

ECONOMIC EVALUATION OF A COMMUNITY BASED EARLY INTERVENTION PROGRAM IMPLEMENTED IN A DISADVANTAGED URBAN AREA OF QUEENSLAND

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ECONOMIC EVALUATION OF A COMMUNITY BASED EARLY INTERVENTION PROGRAM IMPLEMENTED IN A DISADVANTAGED URBAN AREA OF QUEENSLAND

Evidence exists that children raised in socio-economically disadvantaged regions may have an increased probability of negative outcomes such as school failure, delinquency, drug abuse, juvenile crime, youth unemployment and teenage pregnancies. The *Pathways to Prevention* project represents an attempt to intervene and reduce these probabilities in a target community – namely the Inala School Community in Brisbane. It does so through implementation of two separate components: a child-focussed school-based ‘Preschool Intervention Program (PIP)’ and a family-focussed community-based ‘Family Independence Program (FIP)’. The data collection regime ensures appropriate evaluation of the effectiveness of the program in terms of its impact on behaviour difficulties, language skills and school readiness. It is important to document the costs of developing, implementing and evaluating the program in order to permit an economic evaluation of its effectiveness. This paper reports the preliminary results from this economic evaluation. In particular, it estimates the costs of the *Pathways to Prevention* project and compares these with the costs associated with a number of remedial intervention alternatives currently employed by Education Queensland to deal with ‘problem’ children – that is school-aged children with either significant behavioural problems or poor literacy skills. We do not argue that developmental (or preventative) interventions should be favoured over remedial interventions. Rather, we propose that investing more in the front end (preventative) may help alleviate the pressure placed on the already overburdened remedial sector, resulting in potential cost-savings.

1. INTRODUCTION

Evidence exists that children raised in socio-economically disadvantaged regions have an increased probability of negative outcomes such as school failure, delinquency, drug abuse, juvenile crime, youth unemployment and teenage pregnancies (Farrington, 1991, 2003; Karoly, Greenwood, Everingham, Hoube, Kilburn & Rydell, 1998; Keating and Hertzman, 1999). There is a growing consensus within policy and research circles that well designed intervention programs, especially those aimed at developmental rather than remedial intervention, can alter the pathways available to these children and their families and in so doing reduce the likelihood of participants achieving negative outcomes (Developmental Crime Prevention Consortium, 1999; Farrington and Welsh, 2003; Halpern, 2000; Homel et al., 2003 and Homel, 2005). Previous research also suggests that not only can such intervention programs benefit the child and their family; they also benefit all socio-economic groups in society and produce net savings for government (Aos et al., 2004; Greenwood et al., 2001; Karoly et al. 1998; Koshelnyk, 2000, McCain et al., 1999 and Meisels and Shonkoff, 2000). These savings include, lower criminal justice system costs, reduced costs borne by victims of crime, reduced welfare system outlays, a reduction in children needing access to special education services, and increased tax revenues resulting from increased workforce participation and earnings (Karoly et al., 1998 and Manning, 2004). Little analysis has been conducted in the Australian context of the costs of developmental versus remedial interventions aimed at opening up alternative pathways for 'at risk' children. This paper fills this gap by evaluating and comparing the costs of a developmental intervention labelled the *Pathways to Prevention* project implemented in the Inala school community of Brisbane, with the costs of a number of remedial interventions currently employed by Education Queensland.

In Section 2, literature pointing to the potential cost savings derived from developmental intervention is reviewed. In Section 3, the *Pathways to Prevention* project is described and some of its achievements in terms of its impact on behaviour difficulties, language skills and school readiness are identified. In Section 4 the methodology used to identify the costs associated with the *Pathways to Prevention* project is outlined and the results of its application reported. In Section 5 the costs of the *Pathways to Prevention* project are compared with a number of remedial intervention programs and the comparative merits of these alternatives are discussed. Finally some concluding remarks are made in Section 6.

2. THE POTENTIAL COST-SAVINGS FROM DEVELOPMENTAL INTERVENTIONS: A REVIEW OF THE LITERATURE

Karoly et al. (1998) define early childhood intervention as a formal attempt by outside agencies to maintain or improve the quality of life of a young child anywhere from the prenatal period to school age. Much of the support that children receive comes from parents, family members and friends. The aim of early intervention is to interact with the family, via school-based, centre-based, hospital-based and/or community-based programs, to enhance or supplement this support.

Early intervention can also be expanded to include 'developmental' programs that promote a child's cognitive, social and emotional development by bridging the

transition points from home to preschool and/or from preschool to primary school environments. Such developmental interventions are premised on the notion that an individual's life course is not determined early in life. Rather than a fixed 'trajectory', an individual faces a series of life-phases or transition points. Transition points mark a time when things often go wrong, but they are also the times when interventions are most effective, particularly for children and families from disadvantaged backgrounds. Transition points also involve a modification in one's social identity and/or movements between social institutions (e.g. preschool to primary school); therefore, representing an ideal time to strengthen the links between multiple contexts (Freiberg, Homel, Batchelor, Carr, Hay, Elias, & Teague, 2005).

Remedial interventions, by contrast, are aimed at treating problems once they arise for example, behavioural and/or learning difficulties at school, juvenile crime offences or substance abuse.

There is no intention to make the case that developmental (or preventative) interventions should be favoured over remedial interventions. Taking this stance would neglect the inherent benefits that both forms produce. This is not to say that the relative mix of such programs that has evolved currently represents a perfect balance in terms of resource allocation. Investing in the front end (preventative) may help alleviate the pressure placed on the already overburdened remedial sector and allow those students who are 'slipping through the cracks' to receive the attention they require. Remedial interventions seem to be making some real impact (Queensland Government, 2002). However, the greatest impact is predominantly around clinical cut-off points where children who require intervention are not receiving it and also post-remedial intervention when further support may be required. To improve this situation it is crucial to assess the costs of both forms of intervention in order to gain insights into how to efficiently and effectively allocate resources that will benefit those of 'our children' in most need.

If early childhood intervention (ECI) initiatives are to continue to develop and reach those most in need, they must demonstrate effectiveness in improving children's behaviour, learning and health in later life (Farrington & Welsh, 2002), as well as deliver a positive return on investment and be individually cost-effective. This is because, like other portfolio programs (e.g. health), ECI's will also face a vast array of economic limitations including restricted funding opportunities, an ever increasing market of competitors applying for support and stakeholders demanding evidence of economic efficiency.

A series of studies demonstrating the long-term effectiveness of intervention programs prior to the 1980's, such as the Perry Preschool Project (Barnett, 1985, 1996; Schweinhart, 2004), the Seattle Social Development Project (Hawkins, Catalano, Kosterman, Abbot, & Hill, 1999) and the Elmira Prenatal/Early Infancy Project (Eckenrode, Olds, Henderson, Kitzman, Luckey, Pettitt, Sidora, Morris, Powers, & Cole, 1998; Olds, 2002) have strengthened the argument for the continuation of early prevention initiatives. Recent interventions have confirmed not only positive outcomes as a result of successful planning and implementation, but the positive effects resulting from the systematic delivery of basic services or resources to disadvantaged families with young children (Farrington & Welsh, 1999, 2003; Homel, 2005; Shonkoff & Meisels, 2000). Results demonstrate:

“...initial gains in intellectual and achievement scores, and longer term outcomes reflecting more successful school experiences...Reduction of behavioural problems and delinquency have also been reported” (Brooks-Gunn, Fuligni, & Berlin, 2003, p.10).

Recent studies have also confirmed the improved outcomes for disadvantaged families and their children in terms of child maltreatment, educational performance (mother and child), maternal workforce participation, child and youth behaviour, substance abuse and income (Brooks-Gunn et al., 2003; Hawkins et al., 1999; Homel, 2005; Olds, 2002; Reynolds, Temple, Robertson, & Mann, 2001; Schweinhart, 2004). Table 1 provides a summary of the benefits that have been identified as a result of intervention programs studied. Based on these results, intervention programs are expected to produce positive outcomes that will result not only in a reduction in crime, but an improvement in the health and wellbeing of the disadvantaged.

Table 1: The benefits of early childhood intervention

Educational/ Cognitive Outcomes	Behavioural Outcomes	Health Outcomes	Economic Outcomes	Social Outcomes	Other Positive Outcomes
Increase in intellectual competence	Improved school readiness	Children at-risk identified earlier	Increase in living conditions	Decrease in teen pregnancies	Improved parent-child relationships
Positive home/school relationships	Reduction in juvenile delinquency	Improved knowledge of nutrition	Increase in work skills	Reduction in child abuse	Increased self-respect
Parental involvement in a child's schooling	Increase in child school engagement	Increase in medical check-ups	Increase in family income	Elimination of infant and child homicide	Acceptance of personal responsibility
Improved literacy	Less disruptive behaviour in classroom	Decrease in licit and illicit drug use	Increased employment rates	Development of social support networks	Mental health benefits Environment with reduced stress
Improved school achievement	Improved parent-child relationships	Improved prenatal care	Decrease in welfare dependence	Familiarity with local health care/social service support systems	Self efficacy
Less need for remedial assistance	Reduced participation in criminal activity	Less emergency room visits		Improved peer relationships	Lower rates of family adversity and conflict
Less school failure				Reduced social isolation	
Higher school completion rates				Improved networks of support	

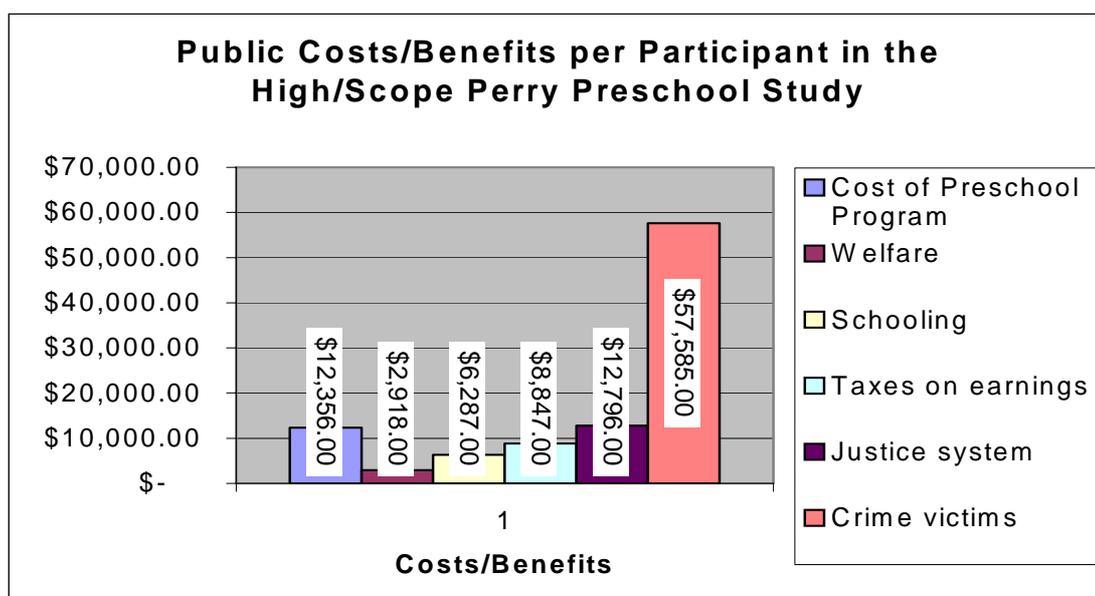
Source: Homel, R., Freiberg, K., Lamb, C., Leech, M., Hampshire, A., Hay, I., et al. (2006). *The Pathways to Prevention Project: The First Five Years, 1999-2004*. Sydney: Griffith University & Mission Australia.

ECI's such as the Perry Preschool project, the Chicago Parent-Child Centres and the Elmira Prenatal/Early Infancy Project, have in most cases not only yielded reductions in crime and a range of other problem behaviours, but have also produced positive economic returns (Barnett, 1993; Greenwood, Karoly, Everingham, Hoube, Kilburn, Rydell, Sanders, & Chiesa, 2001; Karoly, Greenwood, Everingham, Hoube, Kilburn, Rydell, Sanders, & Chiesa, 1998; Reynolds, 1994; Schweinhart, Montie, Xiang, Barnett, Belfield, & Nores, 2005). A cost-benefit analysis of the Perry Preschool

Project (Barnett, 1993) estimated the cost per participant to be US\$12,356 (1993 dollars), with savings to the government totalling \$108,000. Reported net savings to the public purse were estimated to be around \$95,646.00, a staggering US\$7.16 return for every dollar spent (See Figure 1). Schweinhart et al. (2005), in their recent follow-up of the Perry Preschool Project (through age 40) found that preschool participants were more likely to hold a job, to have higher earnings, graduate from high school, and commit fewer crimes. It was estimated for every dollar invested in the program, there was a return to society of more than US\$17.

A cost-benefit analysis of the Chicago Child-Parent Centers (CPC) (Reynolds et al., 2001) revealed that the benefits of this program greatly exceeded its costs. Costs per participant were estimated at US\$6,692 compared with aggregated benefits of US\$48,000. Every dollar spent on the program produced a net benefit of \$3.29 to program participants and \$3.85 to society. Economic benefits were attributed to increased earnings due to higher educational attainment (\$20,000), decreased need for special education (\$4,900), reduced childcare costs (\$1,700), increased taxes as a result of higher earnings (\$7,200), reduced criminal justice costs (\$7,100) and reduced costs to victims of crime (\$6,100).

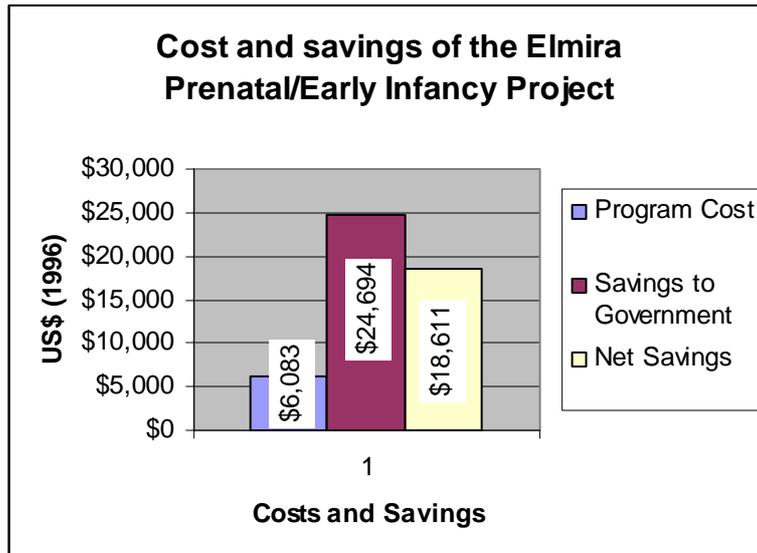
Figure 1: Costs/Benefits of the Perry Preschool Project



Adapted from: Parks, G. (2000). *The High/Scope Perry Preschool Project*. Washington: U.S. Department of Justice.

A cost-savings analysis of the Elmira Prenatal/Early Infancy project (Greenwood et al., 2001) revealed a net saving to the government of US\$18,611 (1996 dollars) (see Figure 2). Eighty percent of the savings (\$20,384) were attributed to higher employment rates for mothers and reduced welfare usage. Another \$4,310 was attributed to less crime over the child's lifetime (Olds, Eckenrode, Henderson, Kitzman, Powers, Cole, Sidora, Morris, Pettitt, & Luckey, 1997; Olds, Henderson, & Kitzman, 1994; Olds, Henderson, Phelps, Kitzman, & Hanks, 1993).

Figure 2: Costs and Savings of the Elmira Prenatal/Early Infancy Project



Adapted from: Greenwood, P., Karoly, L., Everingham, S., Hoube, J., Kilburn, M., Rydell, C., et al. (2001). Estimating the costs and benefits of early childhood interventions. In B. C. Welsh, D. P. Farrington & L. Sherman (Eds.), *Costs and benefits of preventing crime* (pp. 133). Colorado: Westview Press.

It is against the background of these studies that the current paper found its genesis. This paper extends the previous research to evaluate the costs of the *Pathways to Prevention* project. This project is a recent ECI intervention that has attracted Federal government attention in Australia.

3. THE PATHWAYS TO PREVENTION DEVELOPMENTAL INTERVENTION

The *Pathways to Prevention* project, established in 2000 as an ‘early intervention’ developmental prevention initiative, focussed on the transition to school in one of the most disadvantaged urban areas in Queensland (Hamel et al., 2001). The community of Inala is located in the south western suburbs of Brisbane. It was selected based on: high levels of social and economic disadvantage (e.g. lower than average median weekly household income (\$400-499 vs. \$800-899 for the wider Brisbane area); low rates of high school completion within the adult population (less than 24 percent compared to 43 percent); high rates of single parent families (33.1 percent vs. 15.7 percent); high levels of unemployment (20 percent vs. 7 percent); and, a large proportion of public housing (39.1 percent vs. 4.3 percent). The community is also culturally and linguistically diverse (32 percent of households have home languages other than English, vs. 20.0 percent of the Australian population). Ethnic groups include Vietnamese (17.2 percent), Pacific Islanders (6.4 percent), and Indigenous (5.8 percent) compared with the Brisbane average of 0.8, 1.9 and 1.7 percent respectively. Also, approximately one person in five is aged less than 10 years, and 50 percent of the Indigenous community are less than 15 years old. Court appearances by 10 to 16 year olds (158 per 1000) are significantly higher than for the greater Brisbane area (20 per 1000) (Freiberg et al., 2005).

Hamel et al. (2006) further observed that Inala was the third most disadvantaged statistical local area in Queensland (falling only behind Aurukun and Mornington Island) according to the 1996 Index of Relative Socio-Economic Disadvantage (SEIFA). Previous research has indicated that the transition to school is especially

problematic for children from disadvantaged communities such as Inala (Rimm-Kaufman & Pinata, 2000). This is one of the key reasons for tailoring the *Pathways* project to this particular transition point.

The *Pathways to Prevention* project operates as a partnership between a university-based research team (Griffith University), a non-government national welfare agency (Mission Australia), local government schools (Durack, Carole Park, Inala, Inala West, Serviceton South, Richlands, and Richlands East State schools) and three ethnic communities (Vietnamese, Pacific Island and Indigenous). Funding for the project has thus far come from a number of sources: including competitive granting schemes (the Australian Research Council and the Criminology Research Council), philanthropic foundations (John Barnes, Westpac and Viertel) and the Queensland Government (Education, Health, Premier and Cabinet, Families and Housing Departments). The project recognises that development is closely tied to the multiple contexts in which it occurs and as a result comprises a multi-faceted intervention that incorporates action at individual, family and school levels (Freiberg et al., 2005). In particular it combines two components; a *Preschool Intervention Program (PIP)* which is a child-focused and school-based set of activities; and, a *Family Independence Program (FIP)* which is a family-focused and community based set of activities run by Mission Australia. Demographics of the targeted population are available from Freiberg et al. (2005).

The primary aim of the *PIP* component is to enhance the participant's readiness to succeed at school. Through a sequence of structured small-group interactions with either specialist teachers or program staff it focuses on two issues: First, communication skills development introduce increasingly abstract language, complex vocabulary and appropriate syntax formats in the preschool experience. Second, the social skills development comprised of fun activities such as puppet and videotape modelling of behaviour, games, songs, stories and role-plays. These are designed to improve ability to accurately interpret social information, overcome unproductive emotions such as anger and anxiety and develop a set of strategies for dealing with problems that commonly occur during interactions with peers. Teachers' ratings of a child's readiness for primary school were measured using a 1-10 point rating scale (Freiberg et al., 2005).

The *FIP* component is premised on the notion that in order for parents or carers to be able to create the conditions to foster their children's development and reinforce the learning associated with formal schooling, they may themselves need access to various forms of assistance. With the broad aim of supporting families and strengthening coping skills it includes a range of activities that include behaviour management, playgroups, counselling, support groups, assisted referrals to other services and liaison with various government agencies, youth programs, and other activities including life skills, computing and English language classes for adults, and holiday activities and fun days for children (Freiberg et al., 2005).

For further details on both the PIP and FIP components of the project refer to Homel et al. (2001, 2003, 2006) and Freiberg et al. (2005). In order to implement the project on the basis of a quasi-experimental design that permits evaluation of the effectiveness of the various project components, four of the community preschools (Inala, Serviceton South, Carole Park, and Durack) participated as the PIP intervention group while the remaining three community preschools (Richlands, Richlands East and Inala West) acted as the control group relating to the PIP

component. The FIP activities were made available to all families in the Inala school community, with around 185 families with preschool children volunteering to become involved – from a preschool enrolment of 600 children. This allowed data to be obtained in relation to FIP activities for children and their families from both the PIP intervention and the PIP control groups.

Given that the Pathways project commenced in 2002, it is possible to observe how the various components impacted on preparedness for school at the end of 2002 and the results achieved in the first year of schooling in 2003. Funding permitting, periodic reviews will identify longer-term impacts of the project. Pre- and post- intervention measures of language skills and behaviour were taken of children enrolled in the seven community preschools.

The results indicated that PIP participation was associated with accelerated improvement in language proficiency (as measured using the Preschool Language Assessment Instrument (PLAI)), and that the Pathways communication component was more effective than “business as usual” approaches within Queensland preschools. In addition PIP participation had a positive impact in reducing the level of difficult and challenging behaviour (as measured using the Rowe Behaviour Rating Inventory (RBRI)) for boys but not for girls. Boys are more prevalent in juvenile crime and adult incarceration statistics.

The value added of participation in FIP activities was examined using RBRI scores, with the results indicating that a comprehensive approach that combined both child focused and family-focused components was effective in reducing the impact of family adversity on child behaviour. Other results which reinforced this finding include teacher’s ratings of children’s readiness to succeed in school (collected at the end of the preschool year) and teacher’s ratings of children’s performance during their first year of formal schooling (collected at the end of the Grade 1 year). Results of the Pathways Project success are reported in Freiberg et al. (2005) and Homel et al. (2005).

While these results indicate promising short-term outcomes, medium- to long-term outcomes typically associated with early intervention programs (See Table 1) are unobservable. This is due to the short period of time the *Pathways to Prevention* project has been operating. As a result a cost-benefit analysis of the Pathways project is not possible. There is value to be derived, however, from fully costing the various *Pathways* project activities and comparing these costs with those of other remedially focussed programs available to be accessed within the Inala school community. The intention of this study is to demonstrate that there is a significant gap between the costs of treating children early in the developmental pathway compared to later in the pathway. Thus demonstrating that investment in the front end (preventative) may help alleviate the pressure placed on the overburdened remedial sector resulting in more efficient and effective service delivery and possible cost savings.

4. COSTING OF THE *PATHWAYS TO PREVENTION* PROJECT

An extensive cost analysis of the *Pathways to Prevention* project was undertaken during 2003-4. Cost analysis is a comprehensive and detailed description of the type and amount of resources used to produce and operate a program or group of programs. The cost analysis conducted for the *Pathways* project was undertaken retrospectively in that the data collection took place after the project had been

developed and implementation had commenced for the first cohort of participants. The relevant cost and child/family participation records were spread between archives at both Griffith University and Mission Australia, and in some cases within old work diaries and/or the memory banks of individual program leaders. The task of assembling, classifying and processing of this data was time consuming and required a great deal of forensic type analysis of accounts and interviews with key personnel.

Once this data had been gathered, a number of choices common to all cost analyses had to be made, for example: which costs to consider or the range of costs to be considered; how costs should be estimated (e.g. quantities of resources, assignment of unit costs); how non-market items should be valued (e.g. in-kind costs); the adjustment of market prices (ensuring that market prices reflect true opportunity costs); the length of time costs should be tracked; the inclusion of unrelated costs (flow-on effects from common practice or programs already in place e.g. school and individual teacher treatment of children displaying poor behaviour); and the handling of capital outlays (e.g. equipment, buildings and land) (Boardman, Greenberg, Vining, & Weimer, 1996; Drummond, O'Brien, Stoddart, & Torrance, 1997; Levin & McEwan, 2001; Weisbrod, Test, & Stein, 1980). For a detailed description of the choices made, refer to Manning (2004).

Once these issues had been considered and choices made, the cost analysis was adapted from a format proposed by Levin and McEwan (2001). Steps include:

1. measuring and valuing fixed costs (explicit costs);
2. measuring and valuing implicit costs or in-kind costs;
3. distributing costs among stakeholders;
4. depreciating tangible capital assets;
5. categorising all expenditures and costs; and,
6. discounting costs for further analysis such as cost-effectiveness.

To be consistent with the economic principles of measuring all resources involved in delivering an intervention (steps 1 and 2), explicit costs (costs that require an outlay of money, e.g. salaries of employees) as well as implicit costs (input costs that do not require an outlay of money, e.g. volunteer time) must be identified (Boardman et al., 1996; Levin & McEwan, 2001; Mankiw, 2001; Torrance, Siegel, & Luce, 1996). Table 2 provides an overview of those costs. In the table, explicit costs are separately categorised into fixed and variable costs. Fixed costs are costs that do not change when the numbers of participants increase. Variable costs are costs that may fluctuate depending on the number of participants (Foster, Dodge, & Jones, 2003).

Table 2: Resources Used in the Delivery of an Intervention

Variable (Explicit)	Fixed (Explicit)	Implicit
Personnel	Space	Parent time
Supplies	Utilities	Teacher time
Travel	Administration	Volunteer time
Incentives-parents	Equipment	Other space costs
Incentives-teachers	Training	
Participants' out-of-pocket costs		

Adapted from: Foster, M. E., Dodge, K. A., & Jones, D. (2003). Issues in the Economic Evaluation of Prevention Programs. *Applied Developmental Science*, 7(2), 80.

When distributing costs among stakeholders (step 3) a cost worksheet was used listing all ingredients. This helped to disaggregate costs among stakeholders (see Table 3). To depreciate tangible capital assets (step 4), the ‘diminishing value method’ as recommended by the Australian Taxation Office (2003) was adopted. To ensure that all data are collected and easily accessible for later evaluation, it is helpful to categorise all costs (step 5). How one chooses to do this will be determined by the type and makeup of the program one is evaluating. For example, when classifying costs for the FIP component of *Pathways* project, the following categories were used:

1. Personnel (includes all labour),
2. Equipment (includes all durable items)
3. Facilities (includes land, office space, parking space)
4. Supplies (includes other consumables. Utilities can be included in this category)
5. Other costs (including in-kind costs).

The final step in conducting a cost analysis involves discounting all costs (step 6). The basic premise is that costs incurred in the future are less of a burden than costs incurred in the present. Therefore, future costs must be discounted to properly compare them with present costs. The method for comparing alternative investment patterns is by calculating their present value. The calculation of present value uses an interest rate to discount future costs relative to current ones (Levin & McEwan, 2001, p.90-94). For the purpose of this analysis, a discount rate of 5 percent has been chosen as the most credible rate of discount, based on recommendations in Treasury N.S.W “*Guidelines for Economic Appraisal*” (New South Wales Treasury Economic Appraisal of Capital Works, 1999). Further details regarding inflation over time and the mix of resources from one period to another are available in Manning (2004).

Table 3: Worksheet for Estimating Costs

Cost ingredients	Total cost	Cost to investor	Cost to government agency	Cost to private organisations	Cost to children and parents
Personnel (includes all labour)					
Equipment (includes all durable items)					
Facilities (includes land, office space, parking space)					
Supplies (includes other consumables. Utilities can be included into this category)					
Other Costs including in-kind costs					
Total Ingredients Cost					
User Fees					
Cash Subsidies					
Net costs					

Source: Levin, H. M., & McEwan, P. J. (2001). *Cost-effectiveness analysis* (2nd ed.). (p78). London: Sage Publications.

Costs were estimated separately for three distinct stages of the Pathways project: development, implementation and evaluation (See Table 4). The development stage of the project includes an accumulation of all the costs involved to conceptualise the Pathways intervention, to build and coordinate the partnership between Griffith University and Mission Australia, and to consult with an expert advisory group. The time frame for this stage of the project was spread over four years (2000-2003).

The costing of the implementation stage was performed separately for both the PIP and FIP programs. A snapshot of the costs associated with running these programs for one year only is provided in Table 4. The financial year 2002-3 was chosen for this purpose as this was when the project could be considered as fully established with the individual programs operating at full capacity. Manning (2004) reports costs of these programs for a more extended time period and disaggregated into their separate components.

The evaluation stage took into account the cost of researchers, research assistants, space rental and other expenses associated with PIP and FIP programs. These costs have been calculated for the period 2001-2003.

Table 4: Cost Analysis of the *Pathways to Prevention* Project 2000-2004

	Griffith University	Mission Australia	Preschool Intervention Program (PIP)	Family Independence Program (FIP)
Development 2000-2003	\$184,419.38	\$91,959.00		
Implementation 2002-3 year			\$68,203.13	\$431,218.72
Evaluation 2001-2003	\$455,859.05			

Source: From data reported in Manning (2004), pp. 79-90.

In order to permit comparison with other intervention strategies, the costs associated with the implementation stage of the *Pathways* project have also been converted to a per participant basis for the school-based PIP components. See Table 5.

Table 5: Per Participant Costs of *Pathways to Prevention* School Based Programs, 2002-3

	Social Skills Component	Communication Component
Cost of Program	\$15,434.92	\$52,767.21
No. of Participants	100	125
Per Participant Costs	\$154.35	\$422.14

Source: From data reported in Manning (2004), p. 54.

5. COSTS OF *PATHWAYS TO PREVENTION* PROJECT COMPARED WITH REMEDIAL INTERVENTION ALTERNATIVES

A cost-comparison analysis of the *Pathways to Prevention* preschool intervention and state based remedial interventions has been performed in an attempt to distinguish the differences in cost between providing behavioural management and literacy enhancement programs at different times in a child's life.

5.1 The Remedial Intervention Alternatives

The Education Queensland remedial interventions chosen for comparison with the *Pathways* project were the Behavioural Support Team (Corinda District – Inala Cluster), and the Tennyson Special School and the Reading Recovery Program.

The Behavioural Support Team is located in the grounds of Richlands State School and is aimed at children who display early signs of disruptive behaviour in the classroom. A majority of children who enter the program are between five to seven years of age and are generally referred to the team by the classroom teacher who decides that the child should be assessed by the team and undergo some remedial behavioural management intervention. Caseworkers conduct whole class and small group interventions, while also dealing with individual referrals. In 2002, there were 145 referrals managed by the team. On average, each student required approximately 100 hours of individual behaviour support at a total aggregate cost in 2004 dollars of \$236,312.93, which includes both explicit and implicit costs (Manning, 2004, pp. 55-56).

The Tennyson Special School (TSS) is available to primary school aged children with emotional and behavioural difficulties who have been excluded, suspended or otherwise referred by principals for intervention outside their regular school setting. The long-term program at TSS deals with children of ages six to thirteen. Twenty one students were enrolled at TSS in 2002, with the aggregate cost of operating the school for this year estimated at \$417,460.32 in 2004 dollars; this includes both implicit and explicit costs (Manning, 2004, pp. 56-57).

The Reading Recovery Program is implemented in all state schools in Queensland. It is an early literacy intervention program targeted at children aged between six and seven years of age that are identified by classroom teachers as having difficulties in literacy. Children 'enrolled' in the program are provided with access to an individualised, intensive program of activities on a daily basis with specially trained teachers. In 2002, there were 5514 students enrolled in the program state-wide. Each student is given an average of 72 half-hour lessons over 17.7 weeks for a total aggregate cost in 2004 dollars of \$116,099.773.20 (Manning, 2004, pp. 58-59).

A detailed outline of segregation of costs is available from Manning (2004).

5.2 The Method of Cost Comparison Analysis

The method of cost-comparison analysis is similar to that of cost-effectiveness analysis where a ratio is created that ranks programs according to the cost required to obtain a single unit of effectiveness. This ratio is a cost comparison (C/C) ratio calculated as total program cost divided by the number of participants associated with this program (Nagin, 2001).

The cost-comparison analysis is conducted for two groups of programs: Group A Behaviour Management, and Group B Literary Enhancement. The categorisation of the *Pathways* programs into these groups is not representative of their only effects. Rather, the grouping is used to facilitate the cost-comparison analysis and to demonstrate as practically as possible the outcomes that each program may have on participating children. Typically, well-targeted programs (e.g. preschool intervention

programs aimed at improving the communication skills of children) tend to demonstrate impacts on that outcome (readiness for school). However, impacts are not limited to that particular outcome. For example, although communication programs may improve a child's readiness for school through enhanced abstract language, complex vocabulary and appropriate syntax formats, further outcomes may include improved social skills resulting in prosocial behaviour (Brooks-Gunn, Fuligni, Berlin, 2003).

Initially assumptions are made that: (1) all programs within the same group are equally effective (comparable measures of effectiveness) (see Manning (2004)), (2) and all programs within the same groups aim at producing similar outcomes, with a similar target group of children. The first assumption is necessary to avoid problems that arise when defining units of effectiveness, and those from the ratio created by cost-effectiveness methods not taking into account the different scales of the projects (Boardman et al, 1996). Therefore, an established base from which to choose the program with the lowest cost per unit of effectiveness, assuming comparable measures of effectiveness is created. If levels of effectiveness are held constant across all alternatives, scale will no longer be a problem (Boardman et al. 1996). In other words, holding constant the total level of effectiveness across alternatives may be thought of as a different way of achieving a fixed effectiveness. For example, assuming both early childhood preventative and remedial programs are one hundred percent effective at treating a child identified with literacy problems will ensure that the alternative with the best cost-effectiveness ratio dominates one dimension and is exactly the same on another dimension. The second assumption sets comparisons with similar groups of children. Typically, ethnicity, geographical location and the family contexts of enrolled children (across preventative and remedial programs) are the same within a given community. Age, however, will differ given the age in which the program occurs (preventative vs. remedial).

5.3 Analysis of Group A – Behaviour Management Alternatives

The analyses of the behaviour management component consist of four alternatives, grouped into two categories. Category 1 consists of programs developed to help improve the behaviour of children with 'borderline' or less challenging behavioural problems. Both programs aim to better manage the behaviour of children aged between 4-7 years. Category 2 consists of programs aimed at helping those children with more severe or extreme behavioural problems.

Category 1 (Behavioural)

- Alternative (1): *Pathways* Communication Program
- Alternative (2): School district behavioural management teams (Inala Cluster)- known as Behaviour Support Team, Corinda District

Category 2 (Behavioural)

- Alternative (3): *Pathways* Social Skills Program
- Alternative (4): Behavioural School (Tennyson Special School)

Results of the cost comparison analyses of these alternatives are provided in Tables 6 and 7 assuming a uniform 100% effectiveness (see Manning, 2004), and with costs converted to 2004 dollars for each alternative. Segregated costs are available from Manning (2004).

Table 6: Cost Comparison Analysis for Category 1 (Behavioural) Interventions

Cost Comparison	Alternative (1) <i>Pathways to Prevention</i> Communication Program	Alternative (2) Inala School District Behavioural Management Team
Budget Cost	\$47,861.41	\$236,312.93
No. of Participants	125	145
C/C Ratio	\$382.89	\$1,629.74

Source: From data reported in Manning (2004), p.99.

Table 7: Cost Comparison Analysis for Category 2 (Behavioural) Interventions

Cost Comparison	Alternative (3) <i>Pathways to Prevention</i> Social Skills Program	Alternative (4) Tennyson Special School
Budget Cost	\$13,999.93	\$417,460.32
No. of Participants	100	21
C/C Ratio	\$139.99	\$19,879.06

Source: From data reported in Manning (2004), p. 100.

A cost-comparison analysis of Category 1 behavioural management interventions demonstrated a difference of \$1,246.85 per participant between preventative and remedial treatment (see Table 6). Results for Category 2 groups highlighted a per participant cost differential of \$19,739.07 (see Table 7). The comparison should be understood in terms of the cost of providing services to children of different ages, with varying degrees of behavioural problems and at different stages of intervention. The Tennyson program works with children aged 6-13 years who have already been excluded from school, while the Pathways program works with children aged 4 to 5 years of age. As a result:

“...the analysis should only be used to contemplate future analysis on the savings that may result from the implementation of a social skills program earlier in a child’s life” (Manning, 2004, p.61).

5.4 Analysis of Group B – Literary Enhancement Alternatives

The analyses of the literacy enhancement component consist of two alternatives:

Alternative (1): *Pathways* Communication Program
 Alternative (2): Reading Recovery Program (Education Queensland)

Results of the cost comparison analyses of these alternatives are provided in Table 8 assuming a uniform 100% effectiveness, and with costs converted to 2004 dollars for each alternative. The results demonstrate that the *Pathways to Prevention* Communication program is \$20,672.56 cheaper per participant than the Education Queensland Reading Recovery program. Although both programs are significantly different in terms of both age groups of participants and delivery of service, it does demonstrate the cost differential between preventative and remedial treatment. Segregated costs are available from Manning (2004).

Table 8: Cost Comparison Analysis for Literacy Enhancement Interventions

Cost Comparison	Alternative (1) <i>Pathways to Prevention</i> Communication Program	Alternative (2) Reading Recovery
Budget Cost	\$47,861.41	\$116,099,773.20
No. of Participants	125	5514
C/C Ratio	\$382.89	\$21,055.45

Source: From data reported in Manning (2004), p. 101.

5.5 Results of Sensitivity Analysis of Uniform Effectiveness Assumption

Finally, a series of sensitivity analyses were conducted to test differing levels of effectiveness across different programs. For example, how would ratios differ between a preventative and remedial intervention if the remedial intervention level of effectiveness was held constant at 100 percent and the preventative intervention levels of effectiveness were downgraded significantly? The results of this type of analysis is reported in detail in Manning (2004) for a downgrade to 50 percent and 25 percent for the remedial Pathways to prevention interventions – with the findings in both cases being that in all cases the preventative interventions remained significantly cheaper than the remedial alternatives.

6. CONCLUDING REMARKS

Care should be taken when interpreting the meaning of these results reported in Section 5. In particular, these results do not indicate that remedial interventions are cost-ineffective and therefore funding should be reduced or retracted. On the contrary, many remedial interventions are of great benefit and in their absence a large majority of children would miss out on required remedial treatment (Neal & Kelly, 2002). On the other hand, an array of longitudinal studies have demonstrated that preventative intervention early in the developmental pathway results in fewer children displaying antisocial behaviours and requiring special education services (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004; Elder, Johnson, & Crosnoe, 2003; Farrington & Welsh, 2003; Greenwood et al., 2001; Homel, 2005; Homel, Elias, & Hay, 2001; Karoly et al., 1998; Schweinhart, 2004; Schweinhart, Barnes, & Weikart, 1993; Welsh, 2001). Results indicate a significant gap between the costs of treating children early in the developmental pathway compared to later in the pathway. Therefore, if more funding were directed towards preventative intervention, early in the developmental pathway then significant savings do appear to be a very real prospect. In fact, the analysis suggests that diverting one child from a reading recovery program as a result of a preventative program has the potential to save approximately \$20,672 in future costs (See Table 8). The results reported in Tables 6 and 7 also indicate that considerable cost savings can be expected from preventative behaviour management programs. The cost-comparison analysis demonstrates that, even if preventative programs diverted relatively few children from future remedial treatment, large savings would result in the long run. This cost-comparison severely undervalues the

potential that preventative interventions offer since it assumes the same success rates for preventative as for remedial interventions, nevertheless we feel confident that well-designed and appropriately resourced preventative interventions have the potential to divert a significant percentage of children from future remedial treatments. This is evident given the success rates of other preventative interventions mentioned earlier in the paper.

The economic analysis of the Pathways to Prevention project is only in its infancy. Further research is underway to develop a method that enables a common metric to be employed for measuring the outcomes of alternative programs. Such a metric would be useful since it would enable us to move from the cost-comparison analysis that has formed the basis of this paper to a cost-effectiveness analysis. The latter would enable even more convincing arguments demonstrating the advantages of preventative interventions. More significantly, it would point to the optimal timing of a suite of such interventions with the aim of ensuring that scarce budget allocations to such programs are utilised in a manner designed to have maximum impact.

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