminality and addiction is well known; harm minimisation educational programs and targeted intervention in high school are vital to deterring youth experimentation and addiction.

It is imperative to focus on the cost effectiveness of strategies and programs that work with families and children affected by mental illness and disorders. It is important to include cost benefit analysis; however, historically the cost effectiveness of programs has not been evaluated in research.

6. Recommendations

1. Programs that demonstrate best evidence of efficacy and cost-effectiveness should be rolled out as a matter of priority. Based on available evidence this includes:
   - Universal and targeted screening programs for infants and families to include emphasis on emotional and behavioural development, parental mental health, and risk of stress (home visitation and parenting programs)
   - Programs relating to prevention and early intervention of aggressive behaviour and conduct disorder (school age children)
   - Targeted programs for at-risk children particularly children in out-of-home care environments and children living in dysfunctional family environments
   - Drug use prevention programs (adolescence)

2. Further evidence of cost-effectiveness for prevention and early intervention programs with demonstrated efficacy should be determined as a matter of priority to give further credence of the need to invest, to determine how best to invest, in these areas. Priority areas for research include:
   - Depression and anxiety
   - Programs relating to children of parents with mental illness
   - Programs relating to Indigenous children and families, including evaluation of culturally sensitive adaptations of mainstream programs and Indigenous specific programs

3. Understanding the causal links between socio-economic status, parenting processes, familial factors, including abuse and addiction, and mental health should be improved. These links may reveal some of the most important mechanisms by which to prevent mental disorders in cost-effective ways

4. Future trials of prevention and early intervention programs, particularly where there is demonstrated effectiveness of efficacy and the pilot or program is being ‘scaled up’, should build in formal economic evaluation procedures from the outset

5. Funders of intervention research should provide supplemental funding for projects that include economic analyses, and for projects with protocols that incorporate recommended outcome measures.

6. Long-term follow-up data should be collected whenever possible and special attention should be given to addressing the fact that costs from an intervention in one sector may be evident in multiple sectors

7. Psychiatrists and other health professionals should familiarise themselves as to the types, function, activities and issues surrounding economic evaluation to allow research, literature, and best practice to be developed
Appendix A – How is cost effectiveness measured in mental health?

Decisions about how to invest limited public resources must consider the cost of delivering the service and demonstrate that the benefits that can be expected from an intervention - both those that can be readily valued in dollars (e.g., increased productivity, decreased treatment costs) and those that cannot (e.g., alleviation of pain and suffering of both individuals and their families) [3]. An intervention is deemed cost-effective if it produces the desired outcome at a reasonable price.

In cost-benefit analysis (CBA) all outcomes are valued in monetary units, permitting a direct comparison of the benefits produced by the intervention with its costs. Analysts typically employ cost effectiveness analysis (CEA) when they think that the desired outcome does not lend itself readily to monetization (e.g. alleviation of suffering). However, whilst CEA is the most widely used of the economic evaluation methods [28], most of the studies in the prevention field have employed CBA. In practice, CEA and CBA results are not strictly comparable. Because most of the studies yield strong conclusions (positive in most cases), it is unlikely that the basic findings would be sensitive to the choice of method. As this literature evolves examining the sensitivity of conclusions will be important.

Data for costs and benefits should ideally be collected as part of routine performance reporting for prevention and early intervention programs. The aim of the evaluation would not just be to determine the cost effectiveness of the program at hand; but also how well it ranks compared to existing treatment options. There is a need for more evaluation in this area in order to identify cost effective methods for preventing and intervening early in mental illness for infants, children and adolescents.

It is important to acknowledge the basic purpose and limitations of economic analysis in the context of prevention and prevention research. Limitations include:

- Difficulty in capturing all psychological and emotional costs associated with mental disorder
- Cost-effectiveness often dependent on the perspective of the decision maker (e.g. whole of society vs funding organisation)
- Longer term outcomes of participants in an intervention are often not observed and instead must be projected on the basis of other data that do not necessarily represent causal estimates [29].
- Lack of statistical power [30, 31]; many studies have modest sample sizes
- Outcomes measured (e.g. whether interventions that appear to be cost-effective, but do not measure disorders as an outcome, actually prevent the incidence of these disorders)
- Interventions conducted in research settings (efficacy studies) may get different results if conducted in real-world settings (effectiveness studies); costs and benefits may differ between settings
- Preventive interventions are likely to have differential impact on individuals in different contexts, particularly when dealing with community groups.
- Challenges in measuring the cost of the time of children and other people involved in interventions [13].
- The suffering of children and their families are likely to be costly but extremely difficult to quantify and assign a monetary value, restricting evaluation to accurately evaluate the relative merits of preventive interventions, which may lead to a substantial underestimation of the benefits of successful interventions.