

# A REVIEW OF THE EARLY CHILDHOOD LITERATURE

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by The Centre for Community Child Health

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## AUTHORS

This review was undertaken by a multi-disciplinary team from the Centre for Community Child Health that comprised:

Dr Debra Foley

Dr Sharon Goldfeld

Ms June McLoughlin

Ms Jeanette Nagorcka

Prof Frank Oberklaid

Dr Melissa Wake

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## 1. EXECUTIVE SUMMARY

The current international debate about the importance of the early years of life for subsequent health, development and well-being in childhood, adolescence and adult life, has focused attention on the growing literature in this area. This research has the potential to impact on the way government systems deliver services to children and families, and therefore requires careful consideration within an Australian context.

This document briefly reviews selected literature relating to the major risk and protective factors that may influence children's developmental outcomes in the preschool years. It then reviews selected studies of the preventive and early interventions that may impact on these outcomes.

The literature review was conducted over three weeks in September 1999. The short time frame precluded identification of all relevant high-quality literature and prevented the acquisition of some of the material identified through the searching process as potentially relevant.

A number of longitudinal studies are reviewed in order to identify early childhood risk and protective factors. Important risk factors include: perinatal stress; difficult temperament; poor attachment; harsh parenting, abuse or neglect; parental mental illness or substance abuse; family disharmony, conflict or violence; low socioeconomic status; and poor links with the community. Important protective factors include: easy temperament; at least average intelligence; secure attachment to family; family harmony; supportive relationships with other adults; and community involvement.

The review explores the complex relationship between these risk and protective factors, their variation during different life stages and pathways through childhood with which they may be associated. It notes that while adverse outcomes are associated with these risk factors, some children exhibit resilience and do not experience adverse outcomes.

A range of early intervention programs that seek to improve outcomes for children and/or families were identified. These include: preschool and child care (both universal services and targeted/enhanced early childhood programs); child health surveillance; home visiting; parent education; and programs for children with developmental delay or disability.

High quality studies of the effectiveness of these interventions were reviewed. Key findings include:

- Participation in a preschool program promotes cognitive development in the short term and prepares children to succeed in school (Boocock 1995).

- Preschool experience appears to be a stronger positive force in the lives of low income than advantaged children (Boocock 1995).
- Maternal employment and participation in out-of-home care, even during infancy, appear not to harm children and may yield benefits if the child care is regulated and of high quality (Boocock 1995).
- Early childhood and development programs can produce large increases in IQ during the early childhood years and sizeable, persistent improvement in reading and maths, decreased need for grade retention and special education, and improved socialisation for disadvantaged children (Barnett 1995).
- Anticipatory guidance, a common feature of child health surveillance programs, can improve nutrition, some aspects of behaviour and development, and parenting (Dworkin 1998).
- Home visiting programs can be effective, particularly for very disadvantaged women, but there have been great difficulties in implementing and operating these programs (The Future of Children 1999).
- Group-based parenting education programs, particularly those taking a behavioural approach, can produce positive changes in children's behaviour (Barlow 1997).
- Community based group education programs for parents produce more changes in children's behaviour and are more cost effective and user friendly than individual clinic-based programs (Barlow 1997).
- Early intervention programs for children with a developmental delay or disability increasingly focus on broad family outcomes rather than specific developmental gains for children (Guralnick and Neville 1997).

The review examined a US study of the cost effectiveness of early intervention programs which found that for some disadvantaged children and their families, considerable cost savings could be made by investing in early intervention (Karoely 1998).

The review places these findings into the Australian context. Few Australian early childhood programs have been studied using rigorous research methods. While much can be learned from international studies of interventions in early childhood, extrapolation of the results to the Australian situation should be undertaken cautiously and should take into account existing local service systems, socio-economic patterns and cultural characteristics (Vimpani 1996). Interventions conducted outside Australia have sometimes targeted families who are much more deprived than their local counterparts. The utility of applying similar interventions to Australian society can therefore not always be inferred from international data.

Finally, the review suggests that there may be an association between quality universal early childhood services and positive outcomes (Boocock 1995).

## 2. INTRODUCTION

There is a growing international literature surrounding the importance of the early years of life. This research has the potential to impact on the way government systems deliver services to children and families, and therefore requires careful consideration within an Australian context.

This document has been designed to give a brief review of the literature relating to the major risk and protective factors that may influence children's developmental outcomes in the preschool years. This has been coupled with a review of the preventive and early interventions that may impact on these outcomes. It reflects research that has been conducted over the last decade and has led to the development of a greater understanding of the importance of the early years of childhood. These sections are preceded by a discussion of the wide range of factors that may contribute to developmental delay and the complex relationships between them.

## 3. DEVELOPMENTAL DELAY

A traditional focus on trying to identify single biological and/or environmental factors that cause developmental delay has in recent years been replaced by a model of child development that emphasises the complex dynamic interplay between biological factors within the child and the caretaking environment. This transactional model postulates that developmental outcomes are the end result of a complex transaction between intrinsic or within child factors (eg. genes, central nervous system development, temperament) and environmental factors (eg. parenting style, amount of stimulation, socio-economic status).

A wide range of biological factors have been identified as causing or contributing significantly to poor developmental outcomes. These include: genetic disorders (chromosomal abnormalities, specific syndromes); structural malformations of the brain (microcephaly, hydrocephaly); infections of the central nervous system (cytomegalovirus, rubella, toxoplasmosis); toxic insults to the developing central nervous system (irradiation, drugs, alcohol); malnutrition; and perinatal stress (cerebral hypoxia, brain haemorrhage). As mentioned earlier, for most children the transactional model of development means that these biological insults should be regarded as being 'risk factors' which create vulnerability for the infant rather than resulting in inevitable poor outcomes. This vulnerability can be heightened or diminished by environmental factors. *"A premature infant who struggles through multiple medical complications and is discharged from a neonatal intensive care unit to a nurturing home with excellent social supports is likely to do well developmentally; another baby with an identical medical history who is reared in an unstable environment by an isolated, disorganised and highly*

*stressed single parent is likely to have a host of developmental difficulties*". (Shonkoff and Marshall 1990). It should also be remembered that in a significant minority of children with developmental delay, no specific biological factors can be identified.

A host of environmental risk factors has been identified as contributing to poor developmental outcomes. These factors relate to the quality of the caretaking environment, and are influenced by characteristics of the parents, socioeconomic determinants, the level of stress and support experienced by the family, the level and intensity of early learning experiences the child has, parenting style and family functioning, and parental mental health. A biologically intact infant who experiences a poor caretaking environment is potentially at risk of mild to moderate developmental delay. Children at risk for the worst developmental outcomes are those who have a combination of biological and environmental risk factors; these risk factors operate in a cumulative fashion, so that the more risk factors present the greater the likelihood of a poor developmental outcome.

Attempts to improve developmental outcomes have focused on a variety of interventions at a biological and environmental level. Many interventions have been shown to minimise biological risk. These include ensuring complete immunisation to reduce the risk of maternal infection during pregnancy (e.g. rubella); giving folate supplements during pregnancy to reduce the risk of structural abnormalities of the central nervous system such as anencephaly and spina bifida; advising pregnant women to significantly decrease or refrain from alcohol, tobacco and drug use during pregnancy; testing for genetic disorders during the first trimester of pregnancy and providing specialised genetic counselling in instances where there is a family history of developmental disability; and fetal monitoring for high risk pregnancies.

Similarly there have been attempts to minimise environmental risk with a host of intervention programs designed to improve the quality of the caretaking environment by offering parent support and education, and early education programs designed to provide rich and stimulating learning experiences for infants and young children. These are explored in detail in this review.

## 4. RISK/PROTECTIVE FACTORS: WHAT DETERMINES OUTCOMES?

### 4.1 Introduction

Longitudinal studies, by examining the life course and circumstances of a group of individuals over time, identify the factors that are associated with an increased likelihood of negative outcomes (risk factors) and those that are associated with a decreased likelihood of negative outcomes (protective factors).

One important advantage of longitudinal studies is the ability to investigate relationships between measures taken early in a child's life and outcomes in later childhood, adolescence and adult life. Such studies can therefore identify factors that might be causally related to later problems, and may thereby guide the design of interventions. Given the richness of the data collected by many longitudinal studies, a wide variety of putative risk and protective factors can now be evaluated. Variation in the measures obtained by different studies across time, however, makes any synthesis of the literature a challenging task.

## 4.2 Major studies reviewed

A number of longitudinal studies were reviewed. The longitudinal studies summarised in Table 1 (pp8-11) identify a variety of individual, familial and community risk and protective factors for young children that are associated with differential outcomes over time. These risk and protective factors, together with others identified from additional studies referred to briefly in this section, are summarised in Table 2 (p.12) and Table 3 (p.13) respectively. The longitudinal studies also serve to highlight two important findings. Early childhood risk factors are associated with a wide variety of adverse outcomes, and these may be evident in either the short or the long-term. The major adverse outcomes associated with early childhood risk factors are summarised in Table 4 (p.14).

These tables provide an overview of the risk and protective factors that may impact on young children and identify the range of possible adverse outcomes. The relationship between these factors is quite complex, however, and warrants further comment.

### 4.2.1 Complex Interaction Between Risk Factors

Risk factors for adverse outcomes often co-occur, and they may have cumulative effects over time. Common indices of family adversity, for example, often cluster together and appear to have long standing effects on children's health and development. Results from the Dunedin Longitudinal Study indicate that ongoing family adversity is a risk factor for attention difficulties, poor cognitive performance and delinquency (Silva and Stanton 1996). Family disadvantage has also been linked with greater absenteeism from school due to ill health, and a lower usage of preventative health services such as immunisation (Power 1992). The cumulative effect of familial stressors such as low socioeconomic status, young maternal age at birth, large family size and family instability may therefore have a pervasive effect on the well being of young people. These results – the cumulative effects of multiple risk factors – have been confirmed by the Australian Temperament Study (Sanson et al. 1991).

The numerous factors commonly summarised as family disadvantage or family adversity by these longitudinal studies may have a multiplicative effect on the risk of adverse outcomes in children. Rutter (1970; 1978), for example, demonstrated

that children exposed to six indices of family adversity had 20 times the risk of adverse behavioural or cognitive outcomes compared to children exposed to one or none of the same risk factors. It is important to note that familial risk indices may index a diversity of genetic and environmental risk factors. Parents may transmit genetically mediated risk or protective factors to their children, and they also provide the child's rearing environment. A child's genotype is therefore correlated with their family environment, and genetic and environmental risk or protective factors may interact in a very complex fashion (eg. Goodman and Gotlib 1999).

Table 1 Major Longitudinal Studies Reviewed

STUDY DETAILS	EARLY CHILDHOOD RISK FACTORS	EARLY CHILDHOOD PROTECTIVE FACTORS	ASSOCIATED OUTCOMES
<p><b>Kauai Longitudinal Study</b>                      Sample size: 698                      Location: Hawaii, USA                      Year: 1955                      Age at entry: Prenatal                      (Werner and Smith 1992)</p>	<p>Low birth weight, prematurity, birth injury                      Poverty                      Low maternal education                      Family conflict, breakdown, parental desertion                      Parental alcoholism                      Parental mental illness</p>	<p>Easy temperament                      Positive social skills                      Early language, locomotion and self-help                      At least average intelligence                      Close bonding and attachment                      Positive attention                      Three or fewer siblings                      Spacing of children by at least 2 years                      Religious faith</p>	<p>At 8 years: serious learning or behaviour problems                      At 18 years: delinquency, mental health problems, teenage pregnancy                      Resilience</p>
<p>Mater 900                      Sample size: 8,556                      Location: Queensland, Australia                      Year: 1981                      Age at entry: Prenatal                      (Keeping et al 1989, Najman et al 1997)</p>	<p>Change of mother's partner or conflict between mother and partner</p>		<p>Anxiety/depression and/or behavioural problems</p>

Table 1 continued

<p><b>National Child Development Study</b>                  Sample size: 17,733                  Location: United Kingdom                  Year: 1958                  Age at entry: Birth                  (Power 1992)</p>	<p>Chronic illness eg. Asthma                  Speech difficulties                  Low family socio-economic status                  Poor housing                  Disability</p>		<p>Poor emotional health eg. Social isolation                  Poor school achievement, behaviour problems                  Obesity in early adulthood, poor school achievement, behaviour problems, increased absence from school due to illness                  Domestic accidents                  Wide ranging disadvantage, including higher unemployment</p>
<p><b>Dunedin Multidisciplinary Health and Development Study</b>                  Sample size: 1,037                  Location: Dunedin, New Zealand                  Year: 1972/73                  Age at entry: Birth                  (Silva and Stanton 1996)</p>	<p>Difficult temperament                  Hyperactivity at 3 years                  Delayed language development                  Parental disagreement about discipline                  Low socioeconomic status, parental separation, early reading failure, language difficulties, hyperactivity</p>	<p>Breast feeding                  Less authoritarian and controlling parenting style</p>	<p>Persistent aggressive or emotional behaviour                  Mental health problems, poor cognitive, language and academic attainment                  Reading difficulties, behaviour problems                  Delinquent, aggressive behaviour                  Persistent psychiatric disorder through childhood into adulthood                  Small intellectual gains and improved language development</p>

Table 1 continued

<p><b>Californian Child Health and Development Study</b>                  Sample size: 19,044                  Location: California, USA                  Year: 1959 -67                  Age at entry: Prenatal                  (van den Berg et al 1988)</p>	<p>High blood pressure during pregnancy                  Maternal smoking during pregnancy                  Heavy alcohol and coffee use in pregnancy                  Impulsive / extrovert/ angry/ restless</p>		<p>Increased risk of perinatal mortality                  Low birth weight                  Increase in severe congenital abnormalities                  Initiation of smoking at 15 – 17 years</p>
<p><b>Christchurch Child Development Study</b>                  Sample size: 1,265                  Location: Christchurch, New Zealand                  Year: 1977                  Age at entry: Birth                  (Ferguson et al 1989, Ferguson and Lynskey 1997, Ferguson and Horwood 1998)</p>	<p>Harsh physical punishment                  Child abuse                  Exposure to inter-parent violence                  Initiated by father                  Initiated by mother</p>		<p>Violent offending, suicide attempts, victim of violence, alcohol abuse                  Anxiety, conduct disorder, property crime                  Alcohol abuse/dependence</p>
<p><b>Australian Temperament Project</b>                  Sample size: 2,443                  Location: Melbourne, Australia                  Year: 1983                  Age at entry: Birth/Infants                  (Sansone et al 1991)</p>	<p>Difficult temperament                  Behavioural difficulties                  Perinatal stress                  Prematurity                  Gender (male sex)                  Mother's overall perception                  Problems with mother-infant dyad                  Low socio-economic status                  Non-Australian parents</p>		<p>Behavioural problems in preschool</p>

Note: Table 1 identifies only the factors from each study considered most relevant to this review. Only a selection of studies have been reviewed.

Table 2 Risk Factors In Early Childhood Associated With Adverse Outcomes

CHILD CHARACTERISTICS	PARENTS AND THEIR PARENTING STYLE	FAMILY FACTORS AND LIFE EVENTS	COMMUNITY FACTORS
low birth weight birth injury disability low intelligence chronic illness delayed development difficult temperament poor attachment poor social skills disruptive behaviour impulsivity	single parent young maternal age depression or other mental illness drug and alcohol abuse harsh or inconsistent discipline lack of stimulation of child lack of warmth and affection rejection of child abuse or neglect	family instability, conflict or violence marital disharmony divorce disorganised large family size / rapid successive pregnancies absence of father very low level of parental education	socioeconomic disadvantage housing conditions

Table 3 Protective Factors In Early Childhood Associated With Prevention of Adverse Outcomes

PROTECTIVE FACTORS			
CHILD CHARACTERISTICS	PARENTS AND THEIR PARENTING STYLE	FAMILY FACTORS AND LIFE EVENTS	COMMUNITY FACTORS
social skills easy temperament at least average intelligence attachment to family independence good problem solving skills	Competent, stable care breast feeding positive attention from parents supportive relationship with other adults religious faith	family harmony positive relationships with extended family small family size spacing of siblings by more than 2 years	positive social networks (eg. peers, teachers, neighbours) access to positive opportunities (eg. education) participation in community activities eg church

Table 4 Adverse Child Health Outcomes

PHYSICAL HEALTH	BEHAVIOUR	LEARNING / SCHOOL	EMOTIONAL / MENTAL HEALTH
failure to thrive child abuse and neglect poor physical health	aggression attention difficulties deviant peer group risk taking - substance abuse delinquency offending	poor cognitive development poor speech and language development poor reading skills / illiteracy school failure / early school leaving	poor attachment anxiety depression alienation suicidal ideation or suicide

#### 4.2.2 Risk and Protective Factors Vary According To Life Stages

It is beyond the scope of this paper to discuss other than briefly the risk and protective factors that operate beyond early childhood. It is important to note, however, that risk and protective factors may change over time. The salience of risk or protective factors may vary with age, and this may vary by gender, race or the cultural context in which a child develops.

#### 4.2.3 Pathways Through Childhood

Although a child's pathway through life is necessarily influenced by many disparate factors, sometimes a chain of causal events can be traced from a very early age. One striking example is the origins of life-course-persistent delinquent behaviour. The Dunedin Longitudinal Study (Silva and Stanton 1996) identified many early risk factors for neurological dysfunction that predicted life-course-persistent delinquent behaviour. These included: maternal alcohol or drug abuse, complications during pregnancy and delivery, heritable differences in brain development, poor prenatal and postnatal nutrition, exposure to toxic agents such as lead, deprivation of stimulation and affection during infancy, and maltreatment and neglect. These early risk factors were subsequently associated with poor motor co-ordination, attention deficit disorder, hyperactivity, impulsive self-control problems, language impairments and learning difficulties. Prenatal and infant risk factors for neurological dysfunction associated with poor nurturing and exposure to violence may therefore set limits on the growth of healthy social behaviour and affectional bonds at home and academic achievements at school. This may lead to behavioural problems that culminate in life course persistent anti-social behaviour.

It is important to recognise, however, that risk is not destiny. Many "high risk" children who have been followed up over long periods of time, such as those exposed to chronic family adversity from a young age, do not develop intractable problems in childhood or later life. Such resilience has been variably defined as a good developmental outcome despite high risk, sustained competence under stress, or recovery from trauma (Werner 1997).

In the Kauai Longitudinal Study (Werner 1997), children who were resilient in the face of chronic family adversity were more likely to have temperaments characterised as active, affectionate, good-natured and easy to deal with. By the time they reached pre-school age, resilient children had developed a coping pattern that combined autonomy with help seeking when needed. By primary school age, these children were good communicators and problem solvers. They believed in the effectiveness of their own actions (sometimes referred to as an external locus of control), and had high self-esteem and a marked sense of responsibility. By adolescence and young adulthood, these resilient children had mostly become outgoing and autonomous, nurturing and emotionally sensitive.

In the Kauai Longitudinal Study (Werner 1997), familial and extra-familial factors also played an important role in the development and maintenance of resilience. The presence of a competent, stable caregiver attuned to the child's needs was crucial. These caregivers were often siblings or grandparents who assumed the role of a surrogate parent and were able to provide sufficient nurturing to allow the child to establish a basic sense of trust. The social networks available to children beyond their immediate family were also shown to be protective. Such networks included competent and responsible peers, teachers, youth workers, neighbours and parents of friends.

Across a variety of cultures, families of resilient children are often characterised by religious beliefs that provide stability and meaning in times of hardship and adversity (eg. the Lund Longitudinal Study: Dahlin et al. 1990; the Kauai Longitudinal Study: Werner et al. 1997). Finally, the presence of positive opportunities at major life transitions represents a second chance for many at risk individuals. These opportunities may include access to adult education programs, military service, participation in community or church groups, and the presence of a supportive friend or marital partner (Magnusson 1988).

The pathways to resilience are clearly complex, but provide many opportunities for interventions that aim to foster and reinforce the advantages conferred by a stable primary care giver, an easy temperament, the early development of academic and social competencies and a supportive social and community network.

## **5. INTERVENTION STUDIES: HOW CAN WE INFLUENCE OUTCOMES?**

### **5.1 Introduction**

The identified risk and protective factors provide a framework through which effective changes or intervention programs can be developed that might prevent adverse outcomes for children. A key aim of interventions is to either reduce the risk factors or increase the protective factors operating. Study of the outcomes of these interventions determines whether or not the programs have been effective.

Interventions that might make a difference to adverse outcomes in early childhood include preschool and child care programs, (both universal and targeted or enhanced early childhood programs), health surveillance programs, home visiting programs, parenting programs and programs for children with developmental delay or disability. Each of these is discussed below.

The intervention studies reviewed here have generally sought to bring about changes in the child, mother and/or family in order to improve outcomes for children. No studies were identified of programs that included a significant focus on community risk factors. Theoretically, environmental interventions might be capable of widespread social change at the community or societal level, but such trials have yet to be conducted (Durlak 1997). Looking from the individual child,

to the family and the community is a reminder that outcomes for developing children are not solely the responsibility of early childhood intervention programs, but are rather shared with the whole community and its institutions, as well as with families.

## 5.2 Preschool and child care

### 5.2.1 Universal Services

Preschool is generally universally available at relatively low cost in Australia and participation rates in most communities have been quite high for many years. As well, an increasing number of families use child care as more women participate in the workforce (Ochiltree 1994). The distinction between these two service types is diminishing, particularly in the year before children enter school. Many families need and want both child care and early education.

Preschool and child care services have a very important role in our society but what impact do they have on children? A US review of 15 studies of early childhood programs in 13 other countries (Boocock 1995) provides the most comprehensive available information about the influences of childhood programs on child development and later school success. The review included studies of programs for children ranging in age from birth to school entry. As these were not controlled trials, results must be considered with caution. Study designs included:

- large scale surveys,
- studies comparing children with different child care or preschool experiences, and
- evaluations testing the impacts of particular early childhood programs or program models.

Programs types reviewed were:

- preschool education,
- child care for children with parents in the workforce, and
- programs offering a broad set of health and support services as well as care and/or education to a disadvantaged group. (These are discussed in 5.2.2 below)

In examining studies of preschool programs, Boocock noted that the most highly developed early childhood systems might be found in Western Europe. Like Australia, the countries in which the studies were conducted have strong universal early childhood service systems. The review considered large-scale studies of French, German and British preschool systems and found evidence that preschool attendance under the standard conditions of well established preschool services can provide positive effects on children's school readiness and their later academic performance. This seems to be true of both preschool systems with

national uniformity and those with much greater diversity of services providers and programs.

With regard to studies of child care programs, Boocock noted that many Swedish children experience some form of out-of-home care early in life. A Swedish study included in the review followed a sample of 128 children born in 1975 from age three to 13, in order to compare the relative outcomes of different types of early care. Children who experienced centre based child care or family day care before age one had superior language development, were more persistent and independent, less anxious and more confident than children cared for at home or children entering child care at a later stage. The study suggests that non-parental care, even for infants in quality long day care, need not have adverse effects on children's development and well being. It was suggested that the positive findings from this study might reflect the high standards of Swedish child care. Sweden provides public child care that is well funded and supported by regulations regarding staffing patterns and training, group size, daily routines and the design of children's environment.

One Australian study was included in this review. The Australian Early Childhood Study gathered data from 8,471 urban mothers in the early 1970s to examine any association between early experience of child care and children's socio-emotional development. It found that aspects of the home environment affect children's social and emotional development as much as or more than the experiences they have in child care. This was consistent with the findings of two Swedish studies also reviewed.

On the basis of the evidence from the studies reviewed, Boocock concluded that:

- There is widespread evidence that participation in a preschool program promotes cognitive development in the short term and prepares children to succeed in school.
- There is no strong or consistent evidence that the form of the preschool experience (teaching approach, daily schedule or setting) influences long term outcomes.
- Preschool experience appears to be a stronger positive force in the lives of low income than advantaged children.
- Preschool attendance can narrow the achievement gaps faced by disadvantaged children, though most of these effects appear to diminish over time.
- Maternal employment and participation in out-of-home care, even during infancy, appear not to harm children and may yield benefits if the child care is regulated and of high quality.

In summary, there is considerable evidence that preschool and child care services can have a positive effect on child developmental outcomes.

### 5.2.2 Enhanced and/or Targeted Early Childhood Programs

In Australia most children participate in universally available preschool and/or child care programs prior to school entry. In the US, due to the absence of a strong universal system of early childhood services, and in response to the fact that 40% of children are growing up in poverty (Carnegie Corporation 1994), many targeted early childhood care and education programs have been established.

The most comprehensive available review is that of Barnett (1995), who reviewed 36 studies and considered the extent to which children experience long-term benefits in cognitive development, socialisation and school success.

Four criteria were used to select programs for inclusion in the review:

- commenced with children at or before four years of age;
- targeted group was low socio-economic families;
- at least one outcome measure of cognitive development, school progress or socialisation was made after age eight years, and
- the research design employed a non-treatment control group.

Of the 36 studies included, 15 of were model programs – small-scale programs offering a specially designed program that the researchers considered likely to be exemplary. They all included centre-based education and care; most provided home visiting and three offered parent support and development programs.

The other 21 studies were of larger scale programs, including public school preschools and Head Start programs. Head Start programs, in addition to providing care and education for children, aim to improve health and nutrition and provide services to parents.

In the review Barnett examined the outcomes of the programs, with particular attention to intelligence quotient (IQ), achievement in reading and maths, school progress and placement, and socialisation. Findings in relation to each of these outcomes are examined:

- IQ: The most common pattern for both program types was for IQ to increase by the time the children had entered primary school but to fade out, in most cases, quite rapidly thereafter. An exception to this trend was found in two model programs that provided educational day care from the first year of life. Children who attended these two programs were found to have small increases in IQ that was sustained into adolescence.

- Achievement in reading and maths: In the 1995 review, Barnett found that there was considerable variation in sustainment of reading and maths improvement, with the model programs achieving more sustained improvement than the large scale programs. He reported that results ranged from no improvement in four studies to significant improvement that was sustained at least until adolescence. However, three years later Barnett (1998) re-examined this aspect of the studies and suggests that the apparent variation in sustainment of improvement in maths and reading was a result of methodological flaws in many of the study designs. He argues that this new analysis of the data suggests that it is very likely that these gains are sustained.
- Effects on school progress and placement: Barnett (1995) found that six of the model programs and ten of the larger scale programs had a long-term positive effect on rates of grade retention and need for special education. One of the studies, that of Perry Preschool, a model program, also found significant effects on the rate and duration of placement in special education programs. A smaller number of the studies found positive effects on high school graduation rates.
- Socialisation: Socialisation was not the primary focus of most of the studies that Barnett reviewed but it did receive some attention, particularly in the model programs. Children in two programs were found to have increased aggression at school entry but there was no evidence that this was sustained. Two programs found that model program children continued to have improved behaviour later in primary school. Social adjustment as rated by teachers was mixed, with two studies finding evidence of improvement, and two finding no significant change. Only two studies obtained data on delinquency and crime and both showed a positive effect. Barnett notes that the Perry Preschool Program study provides the longest and most intensive follow up of effects on socialisation. At age 27 it found that children who had attended the program had an increased commitment to school, more positive relationships with friends, greater economic success and, for girls, increased marriage and fewer births while unmarried.

On the basis of the evidence from the studies reviewed, Barnett concluded that:

- Early childhood and development programs can produce large effects on IQ during the early childhood years and sizeable, persistent effects on reading and maths achievement, grade retention, special education, and socialisation.
- Both the larger scale programs (public school preschool and Head Start programs) and the model programs produced the same type of effects but the effects of the better-funded model programs were larger.

- Early childhood and development programs make a significant difference to the lives of disadvantaged children, the target group for all programs included in the review.
- The Perry Preschool Program is one of the most successful of the programs (a detailed description of the program is provided in Table 5 p.21).

**Table 5 The Perry Preschool Program**

The key intervention component in the Perry Preschool Program was the provision of a quality preschool experience. Teachers used a framework of active learning experiences in their interactions with the children.

The preschool personnel were trained teachers with at least one black teacher involved. Classes were conducted very weekday morning for two hours in group with an average of 5-6 children per teacher. Teachers visited the children's homes weekly to encourage parental involvement and to implement the preschool curriculum at home.

There were 10 categories of key experiences: creative representation, language and literacy, social relations and personal initiative, movement, music, classification (recognising similarities and differences), number, space and time. Within each category there were several specific learning experiences. For instance, the category of social relations and personal initiative included:

- making and expressing choices
- solving problems encountered by play
- expressing feelings in words
- participating in group routines
- being sensitive to the feelings, interests and needs of others
- building relationships with children and adults
- creating and experiencing collaborative play
- dealing with social conflict

Emphasis was placed on children engaging in activities that involved making choices, solving problems and taking responsibility in an environment that provide a consistent daily routine.

(National Crime Prevention 1999)

### 5.3 Child health surveillance

Child health surveillance activities provide an opportunity for the early identification of diseases or conditions and risk factors that put children at risk of adverse outcomes, and for facilitating appropriate intervention.

Recent years have seen a shift in emphasis from screening (which implies professionals administering tests to children) to surveillance (which actively elicits parental concerns and makes parents and families a focus of efforts of early detection). More recently there has been a further shift towards attempting to develop systems that promote the health and well-being of all children, recognising that a number of adverse circumstances, especially environmental, may have a significant impact on outcomes.

A focus of many surveillance and screening activities is the detection of a range of diseases and conditions ranging from medical conditions (eg. cystic fibrosis, phenylketonuria) to developmental concerns (eg. language, vision, hearing) to psychosocial concerns (eg. behaviour problems, postnatal depression) (Commonwealth Department of Health and Aged Care 1998). While the rationale for such programs may seem self-evident, only a small proportion of childhood screening and surveillance activities has been demonstrated to be effective. The remainder have either not been evaluated, or, worse, have been demonstrated to be ineffective (Wake 1999). It is beyond the scope of this review to consider each of the elements of a comprehensive child health surveillance program. It should be noted that a review of the literature in relation to child health screening and surveillance is currently being undertaken by the Centre for Community Child Health for the National Health and Medical Research Council as part of a project to review and update national child health screening guidelines.

Anticipatory guidance is a major health promotion activity that is generally provided through child health surveillance programs. A recent review of studies of the effectiveness of anticipatory guidance found evidence that it promotes children's development (Dworkin 1998). The specific findings included:

- improved nutritional and dietary habits
- improvement in some aspects of development and behaviour (night waking, toilet training, separation difficulties)
- increases in children's self-confidence
- positive changes in mothers' behaviour (more appropriate interaction, cooperation and sensitivity to their infants)
- advanced infant language development

Dworkin also noted, however, that exactly which components of anticipatory guidance are effective have yet to be teased out. He suggests that eliciting

parents' opinions and concerns and encouraging parents to set the agenda for discussion of child development may prove more effective than adhering to a listing of suggested topics for discussion.

#### 5.4 Supporting families through home visiting

It is estimated that over half a million children in the US are enrolled in home visiting programs that provide services to pregnant women and families with young children. There are many program goals including the promotion of child health and development, promotion of school readiness, prevention of child abuse and neglect, improvement in parenting skills and improvement in mothers' lives (The Future of Children 1999). In order to consider the evidence relating to outcomes for children from home visiting programs, seven different studies, five from US, one Australian and one Irish, will be considered (Table 6 p.26).

The studies considered were included because of the high standard of evaluation that was undertaken. However, problems that may have contributed to wide variation in the attainment of their respective goals were identified. Most of the US programs struggled to implement services as intended by their program models. For example, the Comprehensive Child Development Program was introduced in 21 sites and involved 4,410 families. Despite its huge cost it was found not to have a positive effect for families when compared to the comparison groups. Individual sites experienced difficulties integrating with existing services. This contributed to difficulties with the model's case management approach that relied on the program worker broking services from other providers. As well, families received only half the number of visits intended in the model. To some degree this latter problem was shared by all of the US programs. The Comprehensive Child Development Program and four other programs also experienced difficulty engaging families and experienced high rates of attrition, ranging from 20% to 67% across the five programs (The Future of Children 1999). Nonetheless, together these studies form the strongest evidence available as to the efficacy of such interventions. The evidence relating to the outcomes of these programs for each of these goals will be considered in the next section.

- Promotion of child health and development: Controlled studies of US home visiting programs that sought to improve child health and development, including Hawaii's Healthy Start (Duggan et al. 1999), Teachers as Parents (Wagner et al. 1999), and the Comprehensive Child Development Program (St. Pierre et al. 1999), have not found evidence that this has been achieved consistently or to any significant extent. In contrast, the Dublin Community Mothers' Program (Johnson et al. 1993) found that infants in the intervention group were more likely to have received all their primary immunisation and was less likely to receive a poor diet. Although the study of the Nurse Home Visitation Program (Olds et al. 1999) found no improvement in these areas at four year follow up, the 15 year follow up found fewer arrests and

convictions, reduced use of alcohol and drugs and fewer sexual partners within the cohort studied.

- **Promotion of School Readiness:** Studies of the Home Instruction Program for Preschool Youngsters (HIPPO) (Baker et al. 1999), a program specifically designed to help parents with limited education prepare their four and five year old for school, focused on two groups of children, each with a separate comparison group. The results were mixed. The children in the first group showed some increased school readiness, compared to their comparison group. Conversely, studies of the second group found that the comparison group children out-performed the HIPPO children. Subsequent analyses excluded a number of possible explanations for these different results from the two groups: program variation, different attrition rates between the groups, and family characteristics. The differences between the two groups could not be accounted for by the study.
- **Improvement of Parenting Skills:** A number of studies of home visiting programs have found evidence of an improvement in parenting skills. The study of the Dublin Community Mothers' program found that the mothers read more to their children and provided more cognitive games (Johnson et al. 1993). The evaluation of the Hawaii Healthy Start program found improved parenting efficacy and more use of non-violent discipline (Duggan et al. 1999). Recent results from a Queensland home visiting program targeted to high risk families during the first six weeks of life found that mother-infant interactions were more likely to be positive and that there was significant evidence of improved maternal-infant secure attachment, compared to the comparison group (Armstrong et al. 1999). Others studies of home programs that sought to improve parenting skills found no evidence of significant improvement (St. Pierre et al. 1999; Wagner et al. 1999),
- **Prevention of Child Abuse and Neglect:** The Nurse Home Visitation Program, a model in which nurses' visits to mothers begin during pregnancy and continue until the child's second birthday, has been the focus of a twenty year research program (Olds et al. 1999). Aspects of the curricula delivered by the nurses promoted positive parent-child interaction, promoted emotional and cognitive development of the child and created safer households. A recent 15 year follow up found evidence that the program was successful in reducing the rates of child abuse and neglect among low-income unmarried women. It is unclear from the study which specific component (or combinations of components) of the intervention was responsible for this finding. The goal of reducing child abuse and neglect was shared by Hawaii Healthy Start and Parents As Teachers, but, studies of these programs (Duggan et al. 1999; Wagner et al. 1999) found no evidence of reduced child abuse and neglect.

- Improvement of Mothers' Life: A number of home visiting programs have sought explicitly to improve the life course of women and found some evidence of improvement. A study of the Home Nurse Visitation Program (Olds et al. 1999) found that the women had fewer rapid successive pregnancies, increased participation in the work-force and lower rates of substance abuse and criminal behaviour. A study of the Dublin Community Mothers' program found that the mothers' had an improved diet and improved self-esteem and confidence. Finally the study of a Queensland infant home visiting program found decreased postnatal depression screening scores (Armstrong et al. 1999). Conversely, a study of the Comprehensive Child Development Program (St. Pierre et al. 1999), which sought to improve the mothers' physical and mental health, and impact positively on life skills, education and employment, found no improvement in these areas.

In summary, there is evidence that some programs can be effective, but there have been great difficulties in implementing and operating these programs. This, and the fact that they seem to be most effective when administered to extremely deprived women, argue against rushing to implement similar programs in Australia without due caution and rigorous evaluation and quality control. There is also considerable variation in models, including onset, intensity and duration of visits, as well as the background of the visitors (professionals, para-professionals, volunteers) and the specific curriculum delivered by the visitors.

Table 6 Home Visiting Studies Reviewed

PROGRAM	GOALS	ONSET, FREQUENCY AND DURATION OF VISITS	TARGET GROUP	BACKGROUND OF HOME VISITORS
<p><b>Comprehensive Child Development Program</b> (USA) (St. Piere and Layzer 1999)</p>	<p>Enhance the physical, social, emotional, and intellectual development of children Provide support to family Improve families' economic self-sufficient</p>	<p>Birth to one year old through fifth birthday Biweekly</p>	<p>Low-income families, all ethnicities, of 24 sites in the United States</p>	<p>Para-professionals and those with associate's degrees or other forms of post-high school training</p>
<p><b>Hawaii Healthy Start</b> (USA) (Duggan et al 1999)</p>	<p>Advance optimal child development Promote positive parenting, enhance parent-child interaction Assure medical care Prevent child abuse and neglect</p>	<p>Birth through fifth birthday Weekly, fading to quarterly</p>	<p>All parents of newborns identified at risk for abuse and neglect</p>	<p>Para-professionals and those with bachelor's degrees</p>
<p><b>The Home Instruction Program for Preschool Youngsters (HIPPY)</b> (USA) (Baker et al 1999)</p>	<p>Empower parents as primary educators of their children Foster parent involvement in school and community life Maximise children's chances for successful early school experiences</p>	<p>1 or 2 years before school entry Biweekly during the school year</p>	<p>Families in the United States and Guam, all income levels and ethnicities</p>	<p>Para-professionals; most work part time)</p>
<p><b>Nurse Home Visitation Program</b> (USA) (Olds et al 1999)</p>	<p>Improve pregnancy outcomes Improve child health and development Improve families' economic self-sufficiency</p>	<p>Prenatal through second birthday Weekly, fading to monthly</p>	<p>Low-income, first-time mothers, all ethnicities</p>	<p>Public health nurses</p>

Table 6 Home Visiting Studies Reviewed continued

PROGRAM	GOALS	ONSET, FREQUENCY AND DURATION OF VISITS	TARGET GROUP	BACKGROUND OF HOME VISITORS
<p><b>Parents as Teachers</b> (USA) (Wagner and Clayton 1999)</p>	<p>Empower parents to give their children the best possible start in life Give a solid foundation for school success Prevent and reduce child abuse Increase parents' competence and confidence Develop home-school community partnerships on behalf of children</p>	<p>Prenatal through third birthday Monthly, biweekly, or weekly, depending upon family needs and funding levels</p>	<p>Families in the United States and six other countries, all income levels and ethnicities</p>	<p>Para-professionals and those with associate's, bachelor's and advanced degrees</p>
<p><b>Brisbane Home Visiting Program</b> (Australia) (Armstrong et al 1999)</p>	<p>Enhance parenting self esteem and confidence Provide anticipatory guidance for normal child development child development problems (eg. crying or sleep behaviour) Promote preventive child health care Facilitate access to community services.</p>	<p>Weekly first six months, fortnightly until three months, monthly until six months</p>	<p>Women experiencing domestic violence, childhood abuse of either parent, sole parenthood and domestic violence and pregnancy</p>	<p>Child health nurses</p>
<p><b>Dublin Community Mothers</b> (Ireland) (Johnson et al 1993)</p>	<p>To raise self esteem and confidence of mother to empower them to be better parents</p>	<p>Monthly visits during the first year of life</p>	<p>First-time mothers who lived in a deprived area of Dublin</p>	<p>Non professional "community mothers" on low salary</p>

## 5.5 Parenting education programs

There were numerous attempts in the 1970s to review parent education programs but most were limited to Adlerian programs or Parent Effectiveness Training (PET). Many studies on the effectiveness of parent training programs have been limited in scope due to methodological deficiencies including inappropriate research design and absence of quantitative data. Two studies of individual programs that used a randomised controlled trial approach have been included in this review, as well as a report of a systematic review of the effectiveness of parent-training programs in improving behaviour problems in children aged three-ten years.

Parent training provides an opportunity to strengthen parenting behaviour, to reduce risk factors and promote protective factors in order to attempt to improve outcomes for children. But are these programs effective?

The first study reviewed the effectiveness of a structured parenting program provided to 394 parents recruited from Head Start programs (Webster-Stratton 1998). It found positive effects on both mothers and children, compared to control groups. The intervention consisted of eight weekly parent group meetings that used videotapes of modelled parenting skills and focused group discussion. The program was found to reduce maternal criticism of the child and reduce the use of harsh discipline. Mothers were found to be more positive and competent in their parenting. The children were observed to exhibit significantly fewer behaviour problems and less non-compliance and to have a more positive affect. When followed up one year later, most of the improvements had been sustained.

The Positive Parenting program, developed at the University of Queensland, is a multilevel preventively oriented parenting and family support strategy (Sanders 1999). It aims to prevent severe behavioural, emotional and developmental problems by enhancing the knowledge, skills, and confidence of parents. Aspects of the program have been evaluated since 1977. A recent large scale randomised control trial of an intervention for three year old children with high levels of disruptive behaviour from families with high levels of parenting conflict, maternal depression, single parent status or low socioeconomic status was undertaken (Sanders 1999). Interventions were of three levels: standard, enhanced and self directed. Both the standard and enhanced interventions involved therapists working with children, whereas the self-directed program did not. The study found that the groups that received the therapist delivered programs had lower levels of disruptive child behaviour, lower levels of dysfunctional parenting, greater parental competence and higher consumer satisfaction, compared to those in the self directed program and the control group. However, at a one-year follow up all three intervention groups had similar and significant levels of improved behaviour.

The Health Services Research Unit in Oxford undertook a systematic review of the published literature on the effectiveness of parent-training programs in improving behaviour problems in children (Barlow 1997). The review showed that much of the research on the effectiveness of group based parent training programs is methodologically flawed. Over half the studies provided insufficient data to calculate effect sizes, which would have facilitated further comparison between studies and different outcome measures. Based on data from only high quality studies, the review found that:

- All group-based programs produced changes in children's behaviour.
- Programs taking a behavioural approach were most effective in improving behaviour problems in children.
- Community based group parent-training programs produced more changes in children's behaviour and were more cost effective and user friendly compared to individual clinic-based programs.

### 5.6 Programs for children with developmental delay or disability

The main studies of interventions for children with developmental delay or disability have been undertaken in the US and have focussed on children with developmental delays and disabilities due to both environmental and biological factors. Schonkoff (1987) reviewed 31 selected studies of USA programs which showed that the effects of early intervention for children with disabilities under three years was effective in promoting developmental progress in infants and toddlers with biologically based disabilities. Programs targeting both parents and children were identified as the most effective. He noted that definitive evaluation of the efficacy of early intervention programs is tempered by the restricted range of outcomes measured and by a paucity of information about the characteristics of children and families enrolled in such programs and the specific nature of services received. In a later review of 105 efficacy studies Dunst, Snyder and Mankinen (1989) examined the manner which intervention and non-intervention factors effected child, parent and family functioning. Key major conclusions regarding efficacy included:

- The large majority of children who participated in early intervention programs make developmental progress and manifest behaviour change over time, although the specific nature of the intervention which effected the change was unclear;
- The most convincing evidence regarding the efficacy of early intervention came from studies of environmentally at risk infants;
- There was very little evidence to support the contention that therapeutic type interventions affect changes in child progress.

Early research in the early intervention area was primarily designed to identify specific ways in which parental wellbeing and parenting skills or both were affected by participation in early intervention programs. It has since been acknowledged that the scientific rigour of studies in this area was problematic. Given the nature of the early research, results were not compelling in terms of the efficacy of the interventions and were often contradictory (Guralnick and Bennett 1987). In 1991 Guralnick noted that *“existing research tends to be global in nature with relatively poor documentation of the characteristics of the interventions themselves and inadequate descriptions of the children and families who participated”*.

Since the 1990s there has been a shift in how people conceptualise desirable impacts of early intervention programs on families. Implicit in this is a belief that the best way to ensure positive effects on families and their children is to have individual families drive the service system according to their own goals and needs. This approach recognises family differences in parenting styles and contexts and has a deeper appreciation of the importance of adaptive family functioning. Outcomes have become more broadly defined with the shift in focus from the mother/child relationship to the capacity of parents to meet the needs of the entire family. This has resulted in an expansion in the diversity of expected outcomes. For example, Guralnick and Neville (1997) identified social competence as a central feature of early intervention programs and argued that an effective program would:

- Focus on longer term goals
- Integrate skills and abilities associated with basic developmental domains into a social context
- Conceptualise assessment and intervention activities within a developmental model that considers the influences of various contexts
- Emphasise parent/child emotional and social relationships
- Use construct of social competence when organising curricula activities
- Consider the importance of underlying processes such as attention, shared understanding and emotion regulation
- Focus on strategies and adaptations in context not on specific behaviours
- Value contributions from the child’s natural environment
- Emphasise broader relationships in community support systems for families
- Encourage social competence exchange

## 6. COST EFFECTIVENESS

The RAND Corporation (Karoly 1998), a US non-profit institution that aims to improve policy and decision making through research and analysis, undertook a cost benefit analysis of the Perry Preschool program and the Nurse Home Visitation Program. Both programs are targeted to disadvantaged families and have been discussed in earlier sections. Subsequent savings included were the cost of special education, reduced welfare payments, reduced incarceration, increased income and taxes. For an investment of \$12,000 for providing the Perry Preschool program to one child, it was estimated that a later saving of \$25,000 would be made. For the Nurse Home Visitation Program the costs per child were calculated at \$6,000 and the savings at \$24,000. The report concluded that for some disadvantaged children and their families, considerable cost savings could be made by investing in early intervention.

The report suggested no net savings for the lower risk participants, although it was acknowledged that the methodology did not include savings from future taxes and welfare savings and the crimes that were prevented. The non-monetizable benefits of the programs, that is the outcomes for children and their families, were not considered in these calculations.

## 7. THE AUSTRALIAN CONTEXT

Few of the studies that have been reviewed were Australian. It appears that few Australian early childhood programs have been studied using rigorous research methods. This situation is changing and the need for the evaluation of programs and services is being increasingly recognised. Following an audit of Australian home visiting, Vimpani (1996) recommended that all home visiting programs should have an evaluation component included in funding. There is evidence that this is being taken up, with a range of service based interventions aimed at early childhood that have undergone some form of outcome and process evaluation (Cant 1999, Department of Human Services 1999). However, such studies are very likely to overestimate the effectiveness of interventions. Therefore, wherever there is real possibility that program may not translate, a properly designed trial with clear hypotheses and appropriate outcome measures should be undertaken.

Much can be learned from international studies of early childhood, but extrapolation of the results to the Australian situation should be undertaken cautiously and take into account existing local service systems, socio-economic patterns and cultural characteristics (Vimpani 1996). In particular, overseas studies have tended to show effectiveness of greatest magnitude for recipients who may be far more deprived than is commonly seen in Australia.

Unlike the US, Australia has in place a set of universal early childhood services that are available at relatively low cost to almost all children and their families.

Boocock (1995), in reviewing international studies of early childhood services, notes that the best outcomes have been found in countries with a national policy of providing preschool services to all children and a system of ensuring the quality of those services through regulations.

The extrapolation of results regarding cost effectiveness of early intervention program to an Australian context also needs to be undertaken with similar cautions and caveats.

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## APPENDIX

### METHODOLOGY

#### Search strategies

Given the time constraints of the project, priority was given to locating high quality summaries of studies and reviews of studies. Literature retrieval methods included:

- searching the on-line database Medline – systematic search for reviews and individual studies using appropriate MeSH headings and text words, (in consultation with Mr Steve McDonald, Information Specialist, Australasian Cochrane Centre). Initially we searched for evidence in the form of systematic reviews and/or meta-analyses of randomised controlled trials (RCTs). Following this, we searched for individual RCTs and controlled clinical trials (CCTs). Similarly, to assess risk/protective factors we searched systematic reviews of and individual longitudinal cohort studies using appropriate MeSH headings. Ideally other databases would also have been searched, in particular CINAHL, Embase (which has a strong coverage of European material) and Psyclit, but time precluded this.
- searching the Centre for Community Child Health Database of Internet Sites, which contains high quality evidence such as government-commissioned reviews of health interventions or technologies (list of sites available on request).
- acquiring published material through professional networks, with a particular emphasis on studies which might be referable to the Australian setting.

#### Assessing evidence: risk/protective factors

The gold standard for assessing how risk/protective factors influence outcomes is the longitudinal cohort study. Good cohort studies follow a clearly-defined and representative population, have very high follow up rates (ideally >90% over many years), employ objective and unbiased outcome measures, and adjust for important prognostic factors that may influence the studied outcomes. As in RCTs (below), it is important to assess strength of evidence, magnitude of effect and relevance of evidence.

Cohort studies typically study many possible relationships between numerous predictor and outcome variables, thus enabling many different possible theories to be checked in the search for true relationships. They can confirm strong relationships and refute others, paving the way for later controlled trials of sensible interventions that focus on proven risk factors and have a real chance of working. Because the choice of variables is so broad, interpretation varies across studies and

comparison between studies can therefore be difficult. Even if an observed relationship is strong, a cohort study cannot truly confirm that it is causal.

In this review, preference was given to material relating specifically to developmental outcomes in milieu relevant to young children.

#### Assessing evidence: interventions to improve outcomes

The gold standard for assessing the effectiveness of interventions is the randomised controlled trial, and failing this high quality controlled non-random trials (CCTs). Although small in number, the existing studies in this field have revolutionised our understanding of management effects. Intervention trials which do not include an adequate control group usually overestimate treatment effects (ie make an intervention seem more effective than it really is). This may be because they fail to take into account the normal improvement over time that tends to occur when management is initiated at a time of crisis or for extreme groups (regression to the mean) or because of the natural enthusiasm of both service providers and recipients of services (selection bias and placebo effects). Typically, fewer outcomes are studied in intervention studies than in cohort studies.

Assessment of quality of evidence was guided by the principles laid out in the NHMRC publication “Guidelines for the Development and Implementation of Clinical Practice Guidelines” (NHMRC 1999). These include assessment of:

- level of evidence – study design used to minimise bias. The strongest evidence comes from a systematic review of all randomised controlled trials; the next best is evidence from at least one properly designed RCT; and then comes evidence from a range of lesser comparison groups. Least persuasive is evidence from studies not containing a control group of any kind. For this review, we took the strongest level of evidence available for each topic and then excluded any lower level evidence for that topic.
- quality of evidence – methods used to minimise bias
- strength of evidence –certainty that a true treatment effect exists
- magnitude of effect
- relevance of evidence

In this review, preference was given to material produced within the last ten years.

#### Limitations of review

The review was conducted over three weeks in September 1999. The short time frame precluded identification of all relevant high-quality literature, particularly that existing in the “grey” literature. In addition, some of the material identified

through the searching process as potentially relevant could not be obtained within the time available.

Time constraints also precluded semi-qualitative analysis, such as the drawing out of “themes” through in-depth reading of the many important papers arising from single studies (often in excess of 500).

### Terminology

Table 1 provides a glossary of terms relevant to this review.

#### Table SEQ Table \\* ARABIC 1 Glossary of terms

(Note: These definitions clarify how these terms are used throughout this paper.)

Adlerian Programs:	Parent training programs that are based on clinical psychology principles of improving the whole person
Cerebral hypoxia	Inadequate blood supply to the brain
Child health surveillance:	Child health activities aimed at reducing the prevalence of disease and departures from good health by shortening their duration or diminishing their impact through early detection and prompt and effective intervention
Controlled clinical trial:	A study of effectiveness in which recipients are non-randomly allocated to receive, or not receive, the intervention of interest
Early childhood:	The period from birth to age five.
Early intervention	Activities implemented to avoid progression or persistence of problems soon after they have arisen (presupposes early detection)
Health promotion:	Any planned and informed intervention that is designed to improve physical or mental health or prevent disease, disability and premature death
Intervention:	An activity implemented by a professional (or other individual outside the family) intended to deal with a problem affecting health or development.
Outcome:	A defined variable representing a study endpoint (result, effect)

Parent Effectiveness Program	A parent-training program that focuses on enhancing family communication, problem solving, and mediation skills
Perinatal stress:	Stressful events occurring in the period shortly before or after birth (eg brain haemorrhage, birth hypoxia, birth injury)
Prevention	Activities implemented to avoid development of problems before they arise
Protective factor:	A variable that decreases the probability of a negative outcome
Randomised control trial:	A study of effectiveness in which recipients are randomly allocated to receive, or not receive, the intervention of interest
Resilience:	Successful adaptation following exposure to stressful life events
Risk factor:	A variable that increases the probability of a negative outcome
Vulnerability:	Susceptibility to negative developmental outcomes

