Indicators for child health, development and wellbeing.

A systematic review of the literature and recommendations for population monitoring

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Executive Summary

Introduction

Focusing attention on young children and their families makes a lot of sense. While parents and those providing care to young children have always understood that the experiences children have in their early years are intrinsic to their future development, this is now supported by an extensive body of international and Australian research.[1,2] This evidence spans the impact of early intervention on crime prevention[3] to a more detailed understanding of the interaction between genes and experience on the structure and function of the developing brain.[1] It is now increasingly clear that the relationships, experiences and environments a child is exposed to in the first few years of life are crucial to their long term health, development and wellbeing.

Development of Indicators

This summary of indicators span the spectrum of domains in which the evidence suggests positive child outcomes are more likely to occur as a result of their improvement. The indicators included in this project reflect the short and medium gains possible that will lead to an improvement in the health, development and wellbeing of children.

The approach that has been taken is to identify domains that are relevant to the developmental health and wellbeing needs of children, recognising the need to consider issues relevant across the age span. Domains and indicators have been validated against international indicator frameworks. The indicators have also been validated against a social model of health, considerate of the child in the context of their family and their community and environment.

The resultant summary of indicators are not necessarily the best or most predictive indicators to represent each domain, however, they are indicators within each domain with an identified data collection. It may be necessary for data to be adjusted for demographic trends to ensure accuracy of change and attributable change over time. For example it may be necessary to adjust for changes in the composition of the population of children, and sociodemographic factors in Victoria over time.

Features of the Review

The work behind the recommended summary of indicators has aimed to source and consider evidence and information relevant to the recognition of the sociocultural differences placed on health and wellbeing. Unfortunately very little research has been conducted in this area and therefore we are limited in our ability to validate these issues for different cultural and ethnic communities. However, this issue has been recognised as an important direction for indicator development and the Centre for Community Child Health in collaboration with other groups in Victoria are directing their research efforts in this area.

Criteria for these indicators

- Indicators enable comprehensive coverage for wellbeing across an array of outcomes, behaviour and processes.
- Indicators have been designed to represent health issues for children from pregnancy though to transition to school around 8 years of age.
- Indicators need to be easily understood and concise.
- Indicators assess positive and negative factors of wellbeing.
- Indicators take into account the degree (or depth), the duration and the accumulation of risk factors children face. This will assist in identifying sub-groups of children at risk of poor developmental outcomes.
- Indicators have aimed to consider the issues relevant to the population diversity.
- Indicators have been developed anticipating future trends. For example, as time pressures on parents continues to increase and with the recognition that this can lead to poor developmental outcomes, the amount of time parents spend with their children becomes an important health determinant and indicator of child wellbeing.
- Indicators reflect national and state social goals such as improving literacy and numeracy and increasing the rates of breast-feeding.
- Indicators must have the same meaning across time.

SUMMARY: HEALTH

The health and wellbeing of children involves consideration of physical, emotional, mental and social aspects. The health of their parents is instrumental – not only is the reporting of their children's health, but also directly, through their nurturing, development, parenting, access to services, and through the social and physical environments they are exposed to. The domains highlighted below aim to cover the developmental spectrum and reflect the changing nature of influences on health. These include those shown below.

A. Parental Health and Wellbeing

This domain reflects a number of determinants of child wellbeing that are associated specifically with parents. Parental health impacts on the health and wellbeing of children both directly and indirectly. Research has shown that a parent's own reported mental and physical health status is likely to alter their perception of their children's health status and hence reporting of problems and utilisation of services. Parent mental health has also now been demonstrated to be a significant predictor of a number of adverse outcomes for children, in particular children's development and risk of behavioural disorders. This relationship begins in the antenatal period. Healthcare aimed at identifying and supporting women at risk of low birth weight babies is thought to improve birth outcomes. Conversely, a child born to a teenage mother is at increased risk of adverse outcomes due to a number of psychosocial determinants that are associated with very young mothers. Parental health behaviours are also significant but will be explored elsewhere.

Table 1. Summary indicators of parental health and wellbeing

Domain area and references	Indicator	Data source
Parental general health and wellbeing and social functioning within families[4]	Proportion of parents reporting high levels of subjective health and wellbeing	National Health Survey Australian Bureau of Statistics (ABS)
Antenatal care[2]	Proportion of women who received early prenatal care in the first trimester	Possibly from maternal and child health nurses
Adolescent births[5-7]	Births per 1000 adolescent females (from age 14)	Perinatal Data Collection Department of Human Services (DHS)

B. Smoking, Alcohol and Other Drugs

Smoking is a key contributor to the health of both the parent and the child. Smoking during pregnancy increases the risk of low birth weight babies and foetal death whilst smoking in the home increases children's rate of respiratory illness and, in particular, asthma. Parents who smoke are more likely to have children who smoke through behaviour modelling and children's exposure to passive smoking. Smoking related illness is thought to be a major contributor to the global burden of disease.

Table 2. Summary indicators of smoking exposure

Domain area and references	Indicator	Data source
Parental smoking behaviours[8]	Percentage of parents of children 0-8 years who smoke in the house	Anti-Cancer Council Centre for Behavioural Research
	Proportion of women who smoke through pregnancy	National Health Survey (ABS)

C. Food and Nutrition

Children require an adequate and varied diet as they grow. This begins with the benefits that can now be attributed to breastfeeding and continues through the diet children are exposed to as they grow older. This domain encompasses two aspects of food and nutrition, both of which are of importance to health and wellbeing outcomes. The first aspect is that of food sufficiency. Low income families often struggle to feed their children adequate diets in either quality or quantity. This has implications for their learning (e.g. breakfast before school), but is also associated with consumption of high density foods that satisfy hunger but have increased fat and carbohydrate content. This leads to the second aspect of food and nutrition, which is the ever increasing rate of obesity and overweight in Australian children. Parental diet is a powerful predictor of children's diet both through the availability and type of food in the house and modelling dietary patterns. Given the morbidity associated with obesity, such as cardiovascular disease and diabetes, childhood obesity is of significant concern for the future population.

Table 3. Summary indicators of nutrition and food

Domain area and references	Indicator	Data source
Breastfeeding[9]	Number of women exclusively breastfeeding at 3 and 6 months	National Health Survey; Maternal and Child Health Nurses (ABS)
Children and parents with 'good' nutritional diet [4,35,71,76]	Proportion of children consuming breakfast at least 5 days per week	National Nutrition Survey (ABS)
	Proportion of parents with an adequate and diverse diet	National Nutrition Survey (ABS)
	Proportion of children with BMI indicative of child overweight and obese	Upcoming National Nutrition Survey (ABS)
Food security [76]	Proportion of families considered to be food insecure (reflects availability and consumption)	Upcoming National Nutrition Survey (ABS)

D. Play, Recreation and Physical Activity

Rationale: The content and focus for play and recreation changes and evolves as children develop and increase in age over time. In the early years, children's exposure to play and incidental activity has positive outcomes on their development and healthy growth, with the associated development in behaviours that are likely to result in lower rates of overweight and obesity. Addressing concerns of accessibility, safety, community commitment and costs will affect and increase participation. As children move into the primary school years, participation in organised activities provides multiple benefits across social, emotional and physical health outcomes.

Table 4. Summary indicators of play, recreation and physical activity

Domain area and references	Indicator	Data source
Participation opportunities for play and recreation[2,10]	Participation in sport, play and leisure opportunities	Survey of Children's Participation in Cultural and Leisure Activities (ABS)
	Number of play and recreation opportunities (programs, parks, other options)	Local Government
	Range of facilities for play and recreation that accommodate a spectrum of community needs and choices	Local Government

E. Child Welfare (Child Maltreatment)

The most recent literature regarding brain development suggests that children living in abusive situations are at risk of numerous adverse behavioural, developmental, educational and health outcomes as a direct result of the abuse and neglect. There is emerging information that suggests that the re-notification rate of abuse in a state of mandatory reporting reflects the capacity of the system to adequately address the underlying environmental situation.

Table 5. Summary indicators of child welfare

Domain area and references	Indicator	Data source
Re-notification rates for child abuse and neglect[11]	The proportion of children aged 0-8 who are re-notified to the child protection system within the space of 12 months	Victorian Government data

SUMMARY: EDUCATION AND WORK

A. Education and Learning

Children's participation in early learning and organised learning will result in improved educational outcomes (literacy), self esteem, employment, decreased crime, delayed pregnancy and improved health outcomes, as has been evidenced by much of the international literature. Although research and debate on class size is not new,[12,13] recent research has fuelled speculation that benefits gained from children in small class sizes (15-17 students) in grades prep to three continued to perform significantly better on achievement tests than those in class sizes of 22 to 25 students, even when those children were in standard size classes. If class size reduction is a policy goal, as has been stated by the Government, then measuring class size remains important and relevant.[12]

Table 6. Summary indicators of education and learning

Domain area and references	Indicator	Data source
Preschool/kindergarten attendance[6]	Percentage of children ages 3 to 5 who are enrolled in preschool/kindergarten	Australian Bureau of Statistics Commonwealth Childcare Census; State-based Kindergarten enrolment data
	Percent families reporting difficulty finding affordable high quality childcare	Not known
	Vacancy rate in accredited family and childcare centre	Not known
Children within a community ready to learn at the commencement of school[14]	Multidimensional indicator of domains relevant to a child's capacity to learn, engage and meet the task demands of school (physical health and wellbeing, social knowledge and competence, emotional health/maturity, language, cognitive and communication skills and general knowledge)	Not yet collected – proposals for Australian adaptation and validation
School attendance[114,115]	Proportion of children enrolled in school	Statewide School Census data Department of Education and Training (DE&T)
	Chronic absenteeism and/or times of attendance at school	School level data (DE&T)
Size of classes in grades prep to 2[12,13]	Average number of children per class size	Statewide School Census data (DE&T)

B. Reading and Literacy

Evidence has shown us that children begin to interact with literacy at an early age and educational outcomes could be improved by increasing the exposure, participation and enjoyment of reading from an early age. Intervention studies in the US have demonstrated improved language outcomes for children exposed to a simple parental based reading intervention.[15,16] Where there is literacy and more books in the home, children more likely to be read to and therefore likely to do better at school.

There is now a well-established literature that has demonstrated the interrelationship between literacy and health that holds after adjusting for socio-economic status.

Table 7. Summary indicators of reading and literacy attainment

Domain area and references	Indicator	Data source
Age at which reading to children commenced[6,17]	Percentage of children aged 3-5 years who are read to every day by a family member)	Not available yet
	Age at which reading to children commenced on a regular basis	Not available yet
Parental level of literacy and numeracy[2,15,17-19]	Proportion of parents who report reading as an activity that they enjoy doing with their children.	Not available yet
	Amount of time parents spend reading to their children.	Time Use survey (ABS)
	Percentage of parents at lowest 2 levels of literacy	Survey of Aspects of Literacy (ABS)
Children meeting benchmark for literacy at grade 3[6,20]	Percentage of year 3 students achieving the reading benchmark	National Schools Statistics Collection

C. Parental Employment

Families must be able to provide adequately for their children, with access to resources and income-earning opportunities.[21] Higher employment rates of parents will lead to lower use of welfare and social security, increased tax revenue and contribution to the local and state economy.

Table 8. Summary indicators of parental employment

Domain area and references	Indicator	Data source
Parental employment[4,6]	Proportion of households where children under 8 years are living, by parental employment status	Labour Force survey (ABS)

SUMMARY: CHILD-FRIENDLY ENVIRONMENT

Physical Environment

The physical environment of a family includes both the natural and artificial aspects of the surroundings. The issues of light, space, shelter, shade, absence of noise and crowding, freedom, security, family friendly facilities and access, urban clutter, local economy, environmental quality, light, vegetation/greenery, pollutants – nitrogen dioxide and oxide are all relevant to the child, the parent and the family.

A. Crime, Safety, Justice and Wellbeing

Crime is both an indicator of the safety of the community and a possible outcome of appropriate early intervention. It is well established that areas with high crime rates often parallel areas with high rate of mental and physical health problems both for children and their families. Children who are exposed to domestic violence are also at increased risk of ongoing behavioural and emotional problems and may themselves be perpetrators of violence.

Table 9. Summary indicators for community safety

Domain area and references	Indicator	Data source
Domestic violence[2]	Number of court applications filed for relief from domestic violence	Court based data/ Department of Justice
	Number of reports to police for domestic violence	Recorded crime statistics collection/Department of Justice/Victoria Police (ABS)
Neighbourhood safety[21]	Proportions of parents feeling safe in the community	National Crime and Safety Survey (ABS)

B. Transport

Improvements in exposure to convenient transport mechanisms allows parents and children to access services, interact with community initiatives, people and environments other than the home, thereby improving their health and wellbeing.[21] It is also an important contributing factor to increasing physical activity and therefore preventing obesity and improving overall wellbeing.

Table 10. Summary indicators of transport

Domain area and references	Indicator	Data source
Transport accessibility[22]	% people able to conveniently access transport opportunities	Not available yet

C. Air Quality

Exposure to environmental air pollutants has been shown in international research to have an important contribution to children's respiratory health, and other health conditions. Relatively little research has been conducted on children's indoor environment, although research is currently being conducted in Victoria which will hopefully provide some scope for further understanding in this area. Although Australian air quality is good in international standards, there remain gradients between children's differential exposure to environmental pollutants.

Table 11. Summary indicators of environmental air quality

Domain area and references	Indicator	Data source
Exposure to air pollutants[2,23]	Number of days exceeding environment protection standards for measures for air quality	Environment Protection Agency ambient air monitoring stations across Melbourne metropolitan areas.

D. Housing

Housing is considered a basic necessity for children and impacts on them through both the quality of the physical surroundings and the extent to which it is a secure environment. Issues such as overcrowding, poor lighting and damp and cold conditions all contribute to physical health problems for children, and exacerbate social issues for parents by contributing to their concerns about safety and security. Parental stress can also be increased if tenure is unknown or short term, as can be the case for low-income families.

Table 12. Summary indicators of housing status

Domain area and references	Indicator	Data source
Home tenure by family type[24]	Home tenure by family type, landlord and tenure type	Housing survey (ABS)
Overcrowded housing[8,25,26]	Ratio of persons to rooms in public housing	State-based Housing tenant data (DHS)

E. Social Environment

The social environment reflects the social connections that families establish. Research from the social capital literature support the effect that these connections can have on improving health and wellbeing outcomes, particularly for parents. The connections that families establish may be both formal, through need, such as parenting difficulties, or may reflect an informal social network of supports and participation that include benefits for the individual and the community.

Table 13. Summary indicators of a child's social environment

Domain area and references	Indicator	Data source
Formal social connections[4]	Proportion of parents who are able to access appropriate parental support and programs, when needed	Community survey data required
Informal social connections[27]	Social and civic participation	See WHO/Euro working group
	Quality of family and social relationships/social connectedness/capital*	Population Health CATI Survey (DHS)

* *See Indicators of Social and Family Functioning*[27]

SUMMARY: SERVICE DELIVERY

A. Early Detection and Intervention in Primary Care

Primary care services play a significant role in the delivery of preventive health care. It is through primary care that early identification and health promotion may take place. The role of early identification and intervention in improving health and wellbeing outcomes has been established, however without adequate primary care there is no vehicle through which to deliver key messages. Primary care has the capacity to engage the whole family and prevent unnecessary hospitalisations, placing less burden on the individual and the health system.

Table 14. Summary indicators of early detection and intervention in primary care

Domain area and references	Indicator	Data source
Immunisation[11]	Percentage of children fully immunised at 12, 18 and 36 months	Australian Childhood Immunisation Register
Injuries	Rate of children being hospitalised for accidental injuries	Victorian Injury Surveillance System
Primary care-ambulatory care sensitive conditions[28]	Proportion of children hospitalised for 'ambulatory care sensitive conditions': asthma, dental caries and gastro-enteritis	Victorian Admitted Episodes Database (DHS)
Service sensitive conditions/problems relevant to children	Parental concerns re. speech and language	School Entry Health Questionnaire (DHS)
	Numbers of children with speech and language problems referred to specialist children's services	School Entry Health Questionnaire (DHS)
	Parental concerns around development, behaviour, mental health	School Entry Health Questionnaire (DHS)
	Access to appropriate services and support	
	Dental care:	
	Proportion of children being seen by a dentist prior to school	School Entry Health Questionnaire (DHS)
	Proportion of children receiving treatment for dental caries	School Entry Health Questionnaire and Dental Health Services Victoria (DHS)

Introduction

Background: Investing in early childhood

There is now an understanding that investment in pre-natal, post- natal, infant and early childhood periods of life is necessary in order to facilitate the healthy development of children into adulthood, especially for those who live in disadvantaged circumstances.

This review is based on a conceptual framework of health and wellbeing that incorporates dimensions physical, emotional, cognitive and social aspects of health, and includes domains within a social model of health that impact on any or all of these dimensions. This review involves a summary of the definitions and models of health and wellbeing and the major international programs and research projects from which the main principles for this project have arisen. However, the social model of health will provide the underlying conceptual framework, upon which a developmental and ecological approach will be superimposed. This allows for an understanding of both the longitudinal nature of children's changing development as well as emphasising the intimate relationship children's health and wellbeing has with that of their parents and the community at large.

In defining indicators, it needs to be recognised that there is considerable overlap between indicators and outcomes within a causal pathway due to the complicated interactions that occur as development progresses. This project has included indicators that are part of an evidence-based causal pathway and information on where indicators coincide with potential outcome measure is provided, wherever possible. For example, low birth weight may be an outcome related to poor nutrition in pregnancy, but is also an indicator in relation to children's risk of learning difficulties.

Investing in early childhood

Almost all adult diseases and causes of ill health have their antecedents in childhood. This includes cardiovascular disease, mental health and social functioning. Early childhood is thought to hold the key to many future outcomes. Brain research has shown us that this is a time of rapid brain development, during which time many sensory and intellectual pathways are laid down. This presents both a window of opportunity and a window of vulnerability – a time when exposure to appropriate stimuli and experiences in a nurturing environment can protect a child against life's future hardships, or it can be a time when the devastating effects of neglect and abuse on brain development lead to emotional and behavioural problems that are lifelong. These early experiences were highlighted in Ontario's report (1999), "The Early Years Study – Reversing the Real Brain Drain", which concluded "we consider, in view of this evidence, that the period of early child development is equal to, or in some cases, greater in importance, [in determining] the quality of the next generation than the periods children and youth spend in education or post secondary education."

These physiological processes are a combination of genetics (nature) and the environment in which a child grows (nurture). These factors influence a child's development as they grow older and are thought to finally be the risk and protective factors that shape a child's life. Longitudinal data has demonstrated that risk factors in childhood are cumulative. Adding or removing them can have significant effects on the life of a child and their family. Risk factors cross all of the domains that are relevant to children, including physical, social, developmental and emotional health and wellbeing in both the family and the community around them. It is thought that exposure to six risk factors increases a child's odds of poor outcomes by twenty-fold. Developing resilience in children, increasing protective factors, and minimising risk factors is likely to have markedly beneficial effects on the future of today's children.

One of the most powerful determinants, or risk factors, for poorer child outcomes is poverty. There is powerful evidence that shows the link between socio-economic status and adverse outcomes for children in a range of domains including health and education. Long term research emerging from the US has demonstrated that, for at-risk families, intensive early intervention aimed at the needs of the child and the family produces improved outcomes. These include school retention, decreased teenage pregnancy rate, improved employment opportunities and decreased criminal activity. The Rand report released in 1998 showed that every dollar spent in preschool programs for high risk children saves $7.16 (at least) in later special education, welfare and crime costs.[29]

There are also opportunities to build resilience in children. Education is pivotal to a child's development and future potential. In many countries, especially third world countries, maternal education is directly related to infant mortality rate. There is now an international effort to improve school retention rates and improve the quality of education children receive from a very young age. Almost 10% of Australian children are thought to have some kind of learning difficulties or developmental problem. These children are at higher risk of a range of poor emotional and social outcomes. However, early identification and intervention, particularly before grade 2, can improve outcomes. Consideration should also be given to the increasing number of children experiencing mental health problems. In the National Survey of Mental Health Wellbeing in 1999, 15% of children aged 4-12 years of age had identifiable mental health issues[30] which ranged from behavioural problems to depression and anxiety.

The issue is not limited to children alone. The mental health of parents can impact significantly on the health and welfare of their children. Recommendations from the Institute of Medicine's review of early childhood, "From Neurons to Neighbourhoods", concluded that poor maternal mental health had a significant impact on the physical and mental health of their children and that systems need to address the needs of parents in order to ensure the health and wellbeing of children.[31]

In almost every avenue of adult life, there appears to be a pathway to early childhood. The developmental and causal pathways that lead to adulthood are complicated and complex, yet they present a number of opportunities to intervene and change a child's trajectory in order to improve outcomes for them in the long term. The challenge is to create systems and programs that are based on evidence and demonstrate that they have made a difference. McCain and Mustard[31] conclude "The evidence is clear that good early child development programs that involve parents or other primary caregivers of young children can influence how they relate to and care for children in the home, and can vastly improve outcomes for children's behaviour, learning and health in later life. The earlier in a child's life these programs begin, the better these programs can benefit children and families from all socioeconomic groups in society."

Aims

The aims of this review are to

1. provide a concise discussion which deals with the key requirements for individual and population indicators that measure the social, emotional, cognitive and physical wellbeing of children (pregnancy to 8 years) within their familial and social context; the quality of their parenting; and the quality of the child-friendliness of the communities in which they live.
2. identify a range of indicators and suggest data sources that might be available to assist in measurement of these indicators.

Outcomes

The broad outcomes of this project are to critically review of reputable indicators of child and family health, wellbeing and social functioning.

Scope

The project includes a review of indicators that have been previously been demonstrated to be effective in their specific domain, but includes the possibility of exploring indicators that may not have tested measures associated with them.

Methods

Defining the project

The initial stages of the project involved

- Identifying key centres in Australia and internationally for information on current research on health and wellbeing, child health, indicators of outcomes, community based social interventions and child health and development
- Reviewing key background documents and recently published texts[31-34]
- Reviewing models of health and wellbeing to establish the framework for collecting and considering indicators[34-36]
- Reviewing definitions of health and wellbeing
- Reviewing indicators

Searching the Literature

The major purpose of the literature search was to identify possible indicators and frameworks that currently exist and would converge to establish indicators across children's health, development and wellbeing. The protocol for the search strategy and the analysis of the results is provided in Appendix 1. Its main focus was on the literature locatable in the World Wide Web, and through the electronic journals and databases. We searched back to 1990. A summary of the web-based findings and the literature-based findings is located in Appendix 2 and 3. Examples of international programs focussed on the early years which have contributed to the concepts and developments in indicators are included in Appendix 4. Examples of these include Head Start, The Perry Preschool Project and Sure Start.

Results

The results of this literature review revealed a very large number of documents, papers, and reports that focused on aspects of measuring child health across the domain, projects that had developed indicators, and background material that provided an evidence base or context for the development of indicators.

In sum, 139 papers and 32 web-sites have been identified and these are further described in the Appendices. Not all of these were useful in their contribution to this project, but have been included for reference and reading by others interested in this work. The review discusses and selects papers that appeared to include indicators that were both sufficiently sound, evidence-based, and/or were in the realm of relevant issues relevant to the intentions of the project and the optimum determinants for the health and wellbeing of children and their families.

Therefore this review highlights the background to indicators, their methodological background, and recommendations for their use and application.

Theoretical Influences on Models of Health

In providing support and services to children and their families to promote their well being it is necessary to be able to define the concepts and issues that need to be measured. It is necessary to define what is meant by health and how various models conceptualise health particularly in relation to children and their families. Various theories and models have been used to aid in understanding the concepts of health and wellbeing. These models have at times evolved from other established theories that have been used to explain various phenomena. One example is systems theory.

Systems Theory

Systems theory describes how the different components of a system all impact upon each other. The example of child health and wellbeing highlights the importance of how social systems (such as the family, the education or health systems) effect all components of that system. As we have already highlighted, the child's health is influenced by more than internal factors. The child lives within the context of a family, within a community, within a state, within a country, within an international setting, all which will have an effect upon his or her wellbeing. The child will be influenced by interpersonal relationships with, for example, family members and school teachers, by its relationship with other institutions such as, for example, health care systems and the wider context of educational systems, and even by other societal factors such as economic market systems, employment trends, governments and

industry.[37] Factors that are increasingly recognised as playing a significant role in determining health include socioeconomic status and level of education.[37] Interpersonal and community relationships are also increasingly recognised as crucially important determinants of health, especially for the healthy development of children. The model also suggests that basic psychological needs influence health and wellbeing across the lifespan.[38]

Models of Health

A concise discussion about models of health is challenging because of the use of different terminology and overlapping concepts. The social model of health will be applied in developing these indicators. The literature suggests that a *social model of health* encompasses bio-psycho-social, socio-environmental and socio-economic models of health. To help in our understanding of the social model's application to these indicators, a brief description of the development of some of the different models of health is provided. This Indicators project has aligned itself with the social model of health, but in doing so, explored other models including the relationship between an ecological and social model of health.

A Social Model of Health

Consistent with systems theory, the view that the health of populations is not the result of random biological occurrences determined by fate but is socially shaped and collectively experienced is becoming more accepted.[39] Najman pointed out over two decades ago how what first seem like biologically irrelevant features of a population, such as social customs and beliefs, persistently show a correlation with patterns of health and disease.[40] There has been an enormous increase, over the last 30 years, in interest of the role society and social organisation has on health and wellbeing,[41] reflecting the shift in recognition that factors external to the biological system have a crucial role in determining health. Using a social model of health, improved health and wellbeing are achieved by addressing the social and environmental determinants of health alongside biological factors.[42] This framework highlights the importance of understanding health and wellbeing within the personal, social, and cultural context, specific to the individual or community whose health is being addressed.[42] When a social model of health is employed, the aim is to allow persons and communities to define what health means to them and in doing so identify key issues that effect health in their specific context.[42]

Internationally, government health departments and academics are collectively agreeing about the importance of one major piece of work 'Developmental health and the wealth of nations' in which Power writes "…if childhood interventions were to improve health and wellbeing throughout the life cycle and fundamentally address the socioeconomic gradient in health status, they would be more likely to be social or educational interventions than health interventions per se".[37]

Further information on alternative models of health, upon which much of the Australian health care system, and many current and previous paradigms continue to apply, are described in more detail in Appendix 5.

Sociocultural Considerations

The work behind the recommended summary of indicators has aimed to source and consider evidence and information relevant to the recognition of the sociocultural differences placed on health and wellbeing. Unfortunately very little research has been conducted in this area and therefore we are limited in our ability to at least validate these issues for different cultural and ethnic communities.

Health in the Context of Child Development

"Human development is shaped by a dynamic and continuous interaction between biology and experience".[32] Bronfenbrenner has developed an ecological model of human development to highlight the importance of the child and family being seen within the context of a complex web of relationships within the community and larger social systems (see diagram).[43] This ecological model of development provides a framework for interdisciplinary dialogue and improves understanding of the multiple factors influencing child development.

The health and wellbeing of children be must be viewed in the context of development. Keating and Hertzman use the term developmental health to describe the full range of developmental outcomes for physical and mental health and also for a wide range of other developmental outcomes, from behavioural adjustment, to literacy, to mathematical achievement.[37]

Promoting social and emotional development is considered just as important as promoting language and cognitive competence.[32] It is necessary that indicators of child health and wellbeing used for monitoring child health reflect the relevant developmental stage of the children they are being used to monitor.

It has been stated that well-designed early intervention programs are able to promote the social-emotional development of children, improving their school readiness.[37] A lack of school readiness is associated with academic failure, early school misbehaviour and is predictive of school failure, employability, criminality and psychological problems in young adulthood.[37] School readiness appears to be a concept very similar to readiness to learn.

Definitions

There are many ways to define health and wellbeing and there is no clear consensus in the ways health and illness are defined.[44] The way in which it is defined effects how deviations from the ideal healthy state might be tackled. Nonetheless, the meaning of health and wellbeing varies according to who is defining it.[44] For example, the concept of being healthy for children who are developing and who participate in different activities to those of adults, would vary from adult concepts of what good health is.[44]

Health and Wellbeing

The most commonly accepted definition of **health** is that of the World Health Organisation[45] which is as follows: "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".

This definition is consistent with a social model of health. It goes significantly beyond the traditional boundaries of the dominant Western biomedical model of health. Despite this, the Western biomedical model and the health care system that has developed out of it often prevails across health services. Physical health is the dominant concern of the biomedical model (this model is described in more detail in Appendix 5) whereas emotional and social health are emphasised in the 1946 WHO definition.

Wellbeing

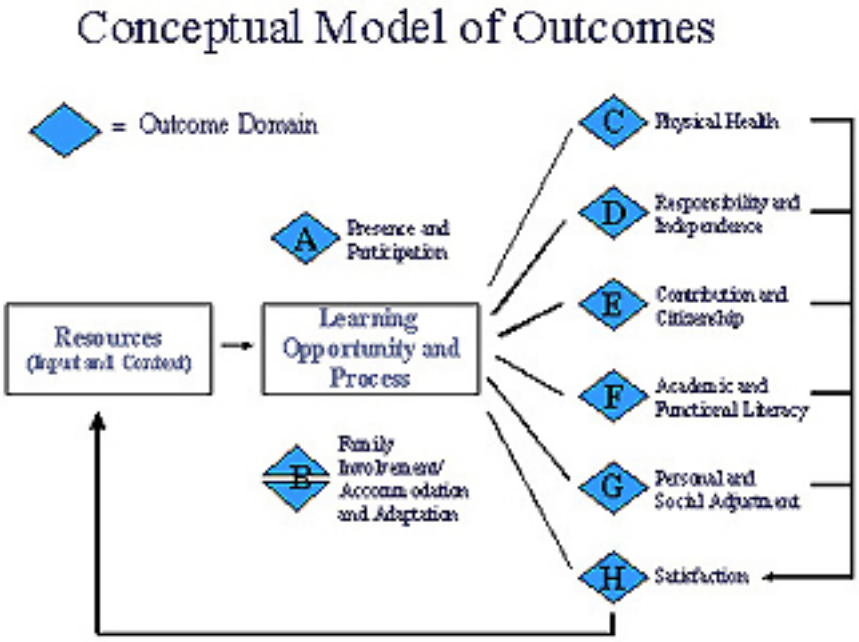
A large number of international initiatives do not differentiate between health and wellbeing, however, the Australian Bureau of Statistics states that 'wellbeing can be seen as a state of health or sufficiency in all aspects of life'.[46] Measuring therefore requires mapping the whole of life, and considering each life event or social context that has the potential to affect the quality of individual lives or the cohesion of society.

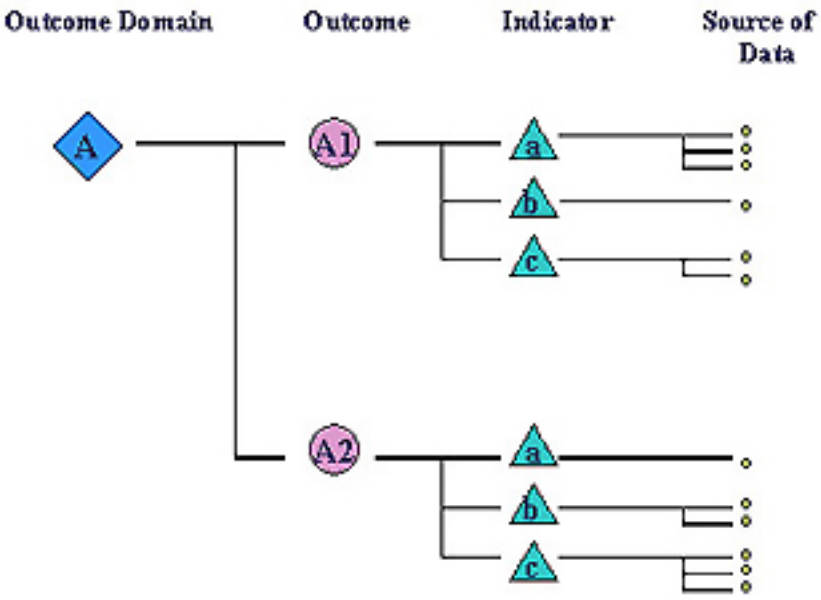
Individual wellbeing can be measured using people's subjective evaluation of themselves, based on their feelings, or by collating any number of observable attributes that reflect on their wellbeing. As individual wellbeing is strongly associated with happiness and life satisfaction, personal wellbeing might be measured in terms of how happy or satisfied people

are with their life or with aspects of their life (eg. job, health, etc). These measures can be aggregated and monitored over time, and theoretically, provide a picture of the population's view regarding changes in living conditions. Population wellbeing can also be measured based on objective indicators, such as number of people with particular health conditions (though clearly this is not necessarily wellbeing but health issues) and economic wellbeing (indicators of particular wealth etc).[46]

In thinking about children's wellbeing, there exists an important distinction between concern with the present and concern with the future. From an inter-generational perspective, the child is both the progenitor of the adult and a future parent of subsequent generations of children. The link between the child and his or her adult self can find expression in a set of enabling factors that may be considered "life skills," both personal and civic. Life skills include knowledge, training, moral and social values, personality traits and habits, and ability to play an effective role in the family, the workplace, and the broader civil society.[26]

Figure 1. Models of Outcomes[47] and Indicators





Ysseldyke, Thurlow, and Brickson National Center on Educational Outcomes

Causal pathways framework: In selecting measures of child wellbeing, a *causal pathways framework* is proposed for guiding decisions about the usefulness of specific indicators. The relationship between cause and outcome is implicit in any discourse about indicators.

It is generally accepted that most of the diseases representing a significant burden to human populations are multi-factorial often caused by a combination of genes and environment. What Keating and Hertzman have called the problems of developmental health have also been referred to as psycho-social problems.[37] These represent a substantial amount of morbidity today. It is rarely possibly to identify a single principal cause of an illness such as an infectious agent. Therefore a causal factor is viewed as being "any factor that modifies (as distinct from being merely associated with) the risk of disease." It is the effort inherent in risk modification or prevention that requires we distinguish between indicators and outcomes.

Individual Level Indicators

Child health and wellbeing

Discussion about concepts and definitions of child health are difficult to locate in commonly used child health texts, with justification for this resting primarily on the difficulty of defining health in the first instance.[44] Some attempts have however been made. For example the Healthy Children Foundation defines wellbeing in children as "The psycho-biological capacity of human beings to experience happiness, self-esteem, esteem for other human beings, esteem for other living beings and for nature. The promotion of wellbeing should be derived from the most recent advances in the relevant biological, psychological and social sciences and comprise a holistic view of the cognitive, affective and social development of children."[38] This definition correlates with a social and ecological model of health as it recognises the role of forces other than biological in nature.

Child wellbeing is sometimes conceptualised as having four inter-connected and overlapping domains, namely social, emotional, cognitive and physical. Frances Page-Glascoe refers to social-emotional health and mental health, perhaps implying that these domains of health and wellbeing are completely inter-dependant. Social health can be seen as referring to effective functioning of relationships between groups and individuals to produce optimal health. Social skills and social functioning may assist in defining the domain of social health, for example, social health could be seen as having age-appropriate social skills.

The term emotional health is perhaps interchangeable with mental health. It is concerned with the psychological wellbeing of people. It has been suggested that basic psychological needs influence wellbeing across life.[38] Emotional wellbeing is seen as directly related to the early relationships between the young child (ie infant/toddler) and their primary care giver.[48]

Cognitive health is an area not well defined in the literature, however cognitive skills refer to "the ways in which children perceive, organise, and analyse the information provided by their social and physical environment."[48] Physical wellbeing has been defined as a comprehensive construct that includes a wide variety of developmental domains that vary with age. A child's physical wellbeing includes, for example an appropriate range of height and weight for age as well as achievement of basic motor milestones within the expected range of development.

Family, School, Neighbourhood Level Indicators

Parenting

Shonkoff et al. use the term parenting to capture "the focused and differential relationship that the young child has with the adult (or adults) who is (are) most emotionally invested in and consistently available to him or her."[32] Research into early childhood development and parenting styles highlighted the importance of the combined influence of clear standards of behaviour, firm control as well as plenty of warmth and affection.[32] Positive parenting is considered a complex and conditional concept encompassing an appreciation for the many ways that parents adjust how they respond to the needs and characteristics of their children, the circumstances in which they live and of their own lives.[32]

Commencing with the reproductive health and behaviour of the mother, the child's primary care-givers structure and shape the experiences and environments within which development occurs.[32] The ability of parents to provide experiences and environments that are conducive to health and wellbeing has been referred to as parenting capacity.

Relationship between context and child health and wellbeing

In measuring child wellbeing, consistent with a systems theory approach, it is important to recognise the contexts in which children live their lives, for example, the family, school and community and the interaction between them. They are inter-related and inter-dependent. These contexts can have direct and indirect effects on health and can enhance and/or limit healthy development. This system has been described as an ecological system.

Environmental Level Indicators

Child friendliness of communities

The environment of the child is influential on his/her health and wellbeing. This includes his/her social and physical environment. How a child's health and wellbeing can be effected by social relationships with primary care givers or parents has been mentioned. It should be noted that all interpersonal social interaction can have an impact on child health and wellbeing as can all other social phenomena in the child's environment. (Examples include social support networks, local and higher level government bodies as well as education, health and welfare and economic systems. This will be explored further in the body of the review).

The physical environment can also impact on the child's health in all four domains. (Examples include road safety mechanisms, availability of nutritious foods and safe drinking water, housing environment and the availability of recreation areas and facilities).

In response to the recognition of how the child's environment can impact upon their health and wellbeing, the concept of "child-friendly communities" has been created. Child friendly communities have the following characteristics:

- Children and young people are listened to
- Children's rights are respected
- Children and young people are valued
- Children and young people are enabled to take responsibility and exercise independence
- Children and young people are protected
- Services are provided to meet children and young peoples needs
- Services are accessible and non-stigmatised and,
- Professionals recognise, understand and respond to the needs of children and young people.

Young people have provided evaluations of their local communities; briefly they include social integration, safety and freedom of movement, peer gathering places, and green areas. These are further described in Appendix 6.

Readiness to Learn and School Readiness

Readiness to learn and school readiness are two related concepts that are utilised in discussion surrounding early child development and have been used to help measure development in early child development and education programs such as Head Start (school readiness)[49] and Sure Start (readiness to learn).[50]

Readiness to learn is a general concept that can be applied to a wide variety of situations.[48] It is a measure of many aspects of a child's development at age five, which is a key developmental transition for most children.[51] The following are components of readiness to learn:

- Physical wellbeing and age-appropriate physical development
- Emotional health, including an ability to adapt to new experiences
- Age-appropriate social knowledge
- Language skills, and
- General knowledge.

The Ontario Royal Commission on Learning stated that "Children who are being readied for future learning are spoken to and listened to; have their questions answered; are offered explanations; and are encouraged to try new words and ideas, to imagine, to guess, to draw and observe…"[48]

Internationally, there is wide support for readiness to learn as one of the most valuable indicators of child development. It is a reliable predictor of future wellbeing, including development of a sense of self respect and concern for others, over-all academic performance (including literacy, numeracy and problem solving skills), the likelihood of life long learning, health status as an adult as well as anti-social and risk-taking behaviours.

Given our institutional structure as present, the earliest time a measurement can be readily made of development in the early years on all children is when they enter the school system.[31] "Given what we know about brain development, an outcome measure at age three would also be valuable."[31]

School readiness has been defined as the following: "a child's ability to meet the task demands of school, such as sitting quietly, and to assimilate the curriculum content at the time of entry into the formal school system."[48]

Criteria for Social Indicators

Social indicators have been defined as: "measures of social wellbeing which provide a contemporary view of social conditions and monitor trends in a range of areas of social concern over time."[27] The focus of social statistics is contained by what social conditions can be appropriately influenced by policy and intervention. In many developed countries immunisation status is viewed as a "social biopsy" reflecting in an indirect way how children are doing.[31]

Criteria for social indicators of child wellbeing

Indicators should assess wellbeing across a broad array of outcomes, behaviour, and processes. Indicators that assess only one area or type of wellbeing provide an incomplete and potentially biased perspective on the development and wellbeing of families and children. A strong set of indicators needs to include measures from varied domains including:

- Population composition and geographic distribution; fertility; mortality
- Physical health and safety; access to health care; nutrition
- Mental health; access to treatment and counselling
- Educational attainment and cognitive achievement; school and non-school cognitive stimulation and learning experiences
- Economic wellbeing; housing adequacy; assets; receipt of public transfers
- Behaviour problems, such as delinquency and substance abuse; positive behaviour attitudes; goals
- Family structure; contact with an absent parent (if any) and extended family members; child support; parent child interaction and time use; children in institutions and foster care
- Workforce behaviours of parents and children; job related benefits; and
- The child's school and neighbourhood environment.

These domains can and sometimes need to be represented by numerous indicators.

Age-appropriate indicators are needed at every age. Indicators should be easily and readily understood by the public, and allow for the reflection of both positive and negative aspects of wellbeing. Indicators should have the same meaning in various societal groups and the same meaning over time. Indicators should anticipate the future and provide baseline data for subsequent trends.[52]

Where a set of indicators are developed to measure the effects of a specific project, they may have the purpose of reflecting factors associated with the child, the family or with specific aspects of the project or program.

In light of these considerations, criteria have been summarised for the development of Indicators:

- Indicators enable comprehensive coverage for wellbeing across an array of outcomes, behaviour and processes.[52]
- Indicators have been designed to represent health issues for children from pregnancy though to transition to school around 8 years of age.[52]
- Indicators need to be easily understood and concise.[52]
- Indicators assess positive and negative factors of wellbeing.[52]
- Indicators take into account the degree (or depth), the duration and the accumulation of risk factors children face. This will assist in identifying sub-groups of children at risk of poor developmental outcomes.[5]
- Indicators have aimed to consider the issues relevant to the population diversity.[52]
- Indicators have been developed anticipating future trends. For example, as time pressures on parents continues to increase and with the recognition that this can lead to poor developmental outcomes, the amount of time parents spend with their children becomes an important health determinant and indicator of child wellbeing.[52]
- Indicators reflect national and state social goals such as improving literacy and numeracy and increasing the rates of breast-feeding.[52]
- Indicators must have the same meaning across time.[52]

Therefore the indicators below were those that most closely fulfilled these criteria. Throughout the text of this document other indicators have been included as other possible indicators for each domain and these have been summarised in Appendix 8. **At the end of each section the indicators have been also summarised and those that have been included as recommended indicators have been italicised.**

1. Population data

Evidence and Context

By collecting data about specific characteristics of the population in question and applying this information to the indicators as appropriate, important information about determinants of health and specific areas of need can be uncovered. Population factors are also referred to as 'demographic factors.'[53] Demographic indicators can "provide a general picture of the situation in a country or a region, and a frame of reference for many of the other health indicators. Moreover, the population data provide e.g. the denominator for calculating many other indicators."

Choosing population factors relevant to the health and wellbeing of children is relatively straightforward as there is general consensus in the majority of the literature reviewed with regards to population factors that ought to be measured. Therefore, a brief discussion about: a) the value of some of the identified population factors, and b) some specific issues about population factors that have been identified in the literature will accompany the recommendations for population factors.

Population distribution is important to measure because the number of children eight years old and younger and their families, as well as expecting parents, determines the demand for services including, for example, prenatal services, parent education and support, and child-care, as well as other services and facilities.

Socioeconomic factors need to be broken down further to ascertain for example poverty levels as well as information about living condition (discussed in more detail in 'Education and Work'.)

A key issue with regards to indicators of health and wellbeing is providing information that aids in the identification of areas of need,[54] both geographically and socially defined. This is necessary if improvements are to be made specifically with regards to disadvantaged children and their families, particularly for indigenous Australians. This is the rationale for the inclusion of population factors such as gender distribution, race/ethnicity, language spoken at home and geographical distribution.

Family composition provides information about the importance of determinants of child health and wellbeing including, for example, parental marital status. The impact of family factors on child health and wellbeing is discussed in more detail in 'Child Friendly Environments'.

Children who live in homes where English is not spoken may face challenges in being ready to learn at school entry, which may in turn effect academic achievement and later employment prospects. The importance of being ready to learn at school entry is discussed in more detail in 'Education and Work'.

Lastly, where variation exists in the indicator literature, it is mainly in terms of what information is included and excluded. For example, the UK Sure Start Project[4] collected information on family and household composition.[4] As well as this, there is some variation in the literature as to what are considered to be 'population factors' or demographics i.e. there is some discrepancy in the literature as to which section of information is presented, but overall there is little disagreement about what information is important to collect.

Table 15. Indicators of population characteristics

Indicator/Domain
Population distribution[4,55,56]
Gender distribution[4,55,56]
Geographical distribution[57]
Socioeconomic position[4,55]
Employment status[4,55]
Family structure[4,55]
Race/ethnicity[55,56]
Language spoken at home and difficulty speaking English[55]
Education level[4,55,56]
Proportion of mothers under 18 years of age[4]
Lone mothers[4]
Childcare Burden[4]
Religion[4]

2. HEALTH

A. Parental Health and Wellbeing

The effect of parental health on the health of the child has been well documented in the international literature: there are clear causal relationships which demonstrate the influence of parental factors on child health outcomes, such as antenatal exposures, environmental and genetic determinants, sociodemographic factors, and parental behaviours.

The evidence base is less clear when you examine the influence of a parent's health and wellbeing on their child's health and wellbeing, due to the bias associated with using parent's reported measures of children's behaviour, health or wellbeing.[58] There is some early evidence that there are differences between father's and mother's reporting.[59]

Table 16. Indicators of parental health and wellbeing

Indicator/Domain
Parental general health and wellbeing[4]
Antenatal care[2]
Births per 1000 adolescent females[5-7]

B. Smoking, Alcohol and Other Drugs

Evidence and Context

Smoking cigarettes, drinking excessive alcohol and the use of other drugs, both legal and illegal, are significant causes of health problems (including physical, social and emotional problems) within the general population.[60,61] The use of these substances can be detrimental to the health and wellbeing of children in a variety of ways, and the various causal pathways by which this can occur are complex. A brief overview of these issues will be discussed here, while the emphasis will be on the indicators. To demonstrate the complex nature of the causal relationships between cigarette smoking, alcohol consumption and drug use and child health and wellbeing, the example of cigarette smoking will be explored in more detail.

Three examples of the way in which parental cigarette smoking can have detrimental effects on the health and wellbeing of young children are: a) Parental smoking can be detrimental to the health of an unborn child if his/her mother is smoking during pregnancy.[62] b) Parental cigarette smoking can have detrimental health effects on children of parents who smoke due to passive smoking.[63] c) Parental cigarette smoking can have a negative impact on children's health through the effects of parental modelling which has been identified as a significant factor in the likelihood of children taking up smoking.[64] Alcohol and drug use during pregnancy is also detrimental to the health and development of the unborn child;[61] and parental cigarette smoking and substance abuse are also detrimental to child health and wellbeing indirectly by negatively affecting parental health and wellbeing.

The review of the literature revealed a significant association between parental drug[65] and alcohol abuse[66] and poor parenting practices. It also reported an increase in the levels of behavioural and emotional problems in children of alcoholics.[66]

Interestingly, the literature also revealed support for the association between children's attachments[67] as well as with child characteristics such as self-esteem and social development and the likelihood of children taking up smoking.[68] These characteristics are strongly influenced by parenting practices.

Indicators

The literature identified in this review outlined indicators that have primarily measured the incidence of cigarette smoking and substance abuse amongst older children than are relevant to this project. For example, in the report entitled 'America's Children: Key National Indicators of Wellbeing' regular cigarette smoking, alcohol and illicit drug use were measured for 8th, 10th and 12th grade students.[6] However, as the focus on this review is children aged 0-8 years, the emphasis for indicators of smoking and substance abuse will be on parental behaviours. While the literature has highlighted indicators of parental smoking and drinking, it does not provide or describe a reliable or valid indicator of parental substance use overall. The suite of indicators below centre around the use of alcohol, drugs and smoking, with additional indices for population subgroup or characteristics of substance use (with the exception of exposure to cigarette smoke via passive smoking). Rates of youth or teen substance use sheds light on long term outcomes for children.

Unfortunately none of these documents provided details regarding the developmental background or original use of the indicators, however, their causal relationships appear to be well established and are discussed at length.

In summary, there is an established causal pathway between smoking, drinking excessive alcohol and taking other drugs and child health and wellbeing. Indicators identified in the literature related to this topic primarily measure the prevalence of substance use, except for one indicator, which is concerned with measuring children's exposure to tobacco smoke via passive smoking.

Table 17. Indicators of smoking, alcohol and other drugs

Indicator/Domain
Children exposed to passive smoking - proportion of parents who smoke in the house[35,69]
Proportion of pregnant women who smoke[69,70]
Population Smoking rate[6,71,35]
Alcohol use[6,35]
Drug abuse[72]
Youth drug abuse[46]
Overall population substance use[53]
Parental substance abuse[69]
Parental alcohol abuse[69]
Illicit drug use[6,35]
Binge Drinking[2]
Teen smoking[2]
Teen drinking[2]

C. Food and Nutrition

Evidence and Context

The health and nutrition of mothers is integral to the health of infants and children. Child health, development and wellbeing are dependent upon access to a diversity of foods, health education programs and environments that support healthy choices for healthy lifestyles. In at-risk communities, poor maternal and child nutrition transmits disadvantage through generations. Breaking the cycle is important, both for the individual and the community.[73]

Pregnant and Lactating Women

The recently published and disseminated public health nutrition document, *Eat Well Australia*, clearly outlines the evidence and context for the priority focus on pregnant and lactating women. In brief, women require nutrient-dense diets during pregnancy and when breastfeeding. The nutritional status of mothers influences the development of the foetus and the birthweight of the babies. Infants born at both extremes of the normal birth weight range

may be at increased risk of chronic disease as adults, with high birthweight babies being often born to mothers with poorly controlled Type 2 diabetes.

Two nutrients, folate and iron, are particularly important before, and during, pregnancy. Evidence shows that increasing the intake of folate before and during early pregnancy can prevent seven out of ten cases of neural tube defects in infants.[74] There is more recent evidence to suggest that folate may also reduce the risk of low birthweight, cleft palate, Downs Syndrome and congenital heart disease.

Breastfeeding

Breastfeeding is particularly important for child health, development, and nutrition.[75] The recently developed national nutrition strategy, *Eat Well Australia,* provides a good summary of the evidence and context, however, in brief, breastfeeding protects against infectious diseases and childhood malnutrition and there is evidence that breastfeeding may give long term protection from coronary vascular disease, cancer, Type 2 diabetes and asthma. There are many barriers to breastfeeding, including women returning to work who find it difficult to continue and a lack of workplace policies to support breastfeeding. Particular groups of women - urban Indigenous women, women in families with low incomes and teenage mothers - have lower breastfeeding initiation and duration. They are also less likely to access antenatal and early childhood services and so receive less advice. In Australia and internationally, breastfeeding is receiving increased attention as a focus of public health.[9] At the national level, *Eat Well Australia*, identifies breastfeeding as a priority area for action.[9] The Dietary Guidelines for Australians also nominates breastfeeding as a key dietary guideline and breastfeeding is the main thrust of the NHMVR Infant Feeding Guidelines.

Children and Food

Not only is it necessary for children to receive adequate quantities of food, it is also essential that the food they receive contains the nutrients necessary for the complex process of development.[75,76] The term 'food security' has been defined as access at all times to enough nourishment for an active, healthy life.[76] A family's ability to secure access to foods and to provide for nutritional needs is linked to economic security. However, the extent to which parents and families provide the type and amount of food to ensure healthy weight gain is associated with both level of education overall and knowledge of foods and food products. Children may receive enough food to far outweigh their need in terms of calorie intake, but the food may be of poor nutritional value. The 1995 National Nutrition Survey revealed many shortfalls in the nutritional intake of children in Australia.[77] For example, thirty per cent of two to seven year-olds do not eat any fruit. Patterns of food eating established in childhood usually

transfer to adulthood. These patterns play a major role in the rates of child overweight and obesity.

Obesity, which is related to excessive calorie intake and inadequate physical activity, is a problem of increasing prevalence for children in Australia.[75] Childhood obesity is a risk factor for adult obesity[78] and is a significant risk factor for cardiovascular disease.[77] Research suggests that 19%-25% of Australian children are overweight or obese.[77] At the other end of the scale there are children who go without adequate amounts of food, suffer malnutrition, and may suffer hunger on a regular basis. This can limit development and predispose a child to infectious diseases.[73]

In addition to food intake, the issue of child oral health is an important one, worldwide, nationally and in Victoria. Significant differences in the oral health status of children do exist in Victoria, the aetiology of which is likely to be multifactorial e.g. access to fluoridated water and reduced availability and affordability of dental services.[79] The multiple potential sequelae of a decline in oral health – pain, infection, general ill-health – have far-reaching consequences.[80] Since diet is inextricably linked to oral health, nutrition, food and oral health need to be considered in tandem.

Issues Related to Indicators

Food and Nutrition

No literature was identified that specifically covered population level indicators of nutritional status, and only a few articles were uncovered about nutrition and indicators at all. Some of the material reviewed gave significant background information to provide evidence of a causal relationships, as described above, but the indicators presented here are those that were identified in broad indicator documents.

Breastfeeding

Australia does not currently have a core set of breastfeeding indicators, however WHO indicators have been reviewed for their applicability in the Australian context and Australian indicators have been proposed.[9] A set of criteria has been used to develop the proposed Australian indicators (relevance to Australian policy, consistent with WHO to meet international reporting obligations, consistent with other indicators in Australia, feasible/simple to collect, and measurable and valid). There is comprehensive coverage of the background to their development and the measurement issues with respect to their validity and reliability in 'Towards a national system for breastfeeding in Australia'.

Indicators of Food and Nutrition

Overall

Food security is a measure of the availability of food and, at a minimum, includes the ready availability of sufficient nutritionally adequate food, without relying on emergency feeding programs or having to resort to desperate efforts to secure food (e.g. stealing).[76] Some information is given regarding the application of this indicator, but no information about the development, or the original use of the indicator, is provided.[76]

Diet quality is assessed in the US with an index called the Healthy Eating Index (HEI), which comprises:[76]

- The degree to which children's diets conform to dietary guidelines
- Fat and saturated fat consumption
- Variety
- Sodium intake and cholesterol intake.

Definitional work and indicators of childhood overweight and obesity have been the focus of a recent Commonwealth Department of Health and Aged Care tender. It provides the evidence and consultative base for the use of standard definitions, and thereby a range of indicators.

Table 18. Indicators related to food and nutrition

Indicator/Domain
Food security[76]
Breastfeeding[35,73]
Diet quality and diversity[76]
Weight Status[4,35]/Overweight and Obesity[71]
Frequency of eating breakfast[35]

Pregnant and Lactating Women

Potential indicators identified in the *Eat Well Australia* document include those described in Table 19.

Table 19. Specific indicators for pregnant and lactating women

Indicator/Domain
Awareness of folate and Neural Tube Defects (NTDs) link among health professionals and women of childbearing age
Awareness of research findings regarding maternal nutrition and health, among health professionals
Nutritional status of pregnant and lactating women by key nutrients

Breastfeeding

A recent review of international indicators related to breastfeeding has recently been performed to determine their appropriateness for the Australian context.[9] A list of indicators has been developed, and is well referenced with respect to definitional issues and reporting opportunities. The indicators have been are extracted and included in the following table.

Table 20. Breastfeeding indicators recommended for a national monitoring system

Indicator/Domain
Percent exclusively breastfed to 4 months and 6 months
Indicators based on mothers' recalled practice among children at ages less than 4 years[9]
Percent ever breastfed
Mean duration of breastfeeding among ever breastfed children
Median duration of breastfeeding among a) children less than three years, and among b) never breastfed children
Percent breastfed at each completed month of age to 6 months
Percent of continued breastfeeding to 12 months
Percent predominantly breastfed to 4 months and 6 months
Percent fully breastfed to 4 months and 6 months
Indicators based on mothers' reported current practice (previous 24 hours) among infants at age less than 6 months
Percent exclusively breastfeeding in the previous 24 hours among infants less than 4 months and less than 6 months
Percent predominantly breastfeeding in the previous 24 hours among infants less than 4 months and less than 6 months
Percent receiving solid foods in the previous 24 hours among infants less than 4 months and less than 6 months

Childhood

Potential indicators in the *Eat Well Australia* document are shown below in Table 21.

Table 21. Indicators to improve children's food, eating and nutritional status

Indicator/Domain
Prevalence of eating disorders/overweight/obesity
Extent children's diets meet Dietary Guidelines for children and adolescents eg eating breakfast
Number/extent health promoting school projects addressing nutritional issues
Extent food sold in school canteens fits dietary guidelines
Extent food provided in childcare meets nutrition standards
Proportion of 'junk' food ads in children's peak viewing times

Food and Nutrition in Disadvantaged Groups

Rates and indicators of health determinants for low socio-economic groups and teenage mothers need particular attention.

Summary

In summary, food, eating and nutrition are well recognised as indicators of child health, development and wellbeing. The introduction of solid foods to infants is critical and poor practices in this area can result in iron deficiency. Increasing the availability and range of foods available to pregnant and lactating women and children - through childcare centres, family day care and school canteens that meet the cost, taste and preference for children - is a priority. Early nutrition is linked to oral health and both will differ with age, depending on exposure to nutrition, socioeconomic factors, prevention and treatment. Working with parents and families to ensure access, information and behaviour change strategies regarding the influence of their behaviour on children's health outcomes is vital. Indicators in this area need to reflect performance on each of these issues.

D. Play, Recreation and Physical Activity

Evidence and Context

Following on from the previous section on nutrition (in which childhood obesity was highlighted as a significant public health concern due to up to 25% of Australian children being overweight or obese) physical activity in childhood is also an important health determinant as it is just as pertinent with regards to obesity as nutritional intake.[77] A summary about nutrition and physical activity in the electronic Medical Journal of Australia highlights the importance of physical activity in children for lifelong health and wellbeing.[77]

Play also has an important role in socialisation and other developmental processes such as the development of coordination in the early years;[31] opportunities and facilities for physical activity and play and recreation are essential for healthy child development.[21] High quality child-care services provide stimulating play environments appropriate to developmental stages which promote child health, development and wellbeing.[81] Additional facilities, as well as providing opportunities for play, need to be provided to allow and encourage children to have active lives.[77] This is discussed in more detail in the Section of this review titled Child Friendly Environments.

Indicators

There are few indicators related to opportunities for play and physical activity. These indicators will be briefly characterised here. Firstly, play, recreation and physical activity have an evidence-based causal relationship as described in the background information above.

Childcare quality is important in that it incorporates the types of activities that should be generating appropriate opportunities for play and recreation as were included in the National evaluation of the Sure Start project in the UK[4] (which is described at the start of this review). While a lot of information about measurement issues is provided in this literature, no background on the development or original use of the indicators is provided. Child-care quality is discussed in more detail in the Section of this review titled 'Education and Work'.

Television viewing was identified in a national American report titled, 'A Child's day: Home, School, and Play' that presents results about selected indicators of wellbeing. Information is collected about amount and type of television viewing and rules regarding these. Only the results are presented i.e. no information about the development or original use of the indicator is presented in this report, although in the introduction, it states that, 'information on how children spend their time adds to a picture of their health and wellbeing.'[82]

The National Evaluation of Sure Start (UK), mentioned above, reports that data is collected on the presence of a toy library in the local area in assessment of the provision of local services, but no further information is provided about this indicator.[4]

In summary, there was not a lot of information revealed from the literature reviewed about indicators of play, recreation and physical activity, despite there being a well-established causal relationship between these and child health, development and wellbeing. Indicators that were identified were in documents that comprised of indicators across a variety of domains, and none of them had background information except with regards to a causal pathway.

Table 22. Indicators of play, recreation and physical activity

Indicator/Domain
Participation opportunities for play and recreation[2,10]
Physical activity[35] (Indicators under development)
Childcare quality[4,81]
Television viewing [82]
Toy library in local area[4]

Facilities for Recreation (Built and Natural)

The literature frequently states that there is a strong relationship between play and recreation and children's healthy development.[21,83,84] In the context of trends regarding child health and wellbeing, there is a call that in order to understand the lives of children better, measures must be developed to assess their play and recreational activities.[83] Indicators identified in the literature are included in Table 23.

The literature describing these indicators did not provide any information with regard to methods of development. However, all are being used to measure community factors in the Champlain Initiative, as described previously. The literature provided some further suggestions regarding the development of future indicators:

- A lack of spaces for play, related to moving and parked cars congesting outdoor spaces. (This was identified as a characteristic of communities where children voiced feeling alienated and negative views of their local environment.)[24]
- Interesting activity settings were identified by children as necessary for their wellbeing[24]

- Activities that celebrate community identity should be encouraged and accessible to all.[21]
- Children in difficult circumstances and with special needs must be able to participate in play and recreation activities. Facilities must accommodate a range of needs and choices including those of both girls and boys of all ages.[21]

Table 23. Indicators for play and recreation

Indicator
Number of facilities (for children) for recreation (e.g. number of parks)[2]
Number of, & participation in, recreation and cultural arts programs/activities (for children)[2]
Proportion of the general population who believe there is abundant opportunity for recreation, cultural events & fun[2]
Richness of the home environment – eg opportunities for reading, outings, music[2]
Child's play environment in[5] and outside the home must be safe[2]

E. Child Welfare (Child Maltreatment)

Evidence and Context

One of the most significant threats to child health, wellbeing and development is trauma, abuse and neglect. The term 'child maltreatment' is used in this review to refer to the range of abuse and neglect experienced by children. This includes physical, sexual and mental abuse. Regardless of the type of abuse, the consequences are wide-ranging, including not only the short-term effects of physical damage, but also the medium-to-long term effects of mental health and behaviour problems and the lasting effects of physical problems as a result of abuse.

A comprehensive discussion about the full range of the different types of child maltreatment and their effect on child health, wellbeing and development is beyond the scope of this review, however, a brief overview of the issues most pertinent in the literature about indicators and child welfare has been included. While the physical injuries that result from abuse have received the most significant attention; psychosocial, emotional and behavioural effects are often less evident, have more complex causal pathways and outcomes, and have received more recent research attention. Significant progress has been made with regards to understanding these complex causal relationships due to new scientific evidence that examines the neurological mechanisms of brain development.[1] Recent research findings have concluded that trauma and abuse, both in-utero and after birth, can affect brain development in such a way as to result in severe anxiety, depression and/or an inability to form healthy attachments to others.[1] It can lead to cognitive difficulties that can, in turn, lead to responding to challenging situations with aggression or violence.[1,85] It has been asserted that emotional neglect, social deprivation and a lack of appropriate stimulation can lead to an inability to control impulses as well as immature emotional and behavioural functioning and (in combination with other developmental experiences) a tendency for violent reactions.[1] Therefore, the behavioral and emotional difficulties that these children often exhibit are not only a psychological response to their environment but are also the result of structural maldevelopment of pathways within the brain as a consequence of the environment they have been exposed to early in life.

Role of Social-Cultural Environment

The degree to which governments put in place systems to protect children (e.g. laws to protect children and child protection programs), the quality and effectiveness of these systems, as well as the amount of resources committed, is indicative of the degree to which protecting children is a government priority.[21] The literature documents the importance of the socio-cultural environment of the child in the aetiology of child abuse.[86] Until recently, greater

emphasis has been placed upon the role of child-parent-family factors in the prevention of child maltreatment. However, as evidence of the importance of contextual factors has emerged, preventive efforts are beginning to be inclusive of contextual environments.[87] Social factors that negatively impact upon, or do not promote child health and wellbeing - such as poor levels of social capital or cohesion (described in more detail in 'Child Friendly Environments') - are reported to underpin child maltreatment and other family violence.[87] Thus, indicators of the social quality of the child's environment are also relevant to child welfare. Specifically, parental health and wellbeing, and particularly mental health (e.g. stress, depression) is significantly related to child maltreatment. Indeed, the relationship between child maltreatment and the presence of a parental mental disorder is well established.[86]

Indicators

Measurement issues

The literature reviewed revealed a number of articles that described issues relevant to child maltreatment. Only three articles, however, specifically described issues associated with the development and application of indicators to measure child welfare.[88-90] Forrestor states that outcome indicators of child welfare services need to balance the principles of child protection, child wellbeing and child and family functioning.[91] However, practical problems are inherent in measuring child maltreatment due to the challenges of what constitutes child maltreatment (e.g. what constitutes child maltreatment differs between cultures) and because of its inherently secretive nature.[91] Interestingly, Forrester and Harwin suggest that measuring the presence and quality of measures to protect children from abuse may be feasible as a measure of a community's commitment to protect children from maltreatment.[88] In their paper, they discuss the appropriateness of indicators of child welfare for international comparison and, while it recommends this indicator i.e. presence and quality of measures to protect children, no further information is provided with regards to its background, development, reliability or validity.

A report about the monitoring of child maltreatment globally states that any existing system of estimating the level of child maltreatment would not be accurate.[91] Child homicide has been suggested as an indicator of the effectiveness of child protection systems but Forrester et al state that this is not an accurate or reliable measure. They also assert that it is not a reliable proxy indicator of more general child maltreatment, as it correlates poorly with more general child maltreatment rates.[91]

Notification rate

Notification rate has been extensively criticized as an indicator because it tends to be more reflective of public acknowledgment and concern about child maltreatment than of the issue itself.[88] Using maltreatment notification rates from administrative data as an indicator could result in an increase in reported abuse being perceived as a positive development as it would mean that these children were being protected.[88] Similarly, given the relatively low incidence of child maltreatment, there are concerns with the reliability of the estimates of child maltreatment data.[88] This indicator has not been recommended for use across the literature identified in this review.

Re-notification rate

Re-notification rate, on the other hand, is supported as an indicator of child safety.[4] Recent research on child maltreatment recurrence rates consistently show increased recurrence rates for children with prior reports, and successive shorter times until recurrence for each report.[89] The Sure Start program in the United Kingdom has included re-notification rate of child abuse within twelve months as one of their main outcome indicators.

Fluke et al, [89] in an article that describes the development of a set of indicators collected within administrative systems for the Department of Human Services of the City of Philadelphia, suggest that indicators of child welfare should comprise safety[89] (e.g. re-notification rate[4]) and permanency[89] (e.g. placement disruption). They state that welfare services' organisational performance measures need to include safety and permanency indicators as well as child and family functioning indicators. The paper describes the methodology for their development in detail.

Developing a matrix of outcomes indicators

A recent Canadian report advances the thinking about maximising administrative data for outcomes and enables continuity of developments in clinical outcomes data. The Canadian Client Outcomes in Welfare Project has been undertaken to examine the state of knowledge regarding outcomes measurement. Its first phase has resulted in an Outcomes Indicator Matrix. This was based on the framework developed by the American Humane Association Outcomes Roundtables, using the four overlapping domains of child safety, child functioning, family functioning and family preservation, but viewed in terms of the three levels of intervention (child, family and community). The Canadian initiative replaced the domain of family preservation with the more child-focused domain of permanence, shifting the emphasis from the family to the child. Preservation was added as a way of reflecting the importance of

the child's family and community supports. Indicators were developed across four domains to reflect the breadth of the child welfare mandate in Canada – inclusive of child protection,

child functioning, permanence and continuity of care for the child, and family and community support. An index of ten indicators is associated with the four identified domains, described in Table 25.[90] Brief background information has been given about each indicator in the report. Administrative indicators were used for a number of reasons, including the fact that they are more easily collected and standardised and are relatively objective. They are, however, proxy indicators that are only indirectly linked to child outcomes. These provide a feasible model for an outcomes measurement system which is consistent with an ecological or social model of health that could be relevant and useful for Victoria.

Summary of Indicators for Child Welfare

There is some consistency across the literature that suggests that the re-notification rate of child abuse is a useful and valid indicator of the safety of children and also reflects the system's ability to respond to notifications. The Canadian model also capitalises on other information that can potentially be available through administrative data systems.

Table 24. Child welfare outcomes indicator matrix[90]

Domain	**Indicators**
Protection	Recurrence of abuse/ *Re-notification rate*
	Child injury and death
Wellbeing	Cognitive functioning
	Child's behaviour
Permanence	Placement rate
	Placement disruption
	Time to achieve permanence
Preservation	Housing stability
	Parenting capacity
	Ethno-cultural placement matching

3. Education and Work

A. Education and Learning

Evidence and Context

Evidence from around the world has suggested that children's participation in early and organised learning results in improved educational outcomes, including numeracy and literacy, improved self-esteem, better employment prospects, decreased crime, delayed pregnancy and improved health outcomes. Learning and communication skills support the development of critical life-skills including social skills, literacy and numeracy.[32] Children start learning in infancy and learn a great deal prior to attending formal education. Even before entering school, weak academic skills are associated with, and appear to exacerbate behavioural and attention problems.[32]

Developmental difficulties may also contribute to learning difficulties in the presence of normal intelligence, therefore, while the mechanics of learning difficulties are not fully understood, it is clear that without attention to problems in speech, hearing and cognitive development, emotional and behavioural problems are more likely to occur.[32] Language acquisition and cognitive skills are also important in their own right.[32] Success in school has been shown to be directly associated with life success; failure to complete school dramatically increases the likelihood of destructive behaviours such as drug abuse, poor employment prospects, low income, welfare dependency, delinquency and crime.[32,92-97]

Educational outcomes in secondary school and beyond can be traced back to academic skills at school entry [98-101] and these relate to the experiences of the child that contribute to their development in the preschool years.[32] Pre-kindergarten cognitive skills show strong correlation with achievement in school[102,103] and early adulthood.[104]

The correlation between early learning and later academic performance underpins the international interest (particularly in Canada and the USA) in the closely related concepts of school readiness and children's readiness to learn[32] (referred to by some authors as school readiness to learn and also readiness to learn at school).

Readiness to Learn and Related Concepts

There is now sufficient evidence linking preschool experiences to school outcomes[1,32] such that it has become increasingly important to ensure that all children commence school ready to learn.[105] For a child to be ready to attend school and be and be able to function in such a way so as to learn in a structured environment and do that which is expected of him/her, he/she must have already established certain traits, behaviours skills and knowledge. For example, children must be able to meet the task demands of school such as being able to sit quietly and cooperate. Being ready to learn encompasses readiness across five domains of development as follows:[105]

- Physical wellbeing and motor development
- Social and emotional development
- Approaches toward learning
- Language development
- Cognition and general knowledge

These domains vary slightly in the literature but the principles are the same throughout. Not being ready to learn at school entry decreases a child's chances of fulfilling his/her potential,[55] and has become an especially important issue for children from some minority groups (e.g. those from poor socioeconomic backgrounds). Research has shown that these children are particularly vulnerable to not being ready to learn upon entry to school.[55] Traditionally, readiness for school was thought to entail readiness in cognitive and linguistic abilities alone.[106] The components of the broader definition will be briefly discussed here:

- *Child and maternal health*
  Both maternal and child health have been shown to be directly related to school performance.[107] For example very low birth weight and poor nutrition are thought to be risk factors for children being unprepared for school.[107] Early childhood educators also emphasise the importance of optimal fine and gross motor skills upon transition to school as well as cognitive and linguistic skills.[107]

- *Social and emotional development*
  This is the foundation for relationships within the school setting and involves a sense of wellbeing that stems from stable interaction and relationships in early life.[107] Emotional support and secure attachments assist in the development of characteristics such as self confidence and the ability to perform as a member of a group.[107]

- *Approaches toward learning*
  This concept refers to the attitudes, disposition and styles, as opposed to skills, that children exhibit in a variety of ways when they become involved in learning.[107] Cultural variance in approaches to learning must be respected and educators must have an understanding of the various ways that children become involved in learning in order to encourage and not hinder their engagement.[107] Some of the approaches that promote early learning and development include curiosity, creativity, independence, cooperativeness and persistence.[107]

- *Language*
  Language enables children to participate in learning activities and fosters social and emotional involvement with others in the school setting.[107] Experience with spoken and written language enables children to interact with others and give expression to their thoughts, feelings and experiences.[107]

- *Cognitive development and the acquisition of general knowledge*
  This occurs through interaction with other people and learning materials and provides foundations for learning.[107] The provision of play-oriented, exploratory activities at the transition to schooling and maintenance of these activities in early school experiences can ease the transition.[107]

A brief note must be made to highlight that some of the literature avoids the term "readiness" for fear that it implies a single dimension and standard of developmental threshold below which a child is not fit for school entry, instead of a generalised developmental concept;[107] but despite this the principles and ideas remain constant throughout the literature.

Indicators of preschool and school education

Children's early learning and development is significantly influenced by their family and community context. The family and community shape early learning experiences of the child and effect all of the dimensions outlined as elements of readiness to learn. The family context is of paramount importance in the development of readiness to learn and more information on the family's impact on all the dimensions of health and wellbeing and related indicators (many of which are relevant to readiness to learn) are described in the sections on social connections and parenting.

Class size

Class size is a controversial topic in Victoria, internationally[13,108](and nationally) with regards to the optimal learning environment for children. A number of studies cited in an article by Bennett[108] have reported that teachers and parents perceive links between class size and academic achievement.[108-110] While this evidence is not scientific, the view that class size is very important is supported by peak education bodies.[111] The literature supports that there is sufficient grounds for believing that class sizes of 20 or less for the first years of schooling would result in higher academic achievement, particularly with regard to children from minority groups, but that factors necessary for the effective implementation must be taken into consideration.[108] The most important factor in implementation is that teachers are appropriately trained to facilitate them, maximising the benefits of reduced class size. Lewit reports the results of a study where students showed significant improvement in smaller class sizes however, the uncertainty of whether these results are replicable on a large scale limit the value of the findings.[12]

The Australian Bureau of Statistics publication, Measuring Wellbeing[46] states that student/teacher ratios can be an indicator of the amount of resources going into education.

School completion

School completion is a long-term outcome of academic achievement and has been identified in a number of publications as an indicator of children's health and wellbeing.[6,112,113]

Participation/Attendance

Absenteeism has been identified (in the literature) as an indicator in Sure Start (UK)[114] which is described in the introduction, and is also suggested as an indicator of school adjustment.[115] No background information has been given with regard to the development of school attendance as an indicator of child health and wellbeing. Lack of attendance can also be due to school refusal (it is not likely to be related to truancy at age eight or younger) which can indicate anxiety or mood disorder.[116] Attendance at a preschool program is seen as one of the US's key indicators of wellbeing and reflects the importance of attending a preschool year, especially for those children at risk. The Head Start program in the US[49] has been developed to give children living in disadvantaged home the opportunity to have a quality preschool education. Research from this has demonstrated the positive short and long term effects and reflects the findings of the Highscope/Perry Preschool project.[1]

Readiness to learn

Indicators of readiness to learn include those that have been referenced in this review in other sections, such as physical health and wellbeing, and social health and wellbeing. Indicators need to be relevant to the five domains of readiness to learn already described. There is no clear distinction between of indicators of readiness to learn and indicators of early schooling.

In Canada a specific tool has been developed with the aim of measuring readiness to learn at school as an indicator of child health and wellbeing. The Early Development Index (EDI) was developed by the Canadian Centre for Studies of Children at Risk at McMaster University and the Hamilton Heath Sciences Corporation in partnership with the Founders' Network and the Early Years Action Group in New York, Ontario[14] and assesses all five domains of readiness to learn: physical health and wellbeing, social knowledge and competence, emotional health/maturity, language and cognitive development and general knowledge and communication skills. Although these domains vary slightly to those outlined in the background information on readiness to learn, they still include the same concepts. It also includes questions about special skills and particular problems experienced by children.[14] It is a teacher-completed instrument that offers a number of multiple choice questions and some short answer questions.[117]

The process of developing the items involved consultation with educators in collaboration with the Early Years Action Group and the Parenting and Literacy Centres (Toronto).[14] It was found to be a valid measure of children's readiness to learn at school entry, and repeated supplemental validation studies are being carried out in order to ensure that the EDI maintains validity.[118] In an example of one of these studies the EDI was assessed in relation to child and parent measures.[118] There is some literature to support its validity (including cultural) when examined at several sites in Ontario.[119] It is completed by kindergarten teachers in the second half of the school year.[119] While it is a disadvantage to have only one person completing the EDI, this is considered to be far outweighed by the advantages of having a measure that can feasibly be administered to populations of children.[119]

In North America, the Early Childhood Longitudinal Study of the Kindergarten Class of 1998-99, developed by the National Center for Educational Statistics, is following a cohort of about 22,000 kindergarteners that are nationally representative from more than 1000 kindergartens.[120] It has collected data about children's early school knowledge and skills including academic skills, social skills, problem behaviours, approaches to learning, and fine and gross motor development.[120] Children's height and weight are also measured over the life of the study as indicators of physical health.[120] The data was collected from telephone interviews with these children’s parents/guardians and self-administered questionnaires

completed by the children's kindergarten teachers. Findings also come from data gathered during an individualised assessment with each child.[121] The methods of development of the indicators are not described nor the validity of each item studied. This study is being used to inform national policy and practice.[120]

In Canada and the USA readiness to learn at school is measured as a whole. The individual items that make up the EDI and the Early Childhood Longitudinal Study of the Kindergarten Class of 1998-99 can be found in Appendix 9.

"Indicators of Children's Wellbeing"[52] provides a comprehensive summary of the present state of indicator development for the measurement of children's health and wellbeing. It lists the following as indicators of readiness to learn: (* denotes the indicators of primary importance)

- Exposure to reading at home*
- Exposure to prenumeracy experiences
- Approaches to learning
- Emergent literacy and numeracy development*
- Proportion of kindergarteners "unready" for kindergarten
- Parental attitudes/expectations
- Access to instruction in native language*

Limited information has been given as to the development and validity of these indicators i.e. causal pathways are identified but information has not been give as to the reason for, method or place of development in most instances. This information will be briefly characterised here:

- Preliteracy interactions in the home have been repeatedly found to correlate with children's readiness to learn at school entry.[52] The extent to which these experiences are provided are related to parental and particularly maternal education.[52] Prenumeracy interactions have also been repeatedly shown to correlate with children's readiness to learn at school entry. Experiences include games that involve numbers and conversations that involve number with quantity i.e. it is not just counting that matters, it is exposure to the functions and meaning of counting that aids in promoting readiness to learn at school.[52]
- Approaches to learning have been shown to impact upon behaviours that effect a child's readiness to learn (e.g. delay of gratification, attentiveness, task persistence).[52,122,123]
- Measuring emergent literacy and numeracy at school entry and the first years of school, is intended to inform about preliteracy and prenumeracy experiences that have been found to foster maths and literacy development in school.[52] This will be addressed in more detail in the section in this review entitled Literacy and Reading.

- The proportion of children deemed "unready" for kindergarten has high face validity but is possibly more a reflection of contrasting preschool education practices than of child wellbeing.[52]
- Parental attitudes and expectations are important indicators of academic performance, (e.g. parental monitoring)[124-126] especially when translated into actual involvement[52,127] (e.g. assistance with homework).
- Lastly, research suggests that some degree of consistency in young children's exposure to their native language may be relevant to later linguistic development and learning.[52]

School Readiness

Some confusion can arise with regard to the terminology surrounding this issue. Readiness to learn may be defined as the state of wellbeing of a child required for them to enter formal schooling, having attained the appropriate developmental level within the five domains as described above. Some of the literature uses the term readiness to learn as a more general concept that can be applied to a variety of situations. School readiness is used to refer to the same concept but can also be used to refer to a school's state of readiness with regard to new pupils starting. A report from the USA on community level factors of school readiness (written by the non-government organisation Child Trends)[128] states that the readiness of schools is dependent upon the following:

- Smooth transition between home and school
- The degree to which schools strive for continuity between early care and education programs and elementary schools
- How schools help children to learn and make sense of their complex world
- The degree to which schools are committed to the success of every child
- The degree to which schools are committed to the success of every teacher and every adult who interacts with children during the school day
- The degree to which schools introduce or expand approaches that have been shown to raise achievement
- The degree to which schools are learning organisations that alter practices and programs if they do not benefit children
- The degree to which the school serves children in communities (i.e. assure access to services and supports in the community)
- The degree to which schools take responsibility for results
- The degree to which schools show strong leadership (i.e. have a clear agenda, the authority to make decisions and the resources to follow through goals)

These ideas explore a range of areas where measures could be developed as benchmarks for the school and its approach, for example, to the transition to school from preschool. Currently there are no specific indicators or measures for these areas.

Quality of Preschool

Preschool and care arrangement factors are significant in the development of preschool aged children. Indicators of childcare have been identified in Indicators of Children's Wellbeing[52] and are as follows: (* indicates the indicators of primary importance.)

- Quality of care*
- Stability of care
- Proportion of eligible children in early intervention programs*
- Proportion of children (in this instance eight years or younger) spending time without a carer or parent present for some of the day
- Ratio of childcare costs to family income*
- Proportion of children in childcare facilities of their parents choice

Limited information has again been given as to the development and validity of these indicators i.e. causal pathways are identified but information has not been given as to the reason for, method or place of development in most instances. What evidence of validity and reliability has been documented will be provided here.

Evidence indicates that quality and continuity of childcare is more important for child health and wellbeing than other aspects of childcare[52,129] such as, for example, the type or amount of childcare utilised. Evidence that the proportion of eligible children in early intervention programs is a valid indicator includes evidence that supports early intervention in the form of high quality programs such as Head Start.[52] Evidence has been documented as to early intervention programs' positive short term and sometimes long term effects on school achievement and therefore supports using enrolment in these programs as a proxy for access to quality childcare settings.[52] The research literature on the developmental effects of self care is not completely consistent, but does indicate that that negative effects are likely in children under the age of thirteen in urban settings.[52] This indicator is considered to be closely tied to the issues of parental involvement and monitoring as discussed in the section on readiness to learn.[52] Costs of childcare relative to family income is an indicator of equity of access as a family.[52] Lastly, evidence suggests that employment opportunities of parents (specifically mothers) is sometimes directly related to whether their children are in the childcare of their choice[130] (i.e. mothers have been shown to be more likely to complete job training and placement programs when children are in childcare arrangements of their choice.)

The report entitled New Social Indicators of Child Wellbeing by The Family and Child Wellbeing Network for the European Centre for Social Welfare Policy and Research[72] (already briefly characterised earlier in the review) lists the following as indicators of early childcare/education (that have not already been mentioned):

- The amount of non-parental childcare
- Quality on non-parental childcare
- Type of childcare arrangement, e.g. childcare center, paid non-relative
- Child/staff ratio in childcare setting
- Stability of childcare arrangement
- Training/education of childcare providers
- Cost per hour of childcare provided

Indicators of child-care are not direct indicators of child health and wellbeing because a consensus is lacking with regard to the effects for children of different types of childcare, including parental care. The quality of care appears to be more important than the type,[72,129] and can only be loosely assessed by measuring some quantifiable elements of care. Ideal child-staff ratios are different for different settings and age groups and consensus has not been reached in the international literature. Minimum standards have been legislated for in Victoria,[131] however these ratios have more children per staff member than national recommendations.

The stability of childcare arrangements depends upon staff turnover and changes that parents make in childcare arrangements. The total years of education and training specific to child development are the main dimensions of carer education that will impact on quality.[72] Lastly, expenditure on childcare can have obvious impact upon quality of care but does not measure it directly. It therefore contributes to the picture of quality of care arrangements but should only be used to add to the total picture provided by the sum of indicators of early childcare quality.[72]

Parental Education

A series of large scale studies have demonstrated that parental education is a predictor of children's health and wellbeing that is stronger than family income, single parenthood or family size in many cases. Higher parent education levels make it more likely that children will receive health care, participate in preventive and promoting activities and have higher educational outcomes themselves.[132] Parental education has repeatedly been shown to be directly related to children's educational attainment.[32] Parent education is most closely linked to children's cognitive development and academic achievement, but is also associated with

children's economic wellbeing, social development, emotional wellbeing and their physical health[132] including low birth weight (a reflection of the pregnancy).[133] In developing countries the link between maternal education and infant mortality has led to an increased focus on promoting education for girls.

There are complex reasons for these associations, but the consistency of findings over a number of domains and children's ages suggests that the association is real and stable over time.

Education has traditionally been associated with gaining knowledge for a broad range of cultural, civic and vocational needs, which usually takes place in institutions such as schools and universities. The continuation of education has been thought of as training and is less broad and more focused on vocational interests in specific institutions for this purpose. It is now thought that these two concepts actually merge into a continuum of learning across the lifespan and are equally important to adults becoming members of a skilled and changing labour force and leading fulfilling lives.[54] More recent survey questions that have been developed to measure education have attempted to incorporate this aspect.

Indicators of parental education

Information on the original development and use of parental education as an indicator has not been identified but is consistently used and suggested as an indicator of children's health and wellbeing.[26,72,121] It has recently been suggested in an article cited on the World Bank web-site that the educational climate of the home is influenced not only by the educational level attained by the mother, (although this remains important) but is also influenced by the average number of years of education in the household for those 15 years or older.[26] It has been demonstrated that this is related to performance of children in school and it is considered to be likely to be associated with a child's intellectual development;[26] however no other information on the development or use of this indicator has been provided.

The Australian Bureau of Statistics has developed a set of standardised questions for demographic data and these are included in the Population section of this document. Literacy levels have been considered separately in Table 25.

Table 25. Indicators of education and learning

Indicator/Domain
Attendance in preschool programs and care
School class size[13]
Measures of readiness to learn at the child, family, school and community level[118,119,121]
Amount, quality and affordability of early childhood care and educational services, and primary schools[5]
School attendance and absenteeism (particularly chronic absenteeism)
Educational attainment of other household members (and particularly parents)[26]
Receipt of special education services[115] (development not discussed but does appear to have face value as an indicator of school adjustment - was used in a study about the presence of risk factors and school adjustment.)[52]
Overall school completion rate may be an appropriate indicator to measure long term outcomes[6,53,112]

B. Reading and Literacy

Evidence and Context

Child literacy

Literacy is a process that begins for children when they are very young and continues into adulthood. The concept of emerging literacy[134] refers to the gradual, ongoing process of developing language skills - listening, speaking, reading and writing - and begins in infancy. Therefore the beginnings of literacy start in the home and extend into the environments that children find themselves in. Language learning is closely related to children's cognitive and social development and therefore can have a significant impact on their future school functioning. Issues related to mental health and self esteem are also closely related to these issues and research has demonstrated that children with school difficulties and mental health problems are more likely to have had learning and literacy difficulties.

Intervention programs are now being developed that address the issue of literacy from a very young age. Two recent trials have demonstrated the efficacy of a simple early literacy program aimed at children living in disadvantaged areas through access to free books; both have seen an increase in receptive language skills and increased use of books in the homes of those in the intervention group.[15,135] These programs have arisen in response to previous research linking children who read well at school to the fact that they were more likely to have been read to at home and to enjoy reading. Further evidence demonstrates that children with learning difficulties who are exposed to literacy at an early age still enjoy reading and are more likely to try and overcome difficulties compared to those children who have not been exposed to books and literacy. Research by Snow[136] has pointed out, however, that home factors such as income and number of people in the home at the time of preschool is significantly correlated with 4th grade reading comprehension.

The research supporting the importance of early literacy has been taken up by programs such as Head Start[49] and Early Head Start[137] in the USA that emphasise the importance of exposing children to literacy very early and have focused on preliteracy activities in their curriculum.

Indicators of Child Literacy

Child literacy rates have been an area of controversy within education circles. In Australia, children's literacy is assessed through school based benchmark testing, which is undertaken at a state based level and for which there has been some concern regarding validity. Benchmarks are nationally agreed minimum acceptable standards of literacy and numeracy at particular year levels and are considered the minimum level a student will need to make sufficient

progress at school without major difficulties.[20] In Victoria in 1999 nearly 14% of children in year 3 failed to reach benchmarks levels for reading. In Victoria testing is undertaken at all government schools, but is optional at Catholic and Independent schools where there is variable uptake, therefore this may be contributing to Victoria's higher rates of reading difficulties compared to some other states.[20] The USA has also followed these indicators and have included reading scores at year 3 and 5 in their key indicators of wellbeing.[6]

It is also thought that children who are read to at an early age are more likely to enjoy literacy activities. Whilst most of the research is retrospective (ie children who enjoy reading at school were more likely to have been read to at home), there is emerging evidence through literacy promotion that the age at which children are first read to is an important determinant of literacy practice within the home and therefore an indicator of family literacy practice.

Adult/Parent Literacy

There is an established link between parental and child literacy. There are a number of factors that are likely to contribute to this relationship, which include genetics and inheritance as well as the literacy environment in the home. Therefore there has been a shift from discussing child or adult focused literacy in isolation to now acknowledging the importance of family literacy and the results that are possible from family centered literacy activities. Literacy is also obviously an important tool for parents and can affect their mental health and feeling of self-worth which may subsequently affect their children (see Parental Health and Wellbeing).

In 1991 Congress in the USA defined literacy as "an individual's ability to read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and develop one's knowledge of real-life literacy tasks". Results from the National Adult Literacy Survey(NALS)[138] in 1988 revealed that 21-23% of American adults aged over 16 years were level 1 literacy, the lowest level. This correlates with the ability to do simple literacy tasks only such as signing one's name or identifying one piece of information in a sports article.[138] In Australia the most recent measure of adult literacy was through the 1996 ABS Aspects of Literacy Survey; this showed that nearly 20% of Australian adults aged 15-74 years old have very poor literacy skills (level 1).

Analysis of the NALS data has also demonstrated the high correlation between low literacy levels and poor health in adults.[139] Even after adjusting for covariates, adults with low literacy were more likely to have poorer health knowledge, poorer health status, more hospitalisation and higher health costs. Although the pathway for this relationship is complex, studies have

demonstrated a relationship between low literacy and health behaviors, including taking appropriate medication and understanding and receiving health messages.[140] This same data also revealed that low literacy was associated with poverty with 43% of level 1 adults living in poverty and more likely to be unemployed.[138] Work by Davis has shown a relationship between low literacy levels and adolescent violence including higher rates of crime by and against adolescents aged 11-18 years.

Indicators of Adult/Parent Literacy

The focus of the indicators developed thus far has been on factors than can be ameliorated in the short to medium term and can influence child outcomes. Whilst education, and in particular parental education, has links to poorer child outcomes, it is not easy to address improving parental education levels through mainstream educational services. Literacy, however, is more fundamental and amenable to intervention regardless of the age and stage of life.

Adult literacy rates have been utilised in international comparisons although the measures for literacy are not always clear. The Australian 1996 ABS Aspects of Literacy Survey focuses on functional literacy and numeracy ie the information processing skills necessary to use printed material found at home and in the community. Three aspects of literacy are considered:

- Prose literacy: the ability to understand and use information from various kinds of texts including newspapers
- Document literacy: the ability to locate and use information contained in materials such as timetables
- Quantitative literacy: the ability to perform arithmetic operations using numbers contained in printed texts or documents.

Literacy is measured using a 5-point scale to provide 5 levels. People with level 1 literacy have very poor levels of literacy (this is similar to the 5 levels of literacy in the USA).[46]

Adult literacy rates have been included for international comparisons and, given the potential for amelioration, an important aspect for improving children's outcomes. The Champlain Initiative suggests the percent of adults at lowest 2 levels of literacy, this includes people with poor to very poor literacy who would gain from a literacy program.[2]

A useful indicator that reflects not only parental literacy, but also family literacy is the time spent reading to children and the proportion of parents who report reading as an activity that they enjoy doing with their child. The 1997 ABS Time Use survey (repeated from 1992) is a 48-hour diary study and questionnaire that explores, in detail, people's use of time and includes questions regarding reading. The literacy promotion activities that have been researched all included reading as a favourite activity as one of their outcome indicators.[15,17-19]

Table 26. Indicators of literacy

Indicator/Domain
Age at which reading to children commenced [6,17]
Parental level of literacy and numeracy[2,15,17-19]
Children meeting benchmark for literacy at grade 3.[6,20]

C. Parental Employment

Evidence and Context

Parental employment is an important determinant of child health and wellbeing and is therefore an indirect indicator of child health and wellbeing. This is less to do with the fact that parents are working and therefore away from their children but more to do with the circumstances associated with the work (the income it generates, the ability for children to spend time in quality, stable childcare and the effects that employment may have on family functioning).[32] These issues are detailed in the literature and are discussed below.

It appears that there are three particularly significant ways in which parental employment affects child health and wellbeing. Firstly, socioeconomic status and family income, which is directly associated with employment, are strongly related to child health and wellbeing status.[32] Secondly, employment is often a significant determinant of the amount and quality of time that parents spend with their children. Importantly, while parental employment is generally beneficial for children this is only the case where the benefits of increased income is outweighed by the loss of time that is able to be spent with their children.[141] 'Juggling' work and family responsibilities often contributes to the third significant factor, that is, parental health and wellbeing and its close relationships to parental employment, particularly with regard to the stress associated with trying to fulfill the responsibilities of work and family commitment.[142]

Measuring the following three factors would aid in producing a picture of the role of these factors as important determinants of child health and wellbeing:

1. income and living conditions
2. the type and nature of employment and its effects on amount and quality of parenting time
3. parent health and wellbeing related to employment.

The relationship between the amount of time parents spend with their children and child health and wellbeing is addressed in the 'Parenting' section of this review.

Income and Living Conditions

In general, children from low socioeconomic backgrounds experience worse health and wellbeing.[32,141] Not surprisingly, income is a significant factor with regards to socioeconomic status and parental income is used as a proxy for factors that might impact on children's health and wellbeing, for example resources available for children and living conditions.[141] While it is generally accepted that income is important, there is some controversy as to whether income alone is important, or whether income is relevant only in relation to other variables, for example family structure.[143]

Income-based measures are subject to many practical problems, for example:

- Family income is not necessarily a good measure of resource availability, due to inaccurate reporting and factors such as saving and borrowing of money and tax variability
- The value of what families consume varies due to their ability to access free or subsidised goods and services, and
- Family resources may depend upon what they already own (i.e. expenses incurred related to owning a car and a home are of particular relevance).[141]

Controlling for these is not possible, so while income is an important determinant of child health and wellbeing, the methodology for measuring income needs to be given significant attention.

While much of the literature concludes that child poverty is increasing in industrialised countries,[144,145] controversy exists in Australia[146] and internationally (e.g. USA – Mayer) as to whether poverty (and therefore child poverty) has significantly increased. Measuring this trend is very sensitive to the variability of different measures of poverty and different types of data used to measure it.[141] It still remains, however, that significant numbers of children do live in poverty in Australia,[147,148] including Victoria,[149] and a clearer picture of this important determinant of health and wellbeing is necessary. Instances where child poverty is used as an indicator of child health and wellbeing, both in developed countries overseas and in Australia, have been found.[6,35,150]

The living conditions of children may also be used to measure their available resources. Trends in living conditions may be measured, for example, by assessing housing conditions.[141] (This is described in more detail in the section of this review titled 'Child Friendly Environments'.) Owning one's own home is another factor used to assess financial wellbeing and living conditions. Owning other consumer variables (e.g. a car, household appliances) is also pertinent and is measured to aid in the assessment of child health and wellbeing.[141] In one U.S. report entitled "Extended Measures of wellbeing: Meeting basic Needs"[151] the number of households that have difficulty meeting basic needs was estimated by collecting data on the following:

- Households that did not pay utility bills
- Households that did not pay mortgage or rent
- Households where someone needed to see the doctor or dentist but did not go
- Households where someone had telephone or utility service cut off
- Households where tenants were evicted

- Households where residents didn't get enough to eat
- Households where other essential expenses were not met.

The length of time that children are exposed to poor economic wellbeing or living conditions provides further insight to the experience of poverty. Indicators generally only give a 'snapshot' of the child's economic wellbeing: information about the stability of their economic status is much more valuable as a determinant of child health and wellbeing.[5] Persistent economic deprivation can have measurable negative effects on child development and provides a strong case for measuring these variables longitudinally.[5] The following are longitudinal indicators recommended in the Eurosocial report "New indicators of social wellbeing":[5]

- Long term or persistent poverty
- Change over time in the proportion of families that are low-income and low to middle income
- Change over time in the proportion of low-income families that become middle income
- Change over time in the proportion of middle income families that become low-income

Indicators related to economic changes due to family disruption and unemployment are also recommended.[5] These are:

- Percentage income change associated with marital disruption
- Percentage income associated with unemployment
- Proportion of families experiencing family disruption and recovering their economic position within five years
- Proportion of families experiencing unemployment and recovering their economic position within five years

In summary, income indicators are used as a proxy for the resources that are available to children in addition to other aspects of their home life, such as psychological wellbeing. Income, consumption and living conditions must all be assessed for a full picture. A summary of indicators related to economic wellbeing follows:

Table 27. Indicators of economic wellbeing

Indicator/Domain
Income[6,8,35,82] and poverty[6]
Consumption and ownership of goods and services[151]
General living conditions such as housing conditions[141]

Income and poverty are measures identified in many of the reports located through the literature search. Whilst there is little specific information on the development background of these indicators, there is a well-established association between income and/or available resources and wellbeing.

The consumption and ownership of goods and services is used as an indicator of the amount of resources available to the child and further information of their application in a US national survey that aimed to assess dimensions of social wellbeing other than income.

General living conditions are suggested as an indicator of child health and wellbeing in the previously described publication titled Indicators of Children's Wellbeing.[52,141] No information has specifically been provided about the development of this indicator other than its validity with regards to being part of an evidence-based causal pathway.

Employment Factors and Parenting Time

The type of work arrangements that families manage do impact upon the amount of time parents are able to spend on parenting. Discussion on how and why the amount of time parents are able to spend with their children has subsequent effects on child health, wellbeing and development is provided in the section of this review addressing Parenting. No specific indicators for measuring employment factors that have an effect on the amount of time available to parents for parenting were identified in the literature. As the next section will demonstrate, 'work arrangements' is referred to as an indicator with regard to parental health and wellbeing, and in relation to availability of parenting time.

Work arrangements that are relevant include:

- Hours
- Wage
- Job tenure
- Leave opportunities.[46]

The reasons why working hours are significant is evident. A parent's wage may be an important factor with regards to parent time as it may influence the likelihood of working over-time or acquiring a second job. Job tenure affects an employee's leave entitlements which impacts upon parenting.

Employment Factors and Parental Health and Wellbeing

A brief description of the many ways in which employment can significantly affect parental health and wellbeing will be followed by an outline of relevant indicators.

Work can be satisfying and rewarding and where this is this case it can contribute to an individual's sense of self-worth and identity.[46] The workplace can also improve social connectedness, which is strongly associated with health and wellbeing as is highlighted in the section of this review about social relationships. Unemployment, on the other hand, can cause and contribute to psychological stress especially over extended periods of time.[46] It has been established that parent's wages, working conditions, job tenure and opportunity or risk associated with employment can affect parental health and wellbeing.[46] Unpaid work provides an additional measurement challenge.[46] It is also significant due to the controversy surrounding the value of unpaid work such as childcare,[46] and the relationship between economic resources and child health, development and wellbeing. Caring work, for children or for people with illness or disability, is also potentially socially isolating, not to mention the limited income usually associated with this work.[46]

In Australia, there has been an increase in the number of people working fewer hours as well as an increase in the number of people working longer hours. There are concerns that it is likely to lead to a polarised workforce whereby part-time workers will often want to work more hours, while overworked full-time workers are more likely to suffer ill health, fatigue and a decreased quality of working and family life.[46] The emergence of short term and unpredictable working arrangements potentially affects people's capacity to ensure theirs and their families' financial security.[46] Single parents are at an increased susceptibility to the problems associated with unemployment and the effects of having to take lower paid part-time work.[46] Unemployment and the lack of income due to unemployment may be particularly damaging to the financial security of single parents and their families,[46] subsequently compromising child development as a result of factors associated with poverty.

Table 28. Indicators of parental employment factors associated with wellbeing

Indicator/Domain
Parental employment status[46]
Work arrangements (e.g. hours, wage, job tenure, leave opportunities)[46]
Working conditions (e.g. occupational health and safety, stressfulness of work, opportunities for skill development)[46]
Unpaid work

Evidence of a causal relationship between employment factors and individual health and wellbeing was identified for all these indicators, however, there is little information on their development or original use.

The effects of different factors associated with employment on parenting practices and health and wellbeing are particularly relevant to people with additional needs. These include people with a disability, older people, young people, migrants and indigenous people and single parents.[46] One example of this are migrants who have difficulty finding work in Australia due to lack of recognition or transferability of qualifications. Detailed discussion about the position of different minority groups in relation to employment and child health and wellbeing is beyond the scope of this review but needs to be taken into account in the measurement of these indicators.[46]

4. CHILD FRIENDLY ENVIRONMENT

Evidence and Context

Child Friendliness

The concept of child friendliness describes settings, principles and practices that have pro-actively taken the needs of children into consideration with regards to promoting and protecting their health, wellbeing and positive development, however we could not find a definition of 'child friendliness' in the literature. There are examples in the literature of the use of the concept child friendliness: extending from settings and policies in retail settings (i.e. child friendly facilities at a shopping centre such as nappy changing facilities), to the Child Friendly Cities initiative promoted by UNICEF,[21] to employment policies that allow officially recognised and supported parental leave when employee's children are unwell.[152]

Living Environments and Child Friendliness

UNICEF has focussed on cities and their child friendly policies because of the increasing urbanisation of the global population.[21] UNICEF has defined a Child-friendly City as a city where every child is guaranteed specific rights.[21] These are the right to: a) influence decisions about their cities, b) express their opinion, c) participate in family, community and social life, d) receive basic services such as health care and education, e) drink safe water and have access to proper sanitation, f) be protected from exploitation, violence and abuse, g) walk safely in the streets on their own, h) meet friends and play, i) have green spaces for plants and animals, j) live in an unpolluted environment, k) participate in cultural and social events, l) be an equal citizen of their city with access to every service, regardless of every origin, religion, income, gender or disability.[23]

UNICEF's City Summit in Istanbul in 1996 emphasised that the best indicator of a healthy city is the wellbeing of its children.[23] Internationally, some attention has been paid to what denotes a child-friendly environment and community. Much of this literature specifically addresses urban environments[21,23,24,153] although the majority of the issues content can also be applied to rural settings. A child-friendly environment has many diverse characteristics that interact with the child in a complex manner to provide an environment that both prevents illness and promotes wellbeing for the child, beginning in the pre-natal period. In different documents, a variety of different means have been employed to determine what constitutes a child-friendly environment. These include the consultation of child health and wellbeing experts,[21] asking children themselves[24] and detailed research projects with the aim of establishing what factors in a specific neighbourhood contribute to, or jeopardise the health and wellbeing of children.[154-156] The outcome of this work is a clearer description of the composition of child friendly environments – this includes an environment that guarantees the

rights of every child, as well as an environment where children feel valued and welcome. There is certainly consensus in the literature that children have special needs for, and indeed rights to, safe, secure and healthy living conditions.[21,32]

Indicators of Physical and Social Environments

This section discusses the use of indicators relevant to both the physical and social environment of the child. It is clear that there are aspects of the physical environment that are directly affected by the social environment, and that these domains are difficult to distinguish at times. For example, a parent's influence upon the physical environment of the child at home with regard to television viewing. The elements of the physical environment that will be specifically addressed here include the natural environment (including ecosystem health), crime and safety, transport and settings and opportunities for play and recreation. The section closes with discussion on miscellaneous indicators of the physical environment that don't fall under any of the other headings. The role of education and care, food quality, smoking, alcohol and other drugs, in relation to child friendly environments, is covered in other sections of this review.

Social Environment

The effects on the wellbeing of children in relation to their exposure to their social environments are as significant as the effects of their physical environment. The broader ecology of child development first described by Bronfenbrenner[43] highlights the impact that the many different social systems have on the developing child.[157] There has been much research and analysis performed in the last 30 years on the effects on health and wellbeing as a result of the massive social changes experienced in the second half of the last century.[157] Much of this research considers the effects of macro-system features such as social values and public policy. There are many different terms, constructs and content of the effects of social systems and social environments on wellbeing that are employed in the literature. Social capital, social cohesion social isolation and connectedness, social organisation and disorganisation and socially toxic environments will all be briefly characterised as these terms are used frequently and sometimes interchangeably throughout the literature. Neighbourhood quality and its effect on the health and wellbeing of children has also received much attention in recent years and will also be discussed briefly.[154,155,158,159] These concepts, plus some other factors associated with formal and informal social environments, will be described.

Summary of the Characteristics of Literature Specific to Indicators of Child-friendly Environments

The literature review highlighted two important documents which contribute in an extensive way to this domain. Firstly, the Healthy Cities Indicators report: Analysis of Data from Cities across Europe[23] provides an analysis of base-line indicators that were endorsed by the World Health Organisation Healthy Cities Project to provide indicators of what constitutes a healthy city. The document describes the methods that were used to select the indicators that were subsequently employed; an index was created based on criteria for selection and the validity of different indicators varies. Analysis of individual indicators will be described below.

Secondly, the Child and Youth Friendly Communities Project[24] in New England, USA has developed a set of indicators by asking children and young people to identify what they believe are specific characteristics of the local environment that contribute to their sense of wellbeing and quality of life. The project's aim is to inform about child perceptions of a child friendly community. Some of these indicators are clearly part of an evidence-based causal pathway, and where this is the case it will be documented. Characteristics of a child friendly environment identified include, for example, an environment where children feel valued and where facilities take their needs into account.[24]

Physical Environment

The physical environment of a family includes both the natural and artificial aspects of the surroundings. The issues of light, shade, shelter, absence of noise and crowding, freedom, security, family-friendly facilities and access, urban clutter, local economy, environmental quality, vegetation/greenery and pollutants (nitrogen dioxide and oxide) are all relevant to the child, the parent and the family. Environmental hazards, both natural and artificial, are potent risk factors for children.[32]

In assessing the physical environment and its influence on health and wellbeing, the use of health status indicators is sometimes difficult due to the indirect nature in which the physical environment can impact upon individuals. Many of the indicators in this section are outside the traditional realm of 'environmental health'. The (physical) environment-health chain is both lengthy and complex so that a wide variety of indicators are needed from different points in the chain.[160] It is beyond the scope of this review to comprehensively cover the traditional domain of environmental health, so an attempt has been made to cover what has been identified in the literature as being the most important aspects of environmental health relevant to child health and wellbeing only.

Developing Indicators of Environment

Urban areas, in particular, represent complex environments in which to protect and promote health. The rapid rates of change in urban environments and the significant spatial variations in sociodemographics and environmental conditions increases the challenge of developing indicators for urban environments.[161] The review has highlighted one international project that is attempting to develop international environmental indicators.[162] The WHO initiated a series of consultations that were organised by the WHO Centre for Environmental Health and the Health and Environment Analysis for Decision Making Project to establish criteria for environmental health indicators. The report discusses the challenges involved in developing environmental indicators, such as the need to present complex relationships in as simple a manner as possible while not oversimplifying to the extent that the determinants of health are not addressed comprehensively.[161] With technological and socioeconomic development, the nature of environmental health hazards is changing significantly, and authors comment that it is imperative that the specific context be considered in the development of environmental indicators.[163] In more industrialised settings, where the basic challenges of sanitation and infectious disease control have largely been conquered, the environmental impacts are often subtle and difficult to assess.[163]

Assessment of Environmental Health

In assessing environmental health, an indicator used may be at any of the many points along the causal chain. Data on the health effects and internal dose are considered most valuable;[164] however, in their absence, other methods are possible: lead poisoning could be assessed by calculating the use of lead in petrol, the quantity of lead used in petrol, the quantity of lead emitted from cars or the concentration of lead in the air. It could also be assessed by calculating human exposure, blood lead concentrations, or by measuring the health effects e.g. short term effects such as behavioural disorders and reduced IQ, long term effects such as anaemia and hypertension or mortality effects due to encephalopathy or acute lead poisoning.[163]

Children are considered to perhaps be at particular risk from environmental hazards because they are sensitive to environmental hazards and because morbidity arising from exposure in childhood can have long-term effects.[164] Therefore, information relating to exposure of children to environmental hazards is particularly important in decision making and priority setting.[164] The environmental exposures specifically identified in the literature include: the natural environment, crime and safety, transport, recreational settings, housing environments, and other non-specific domains.

A. Crime, Safety, Justice and Wellbeing

There are many factors which need to be considered in the protection of children from physical and psychological harm, and exposure to crime and violence are important risk factors for children.[32] Crime rates are both an indicator of the safety of the community and an outcome measure of early childhood prevention strategies. Areas with high crime rates often parallel areas with high rates of mental and physical health problems both for children and their families. A range of documents identified in this review provide measurable indicators to inform action aimed at protecting and promoting the health and wellbeing of children referred to in Table 30.

While the literature describes the range of health problems associated with crime and exposure to crime, definitive evidence of the causal relationship between neighbourhood crime level and health and wellbeing (as opposed to the relationship between individual victim experience of crime and health and wellbeing) did not emerge in the indicator literature. Measuring the incidence of crime in general[22] and more specifically violent crime[2] such as homicides [112] and domestic violence[2] does, however, allow a picture of the safety of a community to emerge, as do rates of drug arrests, rate of juvenile contact with police and antisocial behaviour in schools.

The causal relationship between exposure to domestic violence and increased risk of ongoing behavioural and emotional problems is frequently described.[1,32] Perception of safety has been shown to be associated with subjective wellbeing. The literature revealed little evidence of indicator development work in this area, though much might be being undertaken that is not written up or published. As a result, there is no information on the validity and reliability, or methodology behind, the development of these indicators.[4,21,22,24,82] Further recommendations have been documented about the factors to consider in the development of indicators of crime and safety, including:

- perpetrators of child abuse must be rehabilitated.[21]
- children who have been victims of abuse and/or maltreatment, exploitation, armed conflict, torture and drug abuse must have appropriate treatment.[21]
- interesting places may not be accessible due to perceived or actual safety issues.[24] This has been identified as a characteristic of communities where children voiced feeling alienated and over-all negative views of their local environment.
- public places must be freely accessible to all children and children must be free to partake in the public life of their communities.[21]
- children's community environments should allow them to partake in cultural and religious life and the arts, allowing them to maintain their cultural and religious identity.[21]

Table 29. Indicators of community crime and violence

Indicator/Domain
Domestic violence[2]
Perception of neighbourhood safety[22,24,82]
Rate of crimes against persons[4]
Rate of drug arrests[4]
Rate of violent crime[4]
Rate of juvenile contact with police[4]
Crime rate e.g. homicide rate,[112] burglary and car theft[4]
Accidents, fire protection, emergency services[22,165]
Antisocial behaviour in schools[4]
Children's self-reported safety promoting behaviours[166,167]

B. Transport

Quality of life is significantly affected by access to a multitude of services including education, labour market, health and community services.[168] A safe and secure means of mobility can dramatically affect one's ability to physically access such services. Access to services and the ability to move around freely are fundamental to a child-friendly environment. Similarly, access to opportunities and facilities for play and recreation, as well as cultural activities, are important for healthy child development.[21,32,84] The wellbeing of parents is also influenced by their ability to travel to services and to spend time, with or without their children, outside the home partaking in activities that enhance their quality of life and health and wellbeing. Access to services can be particularly important to socioeconomically disadvantaged people who may experience more problems, such as poorer health.[169] Some groups or populations are less likely to have private transport, facilitating their access to public transport is even more pertinent. Mobility is also an important factor in the economic wellbeing of a city and is relevant to environmental conditions.[23] Towns and cities must enable children and their families to move around by foot, bicycle and public transport, so that they are able to freely experience and learn from their surroundings.[21] The literature was able to provide some information on the indicators of public transport factors, which are described in the table below:

Table 30. Access to public transport

Indicator/Domain
Opportunities for and convenience of travel on public transport[22]
No. of seats on public transport related to population[23]
Public transport network cover[23]

As an indicator for determining health outcomes, transport remains valid across both rural and urban settings. The frequency and reliability of the service, safety, affordability and, cleanliness are all suggested as potential indicators in the Healthy Cities Project, if the domain is to be covered comprehensively.[23] Apart from the causal relationship between mobility and health and wellbeing described above, ready information on the background or the developmental methodology does not accompany the Healthy Cities indicators. The method for development of the indicators in the Jacksonville quality of life project have been described in the introduction of this review.

The Natural Environment

The natural environment, when undamaged, can have a positive effect on the health, wellbeing and development of children.[23] Protecting the environment and planning for sustainable development are essential in protecting and promoting the health and wellbeing of children. The variety of problems the natural environment faces (e.g. greenhouse gas emission and subsequent global warming; land-clearing and subsequent salination and air pollution, particularly in urban settings) all impact upon the health and wellbeing of children. Whilst a comprehensive review of this topic is beyond the scope of this review, this review aims to include the issues of prominence in the literature.

The main environmental indicators identified in the literature arise from the WHO Healthy Cities project which has developed environmental indicators for urban settings that take into account the natural environment.[23] The report clearly describes the process of the evaluation of their validity, according to explicit and rigorous criteria. The criteria included the following:

> Face validity of the indicators (whether the indicator uses standard measurements where relevant; whether the definition is stable over time; whether the information is easily available; whether the data are collected sufficient to permit an assessment of future comparability; whether the indicator is easy to interpret; whether the indicator to 'Health for All' targets); empirical validity (how complete are the data generated by the indicator? (Are the data timely?); relevance of the indicator (does the indicator represent a significant influence on

health?); and Healthy Cities constraints (can the indicator be compared across cultures and national boundaries?).

C. Air and water Quality and other aspects of the physical environment

Atmospheric pollution is also referred to as air quality,[2] and is recognised as a 'Health for All' target by the WHO Regional Office for Europe (2001). No specific information regarding the methods of development of this indicator, nor its original use, are outlined in Health for All, although the epidemiological rigour is covered extensively in the literature. Children's exposure to atmospheric air pollution has an adverse relationship on their health, and is there is much evidence for its causal relationship to health and wellbeing for persons of all ages.

Water Quality

Water quality is assessed in the Healthy Cities Project with regards to microbial and chemical qualities.[23] The causal pathway for poor microbial quality of water is well established - ill health and death have been caused by microbiological agents in drinking water.[10,23] Thermotolerant coliform bacteria are used as a primary indicator to assess microbial quality and microbial testing is done to determine microbial water quality.[23] The absence of thermotolerant coliform bacteria is a World Health Organisation (WHO) guidelines for microbial water quality.[23] The water chemical quality indicator is based on four specified parameters (not described) that are based on WHO guidelines.[23] Background information on its original development and use were not provided.

Waste

The Champlain Initiative promotes the use of waste generation as an indicator.[2] However, the literature was unable to provide further information on the methodology for its development or its original use. Waste management was also identified as an important component of environmental health in the assessment protocol for public health in McDonald et.al. (1994).[160] In that case, indicator development involved an in-depth assessment of the appropriateness of each indicator taking a number of concerns into account, such as the preference of the use of health indicators in environmental health.[160] An evaluation criteria was developed from the protocol reported by the Centers for Disease Control for the evaluation of surveillance systems.[170] The parameters used to evaluate environmental issue indicators are: a) Simplicity. (Is the measurement simple?) b) Availability. (Is the indicator readily available from existing data?) c) Acceptability. (Is there scientific consensus on the relationship of the environmental health issue and the indicator?) d) Understandable. (Is the indicator understandable to the general public?) e) Expressed as rate. (Where possible, the

indicator should be expressed as both numerator and denominator so that a clearer picture of the actual indicator can be provided).[160]

Land

Within the Healthy Cities approach, indicators of land use are measured with regard to the relative surface area of, and public access to, green spaces in the city, derelict industrial sites, and pedestrian streets.[23] The third element of land use i.e. pedestrian streets is based on the total length of pedestrian streets divided by the total surface area of the city.[23] The Healthy Cities literature that was identified in this search acknowledged that the land use indicator needs to be refined in terms of exactly how these factors are measured, their validity or the potential application.

Perception of Pollution Risk

Perception of pollution as a risk factor for health has not been described in any detail in Healthy Cities with regard to methods, or reason for development. However, we do note that people are increasingly apprehensive of their risk of pollution, and this may have an increased load for those groups who are at increased exposure, particularly those who are residents of areas where the pollution is significantly higher.

Environmental Lifestyle

The literature on the measurement of positive aspects of wellbeing, by Moore and Halle,[10] recommend using behaviours that demonstrate concern for the environment as indicators of positive development; examples of environmentally friendly behaviours include re-cycling, litter removal and energy conservation.[10] Moore and Halle suggest that the degree to which society promotes an environmental lifestyle could possibly be measured using some form of index.[10] General agreement about what constitutes an environmental lifestyle is, however, difficult to achieve.[10] The Child and Youth Friendly Communities project used a process whereby they consulted children on their perceptions of the environment who recommended the use of 'green areas' as an indicator.[24] However there was insufficient information in the literature identified that could provide further information on the robustness, the strength of its causal relationship to outcomes, nor evidence of their validation.

Table 31. Indicators of the environment

Environmental exposure domain	Indicator
Air	*Atmospheric pollution/Air quality*[2,23]
Water	Water quality (microbial and chemical quality of the water supply) and consumption per capita[23]
Waste	Household waste management (collection, treatment and quality)[23] Waste generation[2] and management[160]
Land	Land use (relative surface area of green spaces in the city, public access to green spaces, derelict industrial sites, pedestrian streets, cycling in the city)[23] Green areas that are accessible to children, from formal sports fields to shaded parks and safe overgrown 'wild' areas[24]
Environmental lifestyle	Behaviours that demonstrate concern for the environment e.g.recycling[10]
Perceptions of pollution risk	People's perception of pollution[23]

Sustainable Societies and Environments

Ecosystem health is a primary asset of the health and sustainability of any community. Healthy ecosystems are self-sustaining and do not impair adjacent systems; they are free from risk factors, are economically viable and sustain healthy communities.[171] The under-utilisation of appropriate existing technologies means that there is unnecessary over-use of scarce resources such as fuel in many communities, hampering efforts to ensure sustainability.[21]

In recent years, some effort has been made to develop indicators for a sustainable society. The concept of a sustainable society explicitly links the four aspects of health, social equity, economy and environment[172] and there is much evidence to suggest that environment, development and human health are inextricably linked.[163,173,174]

Indicators of a sustainable community have been identified through workshop processes in 1989 in Canada.[172] The feasibility study that followed took into account the work that was occurring at national and international levels at that point in time.[172] Criteria for the selection of indicators were applies at different stages.[172] The first criteria for the indicators were, a) previously published or suggested by individuals in workshops or through private consultations, and b) acceptable comparability between countries and/or regions at preliminary examination.[172] 39 out of 340 indicators remained.[172] The next set of criteria included: a) the scientific basis, b) frequency of data collection, c) data availability, d) The possibility of geographical spatial disaggregation, e) administrative feasibility, f) symbolic value of the indicator for media purposes, g) synthetic value, or the capacity to incorporate the identified four key elements of sustainability - environment, economy, health and equity.

Twenty core indicators were then selected based on, a) a score obtained on the preceding criteria, b) internal consistency (to avoid duplication and to respect the four key elements of sustainability), c) external coherence (consistency with the choices of Environment Canada and the OECD), and d) maximum reduction in the number of indicators.[172] The indicators identified that are specific to the environment are described in the table below. No comparable literature was found for the Australian context.

Table 32. Indicators of a sustainable environment

Indicator
Greenhouse gases emissions and gas emissions leading to ozone layer depletion[172]
Major atmospheric pollutants emissions[172]
Total protected areas[172]
Marine fisheries catches[172]
Forest: ratio of regeneration success rate over harvest rate[172]
Energy consumption per capita[172]
Toxic waste production (other than aquatic and atmospheric)[172]
Public aid for development and debt[172]
Public transport use compared to car use[172]
Recycling[172]
Military expenditures in relation to other government expenditures[172]
Caloric intake and proportions from vegetable and animal source[172]

D. Housing

Housing is considered a basic necessity for children and impacts upon them through both the quality of the physical environment and the extent to which it is a secure environment.[21] Issues such as overcrowding, poor lighting and damp and cold conditions all contribute to physical health problems for children and exacerbate social issues for parents by contributing to their concerns about safety and security. Parental stress can also be increased if tenure is unknown or short-term, as can be the case for low-income families. The more crowded the living arrangements, the greater the potential effect on health and wellbeing.[23]

Developmental Background of Housing Indicators

Access to affordable housing was identified in The Index of Social Health for Canada,[112] described earlier.[112] It mentions that several selection criteria for choosing the indicators were applied but does not go into detail as to how the validity or reliability of each indicator was determined. The indicators in the Index have been used over a significant length of time and have face validity. Having a stable and legally protected lease or rental arrangement, or owning your own home gives a strong sense of control and permanence, increasing the likelihood and opportunity to contribute to community improvements.[24] This supports the use of the indicator, however no definitive evidence of a causal pathway between affordability of housing and child health could be established from the literature reviewed.

The development of the indicator for homeless children and their families has not been described. It has been used as an indicator in the WHO Europe Healthy Cities Project, though it is not specific to children and their families. The causal relationship, however, is strong: homeless people (including parents) are more susceptible to poor health and are likely to have problems accessing health care. Other principles important for the health and wellbeing of children in relations to housing, are:

- Housing location in relation to access to basic services and the necessities of life and to informal social supports has been identified as necessary for families with children for child health and wellbeing.[21]
- There must be adequate space, facilities, lighting, ventilation and warmth.[21]
- The home environment must support the capacity of parents, grandparents and other care-givers to provide a loving, nurturing environment for their children.[21]
- Children in the home environment and its surrounds must be safe from injury, toxins, air or water borne pollutants, and smoke.[21]
- The home must provide a stimulating environment to the child that supports family interaction, exploration and manipulation and that provides the capacity to withdraw from noise and crowding.[21]
- The home environment must support the development of cultural identity; children's play materials and communication media should be culturally appropriate and sensitive to children's needs.[21]
- Where unavoidable displacement or dispossession occurs, families must be promptly relocated or compensated to an appropriate new location for the special needs of children.[21]

Table 33. Indicators for housing

Indicator/Domain
Secure land tenure[24]
Overcrowding.[5] *Concentration of people per room*[25,26]
Access to affordable housing[112]
Homeless children and their families[23]

Additional Non-Specific Environmental Indicators

There are additional factors described in the literature as the essential characteristics of an environment conducive to the health and wellbeing of children. The following are examples of general indicators of factors that, (a) may be present in the child's physical environment that are relevant to their health and wellbeing, and (b) may constitute important areas of measurement of determinants of child health that do not fit into other categories.

Excessive noise has been used as an indicator of mental health by the World Health Organisation and is part of the Minimum data set of European mental health indicators.[53] It is reported that the relationship between aspects of the physical environment and mental health is 'substantial and relatively clear' but no further information has been given.[53] The methodology for the development of these indicators was not described in the literature reviewed, nor could we establish any evidence of a causal relationship between child health and wellbeing. There is, however, strong evidence that excessive noise can cause hearing problems.

Television viewing was also identified as an indicator of child wellbeing (identified in the Survey of Income and Program Participation in the United States) with the aim of portraying children's experiences while growing up. The methodology for the development of the indicator is not specified. However, the evidence is mixed with respect to other determinants of health and wellbeing, such as the contribution of television viewing to the increased incidence of obesity and other potentially negative effects.

Exposure to environmental tobacco smoke,[175] another important environmental indicator, is addressed in the Health section of this review.

Table 34. Indicators of environmental exposure (non-specific)

Indicator/Domain
Excessive noise[53]
Amount and type of television viewing[82,176]

Exposure to Injury Producing Environments

Other points to consider with regard to the physical environment are as follows:

- When safety cannot be guaranteed in the community at large, safe places for children must be provided.[21]
- Heavy traffic leads to diminished space for play, as outdoor areas are taken over by parked and moving cars, and areas adjacent to heavy traffic or high speed traffic are often unpleasant and/or unsafe.[24] This was identified as a characteristic of communities where children voiced feeling alienated and overall negative views of their local environment.
- In rural environments, the hazards are significantly different to urban environments, and unintentional injury is a significant risk to child health and wellbeing.[177] Unintentional farm injury in children is most often related to vehicles (e.g. motorcycles, tractors) and animals (usually falls from horses).[177] No specific indicators were identified in the literature reviewed with regards to the physical environment of rural settings, although standard indices of child safety and injury morbidity and mortality can be applied.

E. Social Environment

Children need to grow up in social environments that go beyond maintaining basic survival to promote a quality of life for all. The family is the primary social milieux for the vast majority of children and within this parents and parenting are of particular significance to the health and wellbeing of children. Monitoring this dimension of the informal social relationships of children will be discussed in some depth at the end of this section of the review.

A great deal of information about the social conditions of children is available in Population Data (e.g. composition and income of household). The population information does not, however, provide any information on the quality of the social relationships of the child - an important determinant of child wellbeing. The goals of child development and the value and belief systems that affect childcare practices are different according to socioeconomic status and sociocultural background, and indicators need to be sensitive to these specific elements of these determinants of health.[25] As a precursor to discussion on indicators of the social environment, some commonly used terms will be briefly clarified.

Social Capital and Related Concepts

Social capital is a relatively new concept (first used in 1988)[178] that is used to describe the benefits gained from social relationships and affiliations within families and communities. It has been found to be associated with positive child development and behavioural outcomes in pre-school children that are at high risk of poor developmental outcomes.[154] It has been defined as "benefits that accrue from social relationships within communities and families"[154] and refers to aspects of the social organisation, including social networks, expectations and trust, that promote the coordination and cooperation for mutual benefit.[154] It is measured using various tools and indices that vary in composition (factors include residential stability, family relationships, social networks, and community and organisational involvement) but has been consistently shown to be associated with child wellbeing.[154,178,179] One study found that affiliation with a church, perception of social support and support within the neighbourhood (as indicators of social capital) were indicators that were strongly associated with child wellbeing, and that social capital may have an effect on child wellbeing as early as the preschool years.[154] It is suggested that the social capital of parents may be the factor that affects the wellbeing of children, just as their financial and educational and financial capital affects the wellbeing of children.[154]

Social cohesion has been described as a central component of social capital. It includes "those features of social organisation such as trust, reciprocity, norms and networks that can improve the efficiency of society by facilitating coordinated actions".[157,180] There is a growing body of evidence that social cohesion is considerably relevant to child health, wellbeing and development.[157]

Social isolation is commonly a problem in today's mobile society, and families may be isolated from members of their extended family and from their neighbours. Social isolation can contribute to a sense of disempowerment, alienation and estrangement.[157] Poor families are likely to be more mobile because of housing issues, which can compound the adversity experienced by their children.[157] Social isolation is also known to be associated with suicide attempts.[181] The term **social connectedness** is also used in regard to the benefits of social support networks on health and wellbeing in general and with regard to child health and wellbeing.

With the increasing use of children's services, children are spending more time outside the home with adults other than their parents.[32] The social relationship of children with the wider community is therefore also of importance, but while this principle is generally accepted, it has proved to be difficult to measure community-level effects on development.[32]

Neighbourhood quality effects on child development has been the topic of many studies for some time, but research has mainly been centered on high poverty urban settings and is therefore limited in its ability to be applied across the board.[32] Findings include that high-poverty urban settings are often characterised by poor employment prospects, poor marriage prospects, violence and high mobility.[32] These environments provide neither the resources nor the role-models for the children who reside there.[32] The proposed negative effects of neighbourhood level factors have a sound theoretical basis, with many theories competing against, as well as complementing, each other in explaining these effects (for example systems theory).[43] Despite this, precise, robust and un-biased estimates of neighbourhood effects have proved extremely difficult to determine.[182,183] In the United States, population-based studies are consistent in showing that much more variation exists in achievement, behaviour and parenting within than across neighbourhoods.[32] It appears that neighbourhoods are more influential upon child health and development in certain settings and it may be the case that neighbourhoods matter most when other risk factors are present such as family poverty or mental health problems within families.[32] Indeed, for children living in dangerous conditions, neighbourhoods appear to matter a great deal.[32]

With the increasing recognition of child maltreatment in all its forms, the increase of behaviour disorders in children and young people, the deteriorating developmental achievements of many children from minority groups (especially in urban settings) and the increase in youth suicide, it has been suggested that these outcomes reflect that the conditions for growing up for many children are "**socially toxic**". This use of language can also be found in the mass media e.g. the recent coverage of Australian child health expert Professor Fiona Stanley, who referred to the society that children are growing up in as socially toxic.[184]

Formal Social Connections

Formal social relationships, such as those with services including health and the law and governing bodies, have an effect on the health and wellbeing of children. Many of the formal social relationships with children are discussed in other sections of this review, primarily in the sections addressing education, health services, early intervention and child welfare, and most of the indicators related to formal social connections are described in those sections.

Measurement of the effects of formal social connections on child health and wellbeing can prove to be difficult, but these elements of the child's environment need be considered.

One of the major community interventions, Sure Start, a national project in the UK, which aims to improve the health and wellbeing of families and children from conception, has as a target that parenting support and information be available for all parents. Whilst the development of this indicator, as with other indicators of the Sure Start initiative, are not well described, there is a very well established relationship between parenting and child health and wellbeing, which is described in more detail in the section of this review on parents and parenting.

Church attendance has been identified in the Champlain Initiative, as an indicator of social connection. No information regarding the development of this indicator has been given, however, research has shown religious faith to be a protective factor against negative child health and wellbeing outcomes.[185,186]

There are many other factors with regard to formal social connections and their effects on child health, wellbeing and development that could be also be measured to provide information to assist in ensuring positive early childhood development:

- Access to services for special needs was identified as a variable associated with positive child development in a paper by members of an international interdisciplinary group proposing widespread consensus on the selection and monitoring of cross cultural indicators.[83]

- The existence of laws that are enacted to protect the child from harmful relationships (racially and/or cultural intolerance, sexual and/or labour exploitation) and that respect cultural and religious identities[21] has been identified as necessary for child health and wellbeing, although no indicator to measure this has been identified in the literature.

- The poorest members of society are often not involved in the formal structures of government, nor are informal approaches to engage them recognised or built upon, which indirectly can negatively impact on the health and wellbeing of children from these backgrounds.[21]

- Free market approaches to economic development regularly lead to inequitable distribution of wealth, threaten access to resources necessary for survival and positive child development, and can increase disparities and exclusions and lead to entrenched poverty.[21]

- The lack of coordination between government, NGO's, and private institutions leads to wasteful overlap of services and the isolation of initiatives. This lack of coordination is particularly evident where there are no coordinating bodies for children's welfare at the local, regional and national level.[21]

- There are macro social forces other than government that affect children's lives including, for example, the free market and the mass media.[83] While the evidence of negative affects of media exposure on child health and wellbeing is inconclusive, the literature highlights concern.[32] The evidence-base for the relationship between particular labour market trends and negative child health and wellbeing is also not well described in the indicator literature: however, there is growing concern about the effects of global economic development on child health and wellbeing, such as the effect of labour market factors on parental employment, for which there is a strong causal relationship to child health and wellbeing outcomes (discussed further in 'Education and Work'.)

- The provision of "family friendly facilities" (i.e. facilities that take the needs of families into consideration at all levels from policy to structural components) allows for families to participate with more ease in activities of all sorts in the community.

Table 35. Formal social connections

Indicator/Domain
The availability and access to appropriate parental support and programs when needed[4]
Church attendance[2] or organised social activities

Informal Social Connections

Social factors that have a more direct effect upon the health and wellbeing of children are the informal social connections that children have with parents, siblings, extended family and other people. Many of these are easier to recognise but remain difficult to measure, particularly at a population level. The family unit is the primary setting for social relationships of young people. Many of the risk factors associated with poor outcomes for children are factors related to the social environment within the family. Family factors such as parental age and marriage status, number and age of siblings, health and wellbeing of other family members and educational level of parents are all associated with child health and wellbeing and developmental outcomes. The quality of social relationships in the family is also of paramount importance in child health and wellbeing and within this, the quality of relationships with parents is of particular importance. Both parents working, as is often the case in extreme poverty or the higher income ranges, or single-parenting, can make caring for children at home very difficult.[25] The literature shows that generally children in single parent households are more vulnerable to poor health and wellbeing than in two parent households.[25] This is less to do with having only one parent as to other factors associated with single parenting that are known to have a detrimental effect in children's development.[187] There is an increasing number of "blended" or "reconstituted" families where there are two parents but one of them is a "new" parent, and these social environments seem to provide a less favorable environment for early childhood than families with two natural parents.[25]

The literature supports the aggregate of adversity factors (or risk factors) that increases the likelihood of childhood developmental impairment.[188] Other factors that have been identified as family risk factors (cited in Bierderman)[188] include severe marital discord, low social class, large family size, paternal criminality, maternal mental disorder, and foster-care placement.[189,190]

Civic life skills include those skills that aid in the development of a civil society.[10] Civility is demonstrated by treating others with respect and, with regards to young children, is demonstrated by such practices as taking turns, by not speaking rudely to others, and by listening to others who are speaking.[10] Civil life skills have been identified as possible indicators of child wellbeing in a paper by members of an international interdisciplinary group proposing widespread consensus on the selection and monitoring of cross cultural indicators.[83] This paper states that it is possible for children to develop social and civic responsibilities in the early years through learning, cooperation and participation, gradually increasing their contributions as able.[83] By assessing opportunities for expressing themselves, to learn to respect others to appreciate diversity, and to practice skills for civic life, a better

picture of child health and wellbeing can be captured.[83] Some of the indicators identified in the literature address civic life skills in populations as a whole but were not identified for children exclusively.

This range of social indicators were identified in the Champlain Initiative[2] indicator set. No specific information was given regarding the methodology for their development, however, they have face value in light of the support in the literature for measuring factors associated with children's sub-cultures, and civic life skills and society[83] as well as the concepts described such as social capital and social cohesion etc. The following have been identified as being associated with positive child development.

- Social support and guidance when faced with adversity[83] (also employed to measure parenting).
- Quality of family and social relationships.[83]
- Social capital.[154]
- Meaningful participation in community life appropriate for age.[166]
- Children must be protected from intolerance and enabled to develop into tolerant humans.[21]
- Practices that contribute to the social disintegration at the family level should not be encouraged.[21] An example might be work practices that prevent family members spending time together (i.e. child friendly work-places, described in more detail in the 'Education and Work' section).
- Children should be given a voice in their communities, according to their abilities.[21]
- More than one consistently involved adult who provides economic resources, interaction, support, regulation, and positive role modelling to the child is beneficial to early child development.[83] Placing the burden for child-rearing on a single adult is not conducive to the child's wellbeing.
- Families must be able to provide adequately for their children, through having access to resources and to income-earning opportunities; these income-earning opportunities must not disrupt or undermine family life.[21]

Table 36. Indicators for informal social connections

Indicator/Domain
Social and civic participation [164,165]
Social connectedness[83]
Daily activities as measure of structure/chaos in child's life[2]
Conflict resolution, measured by the proportion of people that feel they must try to resolve differences peacefully[2]
Faith in others measured as the proportion of people confident somebody would help them in times of need[2]
Young people feel welcome throughout the community and interact with age-groups other than their own and they have a sense of belonging and of being valued.[24]
Sibling and peer relationships[10]

Parenting and Parent Factors that Impact on Child Health and Wellbeing

This section provides a summary of the literature reviewed about child health and wellbeing, parenting and relevant identified indicators. The research literature has clearly established that family factors in general, such as family composition,[27,191] parenting practices, parental education and employment, parent health and wellbeing and other factors associated with parents and care-givers, impact upon the health and wellbeing of children.[10,27,192] There is a large body of literature on effective parenting and factors that contribute to effective parenting. The literature on parenting and family factors and their impact on child health and wellbeing, in general, describes many variables associated with parenting and their relationship to child health. There are also other areas that contribute to parenting, described elsewhere in the review, inclusive of the areas covering population factors, parental health and wellbeing, education and work, and child welfare.

Measuring the effectiveness of parenting is difficult, and there does not appear to be one single definition of what is considered to be good parenting. The literature clearly indicates that parent-child interaction and particularly mother-child interaction is closely related to child health and wellbeing outcomes.[10,191] Different parenting styles have been identified and analysed. Distinctions have been made between parenting practices that constitute ‘good parenting’ and parenting practices that do not protect and promote the health and wellbeing of children. 'Authoritative parenting' has consistently been shown to be associated with positive child development.[193] It is a combination of demanding and responsive parenting behaviours, including setting and enforcing clear standards of behaviour, actively supervising children and maintaining structure in their daily life and making demands appropriate to their developmental stage.[193]

The literature suggests that, beginning in infancy, the social environment affects ongoing child health and wellbeing.[10,191] "Secure" infant-mother attachment and the parenting skills and knowledge of mothers is of particular importance for short and long-term child health and wellbeing.[10,191] When the emotional quality of the attachment is good, the child experiences adequate emotional security to explore his/her environment freely in the present and the future.[194] Mother-infant attachment has been found to be associated with persistence at challenging activities,[195,196] social competence with peers in the preschool years,[67] self-reliance and greater problem solving ability in kindergarten.[197] There is also evidence that children who have a secure attachment to both their mother and father in infancy are more sociable and socially competent than those who were securely attached to one parent only.[198] The crucial role that parents play in shaping their children's social skills and relationships is clear and this is thought to affect peer relations in adolescence.[199] It is argued that children benefit from their parents and other family members in a variety of ways, including from intellectual stimulation and by learning values that can contribute to enhanced life skills (for example learning that working hard and acquiring a good education will benefit one in the future).[200] This is facilitated by having a close relationship with a parent who is committed to guiding his or her children.[200] Parents also provide educational and financial resources as well as connections with other adults in the community and with resources such as schools and the labour market – all of which are vital for the healthy development of children.[52]

Measuring 'Parenting'

There is some suggestion that it can be reliably measured using children's perceptions of their parent's behaviour, however there remains controversy with respect to the best way of measuring parent behaviours i.e. observation of parent-child interactions, parental self-reports and children's reports each have strengths and weaknesses.[201] There are tools available to measure parenting practices, for example, the Authoritative Parenting Index.[193] The Index contains 20 items to assess responsive and demanding parenting behaviours, and measures children's perceptions of parenting behaviours.[193] It was developed from work by Diana Baumrind[202-205] which consists of in-depth qualitative descriptions of parenting.[193]

One US report proposes new measures of positive child development[10] suggesting that measuring the closeness of children to both their parents through child report would be an effective indicator of positive development.[10] While the report does not provide information on its validity, per se, the report documents the evidence for its causal relationship.[10] Another indicator proposed is the amounts of time children spend with their parents where they engage one-another.[10] This domain presents some measurement difficulties with regard to the extent to which you can determine and evaluate whether some activities involve engaging one

another, such as television viewing or a parent attending a sports match or play.[10] Moore et al suggests that all types of activities be included and that more research needs to be conducted to assess the value of different types of activities.[10] The Australian report on Indicators of Social and Family Functioning[27] suggests that activities and interaction between parents and their children be broken down in more detail:

- Amount of time spent by parents with child (includes activities between parent and child), meals together, outings, school-related activities, reading to child, helping with homework and total time together
- Frequency of time spent with dad
- Frequency of meals with both parents
- Amount of time spent with child on a typical weekday 7am - 9pm
- Amount of time spent with child on a typical weekend day
- Time spent with child on leisure activities
- Time child spends watching television, playing video games, internet etc.

This list was developed, along with a variety of other indicators, from a large number of sources. It is not specified what means were employed in developing the individual indicators. It is, therefore, not indicated whether breaking down the time spent in parent/child activities and interactions are valid indicators of parenting but they do have face-value, as they give more information on the likely value of the different activities. This report discusses the resources of parents/care-givers with regard to: available time, income, human capital, (i.e. knowledge, skills and experience about how the world works e.g. education and training, employment, culturally acquired knowledge, beliefs, attitudes and aspirations) psychological capital (i.e. mental health, family cohesion, perceived level of social support, and stress and conflict) and social capital (as previously characterised).

Andrews and Ben-Arieh(1993)[83] published a document that describes the measurement of wellbeing of children across the world, written with the specific goal of developing improved measures of child health and wellbeing. In this report they note that the following factors, (all of which have already been addressed) are related to parenting and positive child development:

- Dependable attachments to parents or other adult care-givers
- Firm, consistent, flexible discipline strategies
- Social support (i.e. for children) when faced with adversity[83]

The parent's personality also plays an important role.[206] Specifically a higher level of parental self esteem has been associated with higher levels of nurturing behaviour and enjoying parent-child interaction[207] and inadequate parenting has been shown to be associated with a variety of personality traits.[208]

There is some evidence that parenting can mediate the effects of sociodemographic context of children.[209] Similarly, parental stress affects parenting practices and parental health. Parental stress and particularly perceived stress, which have both been suggested as possible indicators, are significant determinants of child health and wellbeing. This is covered in more detail elsewhere in the review (see Parental health and wellbeing).

All of these issues are relevant to minority groups and while the broad principles highlighted are valid across these groups, parenting practices vary across different cultural groups and research about the effects of parenting within minority groups is very context-specific. Tools that may be used to measure parenting practices or other family-related phenomena need to be tailored to cultural differences. (This is described in more detail in the article by Knight, Virdin and Roosa which discusses socialisation correlates of mental health outcomes among Hispanic and Anglo-American children).[210] It is increasingly recognised that there is a need for developmental research within samples that are from socioculturally diverse backgrounds.[210]

The previously characterised report titled "Indicators of Social and Family Functioning"[27] provides some examples of measures of parenting as a whole, as well as specific aspects of parenting. Both are based on child perceptions. One measure is a simple 5 line questionnaire about the quality of the time parents spend with their child.[27] The other is a more comprehensive 15 item questionnaire about parents' behaviours, including perceived attitudes of parents towards the child and disciplinary techniques.[27]

Table 37. Indicators of parenting associated with family functioning

Indicator/domain
Disciplinary techniques
Rules of behaviour
House rules for child regarding homework, TV viewing, bedtime
Monitoring behaviour
Parent-child communication
Communication frequency, styles and/or content of communication
Positive interaction
Warmth
Acceptance/punitiveness
Hostility
Aversive parenting
Consistent parenting
Modeling
Parent-child conflict
Conflict between parents
Reports of physical violence within the family
Satisfaction with parenting
Perceived stress
Stressful life events
Perceived level of social support
Parental self-efficacy
Strains/gains of work to parenting

Family Composition

Family composition can have a profound effect on child health and wellbeing and is therefore a significant determinant of health; demographic data on family composition are therefore important indicators of child health and wellbeing.[200] When one parent, either through choice or necessity, has to parent a child alone, the parenting process and connections with resources available to the child through the parent, as described above, may be weakened. Lone parents are often at greater risk of socioeconomic disadvantage[46,211] as single parent families commonly have considerably less financial resources.[32]

Parental divorce

The experience of parental divorce is associated with an increase in behaviour problems and symptoms of psychological maladjustment, lower academic achievement, more social difficulties and poorer self-concepts in childhood. Adults who have experienced parental divorce in childhood do not perform as well on a variety of psychological, interpersonal and socioeconomic indicators; however, considerable diversity exists in children's reactions to divorce and overall the differences between children from intact and divorced families are small.[212] Children's reaction to divorce depends on many factors. These include the amount and type of contact with parents and their psychological adjustment and parenting ability, the degree to which there is parental conflict, the degree of financial stress, and the occurrence of stressful life events prior to and following the divorce.[212] The experience of divorce is a significant determinant of child health and wellbeing but is only one of many possible risk factors for social and emotional maladjustment.

Demographic influences

Demographic data indicates the proportion of children living in single parent households however Sandefur and Mosley (1997)[200] highlight that information about whether children live in single parent households as a result of divorce or due to other factors (e.g. single motherhood) is able to give a more comprehensive picture of the determinants of child health and wellbeing. The amount of contact children have with non-custodial parents may also shed light on important determinants of health.[200] Investigating the amount of family conflict would also make the picture of determinants of child health and wellbeing more comprehensive[200] although no indication of possible means of measuring this has been provided.

Parental education is a widely used indicator of child health and wellbeing.[4,27] There has been shown to be a significant association between parental education and child health and wellbeing.[25,32] An example of the effects of parental education is given in an article addressing maternal education and its effects on children's nutritional status and shows how other factors also play an important role.[213] In this case, socioeconomic status is shown to be an important variable with regards to the relationship between parental education and its effects on child health and wellbeing.[213]

5. SERVICE DELIVERY

Evidence and Context

Although much of the health care dollar is spent on treating disease in the acute setting, there is now wide recognition that early detection and prevention of disease delivered in the community setting is the most cost beneficial approach to improve the overall health of the population.[214] This section will outline the importance of early detection, prevention and health promotion in improving the health, development and wellbeing of children and discuss the importance of primary care in delivering these key messages within the Victorian service delivery framework. Currently very few indicators exist that are able to measure the effectiveness of primary care in both preventing disease and promoting health, however the development of ambulatory care sensitive conditions is an opportunity to begin this process within the constraints of the data currently available.

Health promotion, early detection and prevention

Primary and secondary prevention is an important aspect of health care systems. These activities take place, in general, in community systems, usually by primary care providers. There is a rich source of evidence that points to the benefits of health promotion, early intervention and prevention of conditions.

Health promotion

According to the World Health Organisation,"health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, menial and social wellbeing, an individual or group must be able to identify and realise aspirations, to satisfy needs and to change or cope with the environment".[215] There is an increasing evidence base that supports the effectiveness of health promotion in preventing disease, but more importantly in promoting a state of health and wellbeing. Some of this evidence has already been included in this review, such as injury prevention and breastfeeding promotion. Many health promotion and public health interventions are known to be effective when delivered by primary care professionals in the context of patient needs (breastfeeding, provision of and telephone reminders for immunisation), and increases with accompanied environmental changes (injury prevention, smoking cessation,[216] provision of educational material on peri-conceptional folate).[217]

Early Detection and Prevention

Early detection implies that problems should be identified at the earliest stage of disease or disability that is possible. It is desirable because of a number of reasons including parental desire, improved outcomes and the possibility of early intervention and the prevention of complications and further disease. An example of early detection and prevention is the neonatal screening performed on blood samples of 4-day-old babies in Australia. Screening for metabolic and genetic disorders allows for early detection of anomalies and the prevention of disease.

Indicators of Health Promotion, Prevention and Early Detection

It is difficult to find currently collected indicators that actually reflect the principles of health promotion, early detection and prevention within the Australian healthcare system. Immunisation is considered the cornerstone of health promotion and primary prevention and has therefore been included as an indicator.[6] Injury rates are also included as appropriate health promotion messages have been demonstrated to decrease rates of injury.[218]

Table 38. Some indicators of health promotion, prevention and early detection

Indicator/Domain
Immunisation-number of children fully immunised
Injury rates

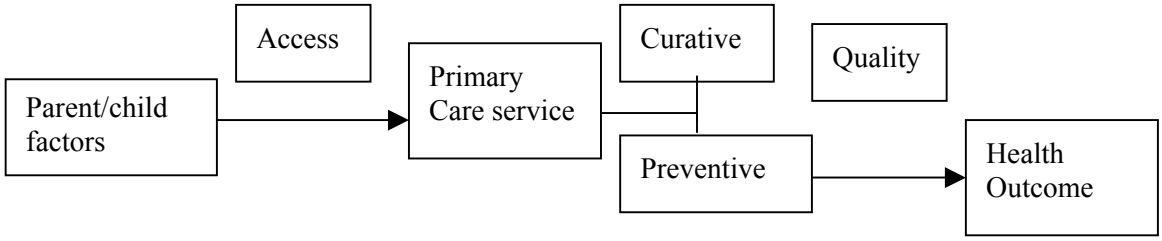
A. Primary Health Care

Primary health care is thought to be the most appropriate and effective platform for delivering preventive messages to children and their families. These are services which are generally universally available and taken up by a large percentage of the population. High quality primary care has been defined as "the timely use of personal health services to achieve the best possible health outcomes"[28]- this includes taking into account the potential barriers to access as well as the quality of the care provided.

In Victoria, general practitioners and maternal and child health nurses provide the majority of primary care for young children and their parents; other providers in the position to deliver appropriate messages to parents and children include chemists, allied health professionals and alternative health care providers. Research has demonstrated that young children are likely to access these services frequently,[219,220] giving primary care providers many opportunities to engage in preventive health care.

Although it would seem intuitive that good health care leads to better health outcomes, in fact the evidence proving this link is weak. Whilst there is evidence that illustrates the capacity of primary care providers to deliver effective prevention messages to children and their families (include references about smoking and injury prevention), it is has been difficult to capture outcome data. This is partly due to the difficult time frame between prevention and improved outcomes, but also underlines the multifactoral nature of health outcomes within a health services framework. There are a number of points in the service delivery pathway to health outcomes where a range of factors may influence health outcomes. In the simplistic diagram below it can be seen that from the point when a parent decides that a child requires a health service there are a number of determinants already influencing decisions about the frequency and type of health service they will utilise. Underlying this pathway is the complex range of socio-environmental factors that have been included in this review and underline the difficulty in attributing health outcomes to health services alone.

Figure 2. Factors influencing use and outcomes of health services



Factors related to the parent and child:

- Maternal mental health[221,222]
- Child illness and vulnerability[223]
- Maternal rate of health service use[224]

Factors affecting access to primary Care:[225-232]

- Geographic eg distance, travel time, availability and cost of transport
- Financial: costs associated with health care and ability to pay
- Cultural: language, religion and personal beliefs
- Organisational: obtaining the right kind of care, overcoming eligibility criteria

Factors affecting quality of care:

- Personal differences
- Training
- Cultural bias
- Professional development
- Time pressure

Indicators of the Effectiveness of Primary Care: Ambulatory Care Sensitive Conditions (ACSCs)

ACSCs are those for which hospitalisation is thought to be preventable with the application of preventive care and early disease management. In Australia the avenue through which much of this is undertaken is primary care. In theory, timely and effective ambulatory primary care can help reduce the risk of hospitalisation for a certain number of disease processes; these have previously been outlined by the Institute of Medicine in the USA. Hospitalisations may be prevented through the actual prevention of illness eg immunisation, controlling an acute episode (for example, as asthma), or managing a chronic disease or condition (for example, diabetes).

ACSCs are indirect measure of primary care. In theory it is difficult to assess whether ACSCs reflect access, quality or both. In practice policy makers have great interest in evaluating the impact of the health care system, particularly access. This is a significant problem in the United States where access is confounded by lack of health insurance. In Australia there are still inequalities within health outcomes and use of health services - access and quality of care are still fundamental issues.

Possible factors that might contribute to variations in ACSC hospitalisations include disease prevalence, propensity to seek primary health care (parental and child factors), socio-economic barriers to care and hospital utilisation patterns, including factors such as criteria for admission and number of beds.

Despite the ease of accessing information about ACSCs through administrative databases, authors urge exercising caution as the indicators should be used to identify possible problems and variations across a region that should be investigated further.

Suggested Conditions:

A set of ICD9 admission codes that are thought to be ACSCs have been developed, based on the original work done by the Institute of Medicine. The Sure Start program has included a decrease in hospitalisations related to gastro-enteritis, respiratory infection and severe injury as ACSCs. Others that might also be included could be asthma and dental caries. The Victorian ACSC Study showed significant variation across regions and age groups in admissions for both of these conditions.

Service sensitive conditions

All parents of Victorian preparatory children complete a questionnaire (SEHQ) that includes parental concern about common conditions affecting children, as well as parental use of services for their children. This provides an opportunity to explore whether parents are accessing services in response to their concerns. An example of this is dental care. In Australia the issues surrounding access to dental care are compounded by the fact that it is not freely available. Community dental clinics do exist but the waiting lists are long and it is not always possible for children to be seen adequately. Therefore for conditions such as caries or speech and language problems, it would be anticipated that parental concern would be met with use of services. If a gap exists, it is reasonable to assume there are some service barriers, especially for services that are not included as part of Medicare.

Table 39. Indicators of Primary Care

Indicator/Domain
Ambulatory Care Sensitive Conditions
Service sensitive conditions/problems relevant to children-conditions where parental concern can be matched against use of services eg dental care, speech therapy

Conclusion

This review has highlighted the international and national interest in developing indicators for children and families that include both their health and wellbeing. These indicators move away from the more traditional indicators that have focused on morbidity and mortality. Although there is increasing interest, there remains a dearth of validated indicators that have been developed within a research framework and only a few countries have included these broader indicators in their regular reports.

The information that has been included has brought together much of the literature that supports the causal pathways that demonstrate why these indicators are important as predictors of child health and wellbeing. It also reviews indicators that are either currently in use or are suggested possibilities, within the constraints of the available evidence.

Although many of the indicators appeared to be useful, few met the criteria we had set out at the commencement of the project and there is a clear agenda for the further development of indicators that are both valid and relevant for the Australian population.

This review is an important first step in creating an evidence-based data monitoring system for children and families that could have the capability of measuring the determinants of health and wellbeing of individuals and the population over time. Current administrative data sources may well contain, or have the possibility of including, vital information that could contribute to this process together with a systematic and epidemiological approach to further data collection.

Developing responsive public and program policy for children is vital. The advent of newer and more streamlined technologies, together with research that is currently being undertaken to develop valid measures of important indicators, suggests that future data collection systems will enable policy and planning decisions to be made in response to accurate and detailed measures of the health and wellbeing of the population.

Appendices

Appendix 1. Protocol for Literature Search

Literature review

Scope

This review involved a review of indicators that are available or recommended in the published and unpublished literature. Ideally, we are seeking to describe whether they have been previously been demonstrated to be effective in their specific domain, but will include the possibility of exploring indicators that may not have tested measures associated with them. Therefore the review of the literature required a preliminary assessment of the potential relevant literature and its size. Initially this included a search of only the most relevant databases utilising a search filter. Search filters exist for many areas of research, however given the limited scope of the project, a search filter that meets the needs of this project needed to be specifically designed.

The scope for this literature search was defined as:

- Defining the appropriate model of indicator domains within a social model of health
- Searching the literature for indicators that fit within the suggested social model of health framework and are relevant to children, parents and communities
- Searching the literature for indicators that have been well documented together with those that have been suggested by the literature as relevant to a social model of health but may not have an associated measure or have previously been utilised

The literature review does not include:
Developing or researching specific measures related to indicators where measures do not already exist.

Theoretical Background

This review has been developed utilising dimensions that exist within a definition of health such as physical, emotional, cognitive and social aspects of health, but has also included domains within a social model of health that impact on any or all of these dimensions of health. This focuses on the child but emphasises the important impact of parents and the community on children's health and wellbeing. Within this context, this project has included searching for indicators that will be applicable for both individuals and populations.

As an added complication to the social model of health, a developmental and ecological approach has been superimposed. This allows for an understanding of both the longitudinal nature of children's changing development (horizontal) but also emphasises the intimate

relationship children's health and wellbeing has with that of their parents and the community at large (vertical). In defining indicators, therefore, there needs to be a cognisance of the overlap between indicators and outcomes within a casual pathway where there may be considerable overlap. For example, low birth weight may be an outcome related to poor nutrition in pregnancy, but is also an indicator in relation to children's risk of learning difficulties. This reflects the complicated interactions that occur within causal pathways based on a developmental approach. This project has included indicators that are part of an evidence-based causal pathway wherever possible and it has been noted where an indicator coincides with a potential outcome measure.

Search Strategy

The development of a search strategy is an iterative process and required a series of pilot searches; however, in the first instance the original proposal was broken down into a series of concepts that allowed for more defined and limited searches. In the Indicators projects there are a number of levels at which data could be attained. The search allowed for broad areas to be narrowed through repeated and subsequently more limited searches. The search included:

Population:

Infants and children (0-8 years) – definition to include conception but not pre-conception.
Parents/parents to be/carers

Setting:

Schools, Childcare, Health services, Welfare services, Housing, Transport

Outcome/indicator:

Social health model domains

Study design:

Surveys, Evaluations

The second level of the indicator search strategy was to link indicators through an evidence-based causal pathway, so that the indicators are clearly linked to outcomes in children. Therefore as the indicators are found, a parallel search to link indicators with outcomes will occur. The discussion within each domain will commence with the evidence and context for the inclusion of the domain, followed by the background information to the particular indicators, and an explanation of the indicators.

Databases

The literature search included peer reviewed publications but had a significant focus on grey publications, in particular reports by government and non government agencies in relation to health and wellbeing status of child populations in Australia and internationally.

Searches of peer reviewed publications were based around the areas highlighted in the social model of health. This included finding references that validated the choice of indicator suggested, as well as source indicators in broad areas such as physical environment where specific indicators have not yet been proposed.

Peer reviewed publications included annotations, reviews and articles regarding:

- Definitions of indicators
- Definitions and theoretical background to social model of health
- Indicators suggested by previous surveys/reports
- Indicators that are specific to the areas suggested by the social model of health
- Indicators that are specific to a child's developmental age and stage (including the exploration of discussion regarding whether children's developmental stages should be presented by milestones/developmental stage e.g. preschool or ages)

Sourcing peer reviewed publications:

Search strategies used these electronic databases: Medline, Cinahl, Healthstar, Psychlit

Data sources for unpublished reports and grey literature:

Government reports on indicators or health status

National reports on key indicators from Australia and overseas (mainly available on the web)

Search engines for the world wide web:

Google, Alta Vista

During the Web-search an inventory of U.S. programs relevant to child and family indicators was identified. This inventory included web addresses and thus was also used.
Some Web-sites were identified as being relevant opportunistically by, for example, referring to government Web-sites and the Web addresses of organisations that are known to address issues related to the use of indicators of child health and wellbeing.

Efforts to Identify Unpublished Data

Communication with stakeholders across the domains in Australia and internationally

Identifying Keywords

Examples included:
Child, Infant, Parent, Health, Maternal health, Maternal welfare, Wellbeing, Social health, Emotional health, Cognitive wellbeing, Indicators, Child welfare, Behaviour disorders, Mental disorders, Development, Growth, Nutrition, Disability, Infant mortality, Child Abuse, Injury, Domestic violence, Violence, Housing, Social environment, Environment, Family, School, School environment, Childcare, Smoking, Environmental health, Social determinants, Emotional wellbeing, Social wellbeing, Mental health, Parenting, Child friendly communities.

Analysis

The indicators that have been identified through the literature search will be brought together under the social/ecological/developmental model of health previously discussed. Where possible the indicators will be described with respect to the issues discussed before, and a checklist provided which describes each indicator against these:

- Methodology for development of indicator
- Where the indicator was developed (ie which country)
- Original or current use of indicator (ie for evaluation versus population survey versus research project)
- The indicator's validity
- The evidence for a causal relationship

The final set of indicators will therefore be comprehensive and considered the best indicators for the allocated domain given that are currently known.

Appendix 2. Results of the search for literature published on electronic web-sites

Country of origin	Geographical area for intended application of indicators (city, county, state, country, international)	Website / Title	Level of Indicator (Child, Family, Environment)	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
USA							
NGO	National	http://www.aecf.org/kidscount/kc2001 The Annie E. Casey Foundation. KIDS COUNT 2001 Data Book Online. The Annie E. Casey Foundation.	C, F	A broad array of data presented each year at a national level (10 key indicators only) and a state level.	The information in this publication is intended to illuminate the status of America's children and to assess trends in their wellbeing.	Data from States' information collection systems.	To inform policy decisions at a State and National level re: (for example) public education, childcare, and family support systems. To provide benchmarks with which states can see how they have advanced or regressed.
NGO	National	http://www.aecf.org/kidscount/rightstart2/docs/rightstart.htm The Right Start: Conditions of Babies and their Families Across the Nation and in America's largest Cities. The Annie E. Casey Foundation.	C, F	Reports on eight indicators to assess the wellbeing of infants nationally. These include indicators of wellbeing of infants at birth, indicators that reflect social conditions prior to birth that can effect the health of an infant and some maternal characteristics, including some social indicators such as maternal education.	To illuminate the status of America's infants and to assess trends in their wellbeing.	Data from States' information collection systems.	To inform policy decisions at a State and National level. To provide benchmarks with which states can see how they have advanced or regressed.

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	http://www.census.gov/prod/2001pubs/p70-68.pdf Fields J, Smith K, Bass L.E. and Lugaila T (2001) A Child's Day: Home, School, and Play (Selected Indicators of Child Wellbeing). US Department of Commerce, Economic and Statistics Administration, US Census Bureau. 1994 (Issued February 2001).	C,F,E	This report presents findings from the Survey of Income and Program Participation (SIPP) on the wellbeing of American children.	This report uses a variety of indicators to portray children's experiences while growing up.	Data on child wellbeing was collected by interviews of households nationally (ie the Survey of Income and Program Participation or SIPP).	To portray children's experiences while growing up including differences in family living arrangements, economic and social environments, and the types of neighbourhoods where children live.
GOV	National	http://www.census.gov/prod/99pubs/p70-67.pdf Beauman, K. J. (1995) Extended Measures of Well Being, Meeting Basic Needs. US Department of Commerce, Economic and Statistics Administration, US Census Bureau.	E	This report presents the national findings from a supplement of the Survey of Income and Program Participation (SIPP) for extended measures of wellbeing specifically associated with meeting basic needs. Is not specific to children and their families.	To try to estimate the incidence of and extent to which people have difficulty meeting basic needs	Questions were asked on basic needs, food sufficiency and income adequacy as a supplement to the SIPP.	To add insight into information currently available about wellbeing.

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	http://www.census.gov/population/www/documentation/twps0024/twps0024.html Kristin E. Smith, Loretta E. Bass, and Jason M. Field 1998 Child Wellbeing Indicators From the SIPP Population Division, U.S. Bureau of the Census, Washington, D.C.	C,F,E	Provides analysis of child wellbeing in four areas: early childhood experiences, parent - child interaction, school-age enrichment activities, children's academic experience.	To identify background correlates of child wellbeing, in addition to showing associations between child wellbeing and household stressors, family characteristics, and participation in enrichment activities.	Data on child wellbeing was collected by interviews of households nationally (ie the SIPP).	Expand understanding of determinants of child wellbeing by addressing the following questions: Does the addition of household sources of income increase the association between income and the measurement of child wellbeing? How are program receipts, home ownership, and assistance programs associated with children's well being? Are perceived indicators of the neighbourhood's level of social capital and safety correlated with children's wellbeing? How are characteristics such as family structure, number of adults in the household, presence of siblings, education of the parents and other adults in the household associated with children's wellbeing? Are measures of household stress such as presence of a disabled parent or child, or recent unemployment correlated with child wellbeing? How are different patterns of employment among adults in the household and family associated with child wellbeing?

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	Http://www.census.gov/population/www/documentation/twps0023.html Fields J M and Smith, (1998) K E Poverty, Family Structure, and Child Wellbeing Indicators from the SIPP.	C F	Looks at the proportion of 6-17 year olds that are academically "on track", relating to other factors such as disability, maternal education and family income.	To determine associations between social indicators and academic achievement.	Assesses data from the new Child Wellbeing Topical Module of the Survey of Income and Program Participation (SIPP)	To determine whether the SIPP can measure child wellbeing To show associations between child wellbeing and risk and protective factors such as household stressors, family characteristics, and participation in enrichment activities.
NGO	National	http://www.kidfriendlycities.org/2001/index.html Kid-Friendly Cities Report Card 2000. Zero Population Growth.	C E	Ranks cities according to their child-friendliness. Includes a list of "Kid Friendly Cities" Indicators.	To track the child-friendliness or American cities.	Data collected form a large array of sources from cities in the US.	Data is used in policy and program decisions.
NGO	National	http://people.mw.mediaone.net/cyoakam Urban Quality Communications. Urban Quality Indicators Newsletter	C E	Site with example articles from and ordering facilities for the Quality Indicators Newsletter. Example articles include indicators for neighbourhood sustainability and culture.	To share information on various efforts in North America measuring the quality, health and sustainability of its communities - from neighbourhoods to regions.	NA	The analysis gives important insights in the way indicators are understood by different countries, the extent of the availability of data, the reliability and validity of the information provided and the appropriateness of the indicators for international comparisons. This document lays the foundation of trying to build a set of indicators that could provide a comprehensive picture of health for participating cities.

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	Nationally	http://ag.arizona.edu/fcr/fs/nowg/introchil.html Evaluating the National Outcomes. Program Outcomes for Children. The National Outcome Work Group for Children.	C,F	Extensive list of program outcomes under the following headings: Presence and Participation, Family Involvement/Accommodation and Adaptation, Physical Health, Responsibility and Independence, Contribution and Citizenship, Academic and Functional Literacy, Personal and Social Adjustment and Satisfaction. Suggested Indicators are listed under each outcome. Includes a conceptual model of outcomes (including diagrammatic representation of the relationship between indicators and outcomes).	NA	NA	NA
GOV	National	http://www.communityhealth.hrsa.gov/ Community Health Status Indicators Project. U.S. Department of Health and Human Services	C	The Community Health Status Indicators (CHSI) project team created 3,082 reports of health status indicators, one for each county in the nation.	The CHSI Project was launched in response to grassroots requests from local health officials for health data at the local level.	A large number of already-existing data resources from each state were used.	To provide the opportunity for local health officials to see, react, and act upon the data from one brief document.

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	http://www.childstats.gov This web site offers easy access to federal and state statistics and reports on children and their families, including: population and family characteristics, economic security, health, behavior and social environment, and education.	C,F,E	Coordinates, collaborates and integrates collection and reporting of Federal data on child and family issues and conditions.	Federal data from many sources.	To develop priorities for collecting enhanced data on children and youth. To improve the reporting and dissemination of information on the status of children to the policy community and the general public.	
NGO	International	http://www.worldbank.org/children/design/starting/61.htm Ben-Arieh, A. International project on indicators of children's wellbeing. Focus: University of Wisconsin-Madison: Institute for Research on Poverty, Vol. 19, No. 1, Summer/Fall 1997.	C	The main conclusions of major international projects and workshops are reported in this article. The changing perspectives on child social indicators are briefly characterized and conceptual frameworks for measuring children's wellbeing are discussed.	NA		

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
NGO	International	http://www.worldbank.org/children/design/starting/indicat.htm Indicators for country analysis on early child development. Survival, growth and health status indicators.	C,F,E	A summary of current practice and development of child health indicators.	NA	NA	NA
NGO	International	http://www.unicef.org/habitat Children's Rights and Habitat - Working Towards Child Friendly Cities	E	Child Friendly Cities are defined; urban children's rights and the conditions for achieving them are discussed, as are obstacles and constraints. Strategies, mechanisms and processes for achieving child friendly cities are also described.	NA	NA	NA

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	Minneapolis	http://www.ci.minneapolis.mn.us/citywork/city-coordinator/health/research-policy/index.html Minneapolis Department of Health and Family Support. KidStat Databook. Minneapolis Child Health Indicators: Data form the CHAMP (Community Health Assessment and Monitoring Project) survey, 2001.	C,F,E	Summary of 1999-2000 population-based survey of Minneapolis parents with young children "Child Health Assessment and Monitoring Project" (CHAMP), which consisted of questions about family life, social connections, community factors and physical health. Includes indicators of child wellbeing such as richness of child's home and community environment, parent characteristics, health behaviours of child and parent and health care systems.	Data collected to assess child health preliminary to planning health promotion and protection activities. To assess the conditions of the youngest children and their parents to determine the strengths and weaknesses that underlie these formative years.	Survey interviews performed with 3,352 parents with infants and toddlers in Minneapolis.	Is used to inform policy makers, community members, program leaders, community organisations and parents.

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
NGO	Virginia	http://www.pediatricresearch.org/cinch/intro.htm The CINCH Report. The Consortium for Infant and Child Health. Centre for Paediatric Research.	C	Report on the health of the children in Hampton Roads (Virginia) looking at twelve indicators including some social indicators and some indicators concerned with mental health.	This information has been gathered to assist in decision making for resource allocation for the health and wellbeing of children and guide identification of effective strategies.	The data sources for this report include the U.S. Census Bureau, the Virginia Patient Level Database compiled by Virginia Health Information, Inc., the Virginia Child Health and Immunization Survey, the Virginia Department of Health, and Community Services Boards.	To assess how Hampton Roads compares to itself and the Commonwealth of Virginia over the past years.
NGO	Vermont	http://geo-vt.uvm.edu/ahsdoe Children's Wellbeing Online. University of Vermont	C,F,E	A mapping system enabling the public to map the key indicators of children's wellbeing in Vermont. Includes child, kindergarten, school, and community indicators.	To inform the public about information on key indicators of children's wellbeing by region.	Data from the education department, the Vermont Agency of Human Services and the University of Vermont's Centre for Rural Studies.	To help users gain a better understanding of the wellbeing of children and families in their communities.

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GO	Pierce County	http://www.co.pierce.wa.us/services/family/benchmrk/qol.htm Pierce County Department of Human Services. Quality of Life Benchmarks.	C,E	Information about the wellbeing of Pierce County (Washington State) using 80 quality of life indicators (eg affordability of housing and access to cultural and recreational facilities). Is not specific to children.	To gather and publish information about the wellbeing of the community as a whole.	Uses information gathered from a variety of sources including for example, state and federal agencies, the Department of Health, electricity consumption data and building permit data.	To inform decision making and policy and highlight areas where there is a high quality of life and areas of need.
NGO	North Central Region	http://www.ncrel.org/sdrs/areas/issues/students/atrisk/at5out.htm North Central Regional Educational Laboratory. Pathways to school improvement - Outcomes. Outcomes and Indicators. A Core List to Serve as a Starting Point. The Center for the Study of Social Policy.	C,F	A list of suggested outcomes and indicators for communities within the North Central Region of the US.	To assist communities by providing a starting point for community discussion on which indicators might best suit their county	NA	To assist communities within the North Central Region of the US to measure their health and wellbeing.

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
NGO	Atlanta, Baltimore, Boston, Cleveland, Denver, Indianapolis, Miami, Milwaukee, Oakland, Philadelphia, Providence, Washington.	http://www.urban.org/nnip National Neighbourhood Indicators Partnership. Indicators in Action.	E	A collection of brief case studies that describe successful uses of neighborhood indicators in three categories: (1) neighborhood-level applications—specific initiatives; (2) neighbourhood level applications—organizing and capacity-building; (3) citywide initiatives and policy change.	To further the development and use of neighborhood information systems in local policymaking and community building.	Data is collected from different sources for individual case-studies.	To ensure accountability of program.
NGO	Jacksonville	http://www.jcci.org The Quality of Life Indicators Project and the Community Agenda Indicators Project	C,F,E	These projects are aimed at tracking certain assets and vulnerabilities of communities in Jacksonville.	To improve the community of Jacksonville through supporting the direct involvement of citizens by tracking a quality of life indicator set for Jacksonville/ Duval County, and a health and human-service indicator set for five Northeast Florida counties (Baker, Clay, Duval, Nassau, and St. Johns).		

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
NGO	Central Indiana	http://www.savi.org Social Assets and Vulnerability Indicators (SAVI) Project. United Ways of Central Indiana	C,F,E	This website is a comprehensive electronic database of mapped and tabular data about community assets and vulnerability's from the Indianapolis Metropolitan Statistical Area.	To provide succinct data on community assets and vulnerability's specific to local areas.		
NGO	Multoma	http://www.p-m-benchmarks.org Multomah County Benchmarks. Portland-Multomah Progress Board.	C,F,E	Benchmark areas addressed in this project include the following: economy, education, environment, governance & civic participation, health & families, public safety and urban vitality.	The overall aim is to contribute to improving their community's quality of life by tracking progress indicators in the benchmark areas already mentioned.		
NGO	Chittenden County	http://www.unitedwaycc.org Chaplain Initiative. United way of Chittenden County, Vermont	C,F,E	A community wide initiative focused on improving the quality of life in Chittenden County by 2016.	Identifies indicators of a healthy community and measures the trends of those indicators.		

Country of origin	Geograph-ical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
NGO	NA	http://www.gwu.edu/~ccps/Moore.html Moore KA. and Halle TG. (1999) Preventing Problems vs. Promoting the Positive: What Do We Want for Our Children. Suggested new Indicators - Under expanded approach. Communitarian Network	C	Reports on potential indicators for positive youth behaviors. Discusses the need for development of valid and reliable indicators of positive attitudes, beliefs and outcomes so that positive development does not continue to be construed as merely the absence of negative behaviors and outcomes.	NA	NA	NA
NGO	NA	http://www.childtrends.org/%5CPDF%5Clocal.pdf Indicators of Child, Youth and Family Wellbeing: A Selected Inventory of Existing Projects. The Annie E. Casey Foundation.	C,F,E	Summary of (US) projects related to indicators of child, youth and family wellbeing.	NA	NA	NA
United King-dom							
NGO	NA	http://www.iser.essex.ac.uk/pubs/workpaps/pdf/99-15.pdf McCulloch A and Joshi HE. Child Development and Family Resources: an exploration of evidence from the second generation of the 1958 British birth cohort.	NA	Reference to parenting capacity within text.	NA	NA	NA

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
Canada							
GOV	National	http://www.hrdc-drhc.gc.ca/arb/publications/research/1999docs/t-98-4eb.pdf Applied Research Branch, Strategic Policy, Human Resources Development Canada (1998) Readiness to Learn, Child Development and Learning Outcomes: Potential Measures of Readiness to Learn.	C	Describes potential measures of readiness to learn.	NA	NA	NA
GOV	NA	http://www.hc-sc.gc.ca/hppb/phdd/determinants/e_deter_biblio.html What Determines Health? An Annotated Bibliography on Indicators for the Determinants of Health. Susan Lilley, MHSc for the Atlantic and Manitoba/Saskatchewan Regional Offices. Health Promotion and Programs Branch, Health Canada - March 2000	NA	An Annotated Bibliography on Indicators for the Determinants of Health.	NA	NA	NA

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	http://www.hrdc-drhc.gc.ca/arb/research/abr-97-9e.html Measuring Social Wellbeing: An Index of Social Health for Canada. Satya Brink et Allen Zeesman 1997	C,F,E	This paper describes the application to the Canadian context of the Index for Social Health (ISH), first developed in the United States, and provides an overview of social performance. Each indicator of the Index represents an area that affects quality of life: health, employment, income, education, security and psychological wellbeing. This paper provides a good argument for grouping indicators by age group or life stages: children, youth, adults and elderly			
Australia							
GOV	Queensland	http://www.families.qld.gov.au/families_first/policy/success.html Putting Families First Initiative (2001) Draft Policy. Indicators of Success. Queensland Government.	C,F,E	Reports on the Queensland governments measuring of "indicators of success" to monitor the success of the "Putting Families First" initiative.	Informing policy development and ensuring that the implementation process is effective.	Information not given	To ensure accountability of program.

Country of origin	Geographical area for intended application of indicators	Website / Title	Level of Indicator	Description of Publication	Why data on these indicators is being collected?	From whom is data being collected?	How is data used?
GOV	National	http://www.health.gov.au/pubs/hfsocc/hacocc3.pdf A Healthy Start for 0-5 Year Olds (1997) Commonwealth Department of Health and Aged Care.	NA	Australian Commonwealth Government occasional paper on the health and wellbeing of children age 0-5. Discusses the ecology of child health and wellbeing. Describes a selection of programs and initiatives aimed at improving and monitoring children's health and wellbeing.	NA	NA	NA
Denmark							
NGO	Europe	http://www.who.dk/healthy-cities/hcppub.htm#Indic Doyle E, Brunning D, Cryer C, Hedley S, Russell Hodgson C. (1997) Healthy Cities Indicators: Analysis of data from across Europe. World Health Organisation Regional Office for Europe, Copenhagen.	E	Analysis of data from across Europe of "Healthy Cities Indicators" for the World Health Organisation's Healthy Cities Project. Appendix 2 lists 53 healthy city indicators.	To monitor the progress of the healthy cities project in Europe. This report covers health, demography, health services, environmental and socioeconomic status indicators.	Data from 47 cities across Europe.	The analysis gives important insights in the way indicators are understood by different countries, the extent of the availability of data, the reliability and validity of the information provided and the appropriateness of the indicators for international comparisons. This document lays the foundation of trying to build a set of indicators that could provide a comprehensive picture of health for participating cities.
International							
NGO		http://www.who.int/site-search/data-who-hq-live/search.shtml WHO Unable to gain access					

Appendix 3. Results of published literature search

Summary Spreadsheet of Journal Article Abstracts from Ovidweb Search

The following is a summary of the literature identified in the search of electronic database using the search strategy in Appendix 1. The abstracts have been loosely categorised so as to aid the reader in identifying relevant articles. In many instances, however, the material was very difficult to categorise due to a vast amount of overlapping in the subject matter of each article. Indicator domains have been used to assist the reader identify material only. These domains are Health (H), Education and Work (E&W), and Environment (E), an abbreviation short for child friendly environment.

	Journal Articles (NA = not available or not applicable)						
	Paper	**Description of article**	**Type of Article / Study**	**Indicator Domain**	**Health Status/ Determinants**	**Population**	**Setting**
1. General Articles							
1	Halfon N. Newacheck PW. Hughes D. Brindis C. **Community health monitoring: taking the pulse of America's children.** Maternal & Child Health Journal, 2(2):95-109, 1998 Jun.	Describes the development, content, enablers/barriers, and impact of child health reports in nine communities participating in a child health initiative. Includes environmental exposure indicators as well as health status indicators.	A qualitative, prospective, multiyear, longitudinal evaluation using a multiple case-study methodology.	H, E&W, E	Health Status & Determinants	Child	Community
2	Spencer N. Logan S. **Community indicators of child health.** Sozial- und Praventivmedizin. 38(2):90-5, 1993.	Indicators of health in child populations are critically reviewed and the potential for routinely collected morbidity and life quality data discussed.	Discussion/ description	H	Health Status & Determinants	NA	NA
3	Emig C. Moore A. **Standards and guidelines: building a better system of child and family indicators.** Journal of Child & Family Nursing, 3(5):384-6, 2000 Sep-Oct.	Abstract not available.	NA	NA	Health Status & Determinants	Child Family	NA
4	Andrews AB. Ben-Arieh A. **Measuring and monitoring children's wellbeing across the world.** Social Work. 44(2):105-15, 1999 Mar.	Describes how an interdisciplinary group proposes widespread consensus on the selection and monitoring of cross-cultural indicators to cover the following children's life domains: social connectedness, civil life skills, personal life skills that enable children to contribute to their own wellbeing, safety and physical status, and children's subculture.	Review	H, E&W, E	Health Status & Determinants	Child	Global

	Journal Articles (NA = not available or not applicable)						
	Paper	**Description of article**	**Type of Article / Study**	**Indicator Domain**	**Health Status/ Determinants**	**Population**	**Setting**
5	Offord DR. Boyle MH. Fleming JE. Blum HM. Grant NI. **Ontario Child Health Study: summary of selected results.** Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie. 34(6):483-91, 1989 Aug.	Selected results from the Ontario Child Health Study (OCHS), a cross-sectional community survey of Ontario children 4 to 16 years of age, are presented in the areas of prevalence, risk indicators and service utilization.	Description / analysis	H, E&W, E	Health Status & Determinants	Children age 4 to 16 years.	NA
6	Wise PH. Lowe JA. **Noise or fugue: seeking the logic of child health indicators.** Mental Retardation. Vol 30(6): 323-329. 1992 Dec. American Assn. on Mental Retardation, US	A focus on dramatic but rare risk factors has distracted attention away from the primary determinants of child health indicators. An analytic model to assess these indicators identifies 3 interacting determinants: social wellbeing, technical capacity to reduce the risk that low social status conveys, and performance in providing access to this technical capacity.	Discussion	NA	Health Status & Determinants	Child	NA
7	O'Hare WP. Ritualo AR. **KIDS COUNT: identifying and helping America's most vulnerable.** Statistical Bulletin - Metropolitan Insurance Companies. 81(1):26-32, 2000 Jan-Mar.	Using data from the 1999 KIDS COUNT Data Book, compiled and published by The Annie E. Casey Foundation, the most recent state figures (1996) are compared with corresponding data from 1985 to assess the trends in child wellbeing in each state during the decade.	Retrospective cohort	H, E&W	Health Status	Child	NA
8	Halldorsson M. Cavelaars AE. Kunst AE. Mackenbach JP. **Socioeconomic differences in health and wellbeing of children and adolescents in Iceland.** Scandinavian Journal of Public Health. 27(1):43-7, 1999 Mar.	The objective of this study was to assess differences in health, healthcare use and wellbeing of children according to their socioeconomic situation, as part of a larger cross-sectional survey on health and wellbeing of children and their parents in the Nordic countries.	Part of a cross-sectional survey.	H, E&W	Health Status & Determinants	Child Parent	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
9	Tamburlini G. Ronfani L. Buzzetti R. **Development of a child health indicator system in Italy.** European Journal of Public Health. 11(1):11-7, 2001 Mar.	A working group was established in Italy in order to develop a proposal for a minimum set of health indicators to be adopted at the regional and local health authority levels.	Development of a set of proposed indicators.	H	Health Status & Determinants	Child	NA
10	Visschedijk J. Simeant S. **Targets for Health For All in the 21st century.** World Health Statistics Quarterly - Rapport Trimestriel de Statistiques Sanitaires Mondiales. 51(1):56-67, 1998.	The new global health policy "Health For All in the 21st Century" will be guided by global targets. Specific indicators will be developed to assess progress at all levels. This article outlines how these targets are directly related to the policy, indicating that the HFA targets are both inspirational and achievable.	Discussion	H	NA	NA	Global
11	Cohen MM. MacWilliam L. **Measuring the health of the population.** Medical Care. 33(12 Suppl):DS21-42, 1995 Dec.	A set of 102 population-based indicators was developed from multiple administrative data sources; these indicators were used to compare the health status of 1 million Manitoba residents across 8 administrative regions for 1 year. Marked variations in health status were shown.	NA	H	Health Status	NA	NA
12	Millar JS. Hull C. **Measuring Human Wellness.** Social Indicators Research. Vol 40 (1/2): 147-158, 1997. Kluwer Academic Publishers	A conceptual framework is presented as a means to organise the many measures of human wellness that are now available. The considerable augmentation of the indicators of health and wellness progress is discussed. It describes how there is now the opportunity to use more positive indicators than traditional indicators such as life expectancy and mortality rates.	Discussion / description	H, E&W, E	Health Status & Determinants	General	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
13	Zucconi SL. **CDC's consensus set of health status indicators: monitoring and prioritization by state health departments.** American Journal of Public Health. 84(10):1644-6, 1994 Oct	This is a survey of state departments in regard to prioritization of the CDC set of health status indicators. Almost all states monitored mortality and some diseases but other areas were not monitored at all.	Survey	H, E	NA	Child Parent	State level data
14	Noack H. **Conceptualizing and measuring health.** Health promotion research: towards a new social epidemiology. World Health Organisation, European Series, No. 37, 85-112, 1991	Reviews of the state of measuring health in the context of rapid growth of health promotion and health research.	Review	NA	NA	NA	NA
2. Family							
15	Seifer R. Sameroff AJ. Baldwin CP. Baldwin A. **Child and family factors that ameliorate risk between 4 and 13 years of age.** Journal of the American Academy of Child & Adolescent Psychiatry. 31(5):893-903, 1992 Sep.	Protective processes in at-risk children between 4 and 13 years of age were examined.	Longitudinal	H, E&W, E	Health Status & Determinants	Child Family	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
16	Sprusinska E. **The Family APGAR Index: study on relationship between family function, social support, global stress and mental health perception in women.** International Journal of Occupational Medicine & Environmental Health. 7(1):23-32, 1994.	The aim of the study was to evaluate how far women are satisfied with their family function. The obtained results were compared with the perception of global stress (S. Cohen PSS) by the women under study and their mental health.	NA	H, E&W, E	Health Status & Determinants	Parent	NA
17	Curtis LJ. Dooley MD. Lipman EL. Feeny DH. **The role of permanent income and family structure in the determination of child health in Canada.** Health Economics. 10(4):287-302, 2001 Jun.	Used data from the Ontario Child Health Study (OCHS) to provide the first Canadian estimates of how the empirical association between child health and both low-income and family status (lone-mother versus two-parent) changes when the model was re-estimated with pooled data.	Analysis	H, E&W, E	Determinants	Child	NA
18	Biederman J. Milberger S. Faraone SV. Kiely K. Guite J. Mick E. Ablon S. Warburton R. Reed E. **Family-environment risk factors for attention-deficit hyperactivity disorder: a test of Rutter's indicators of adversity.** Archives of General Psychiatry. 52(6):464-70, 1995 Jun.	This study investigated whether family-environment risk factors are associated with attention-deficit hyperactivity disorder (ADHD).	Case-control study	H, E	Health Status & Determinants	Children age 6-17 years	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
19	David PH. **Family-building patterns and childhood mortality: a family-level analysis.** Journal of Biosocial Science. 31(4):463-85, 1999 Oct.	This paper analyses mortality risk in sibships to explore the relationship between family formation factors and other household characteristics that identify women whose families are at higher risk.	Analysis	H, E	Health Status & Determinants	Parent Child	NA
20	Maris RW. **Social and familial risk factors in suicidal behavior.** Psychiatric Clinics of North America. 20(3):519-50, 1997 Sep.	The focus of this article is on the presence or absence of external and constraining social facts, as reflected in indicators like divorce rate, marital status, the number of close friends, loss of crucial significant others, or sometimes having no one who cares if the person lives or dies, feelings of shame or intolerable guilt, the belief of sacrificing one's life for a higher cause or another person, and military suicide.	Review	H, E	Determinants	NA	NA
21	Amato PR. **Life-span adjustment of children to their parents' divorce** Future of Children. 4(1): 143-64, 1994 Spring	Children from divorced parents have more social, academic and behavioural problems.	Review of literature	H, E	Determinants	Child Parent	NA
22	Knight GP. **Socialization and family correlates of mental health outcomes among Hispanic and Anglo American children: consideration of cross-ethnic scalar equivalence** Child Development. 65(1):212-24, 1994 Feb.	Relationship between mental health indicators and family and socialization variables.	Cross-sectional	H, E	Health Status	Family	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
3. Parents & Care-givers							
23	Ayoub CC. Milner JS. **Failure to thrive: parental indicators, types, and outcomes.** Child Abuse & Neglect. 9(4):491-9, 1985.	This study clinically evaluated and followed 42 parents and their infants with environmental failure to thrive (FTT) to determine if the type of FTT is related to assessments of parental awareness/cooperation, subsequent FTT outcome, and later neglect. The relationships between the parents' Child Abuse Potential (CAP) Inventory scores and the clinical measures were determined.	NA	H, E	Health Status & Determinants	Parent Infant	NA
24	Broom BL. **Expanding nursing's role in helping new parents.** Advanced Practice Nursing Quarterly. 3(3):55-62, 1997 Winter.	This article outlines indicators, timing, targets, and outcomes for research-based nursing interventions to help parents care for their couple relationship, thereby indirectly influencing parenting.	Descriptive	E	Determinants	Parent	NA
25	Gorzka PA. **Homeless parents' perceptions of parenting stress.** Journal of Child & Adolescent Psychiatric Nursing. 12(1):7-16, 1999 Jan-Mar.	This describes homeless parents' perceptions of parenting stress as potential indicators of needs for support in parenting roles.	Subjects completed the Parenting Stress Index	E	Determinants	Parent	NA
26	Brook JS. Whiteman M. Balka EB. Cohen P. **Parent drug use, parent personality, and parenting.** Journal of Genetic Psychology. 156(2):137-51, 1995 Jun.	This study examined the relationship of parent drug use and specific parent personality traits with four indicators of the parent-child bond: affection, child-centeredness, involvement, and nonconflictual relations.	Questionnaire	E	Determinants	Child Parent	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
27	Lam WKK. **Sociodemographic and parenting pathways of low birthweight infant development.** Dissertation Abstracts International: Section B: the Sciences & Engineering Vol 58(4B), Oct 1997, 2155, US: Univ. Microfilms International.	The purposes of the study were (a) to investigate whether selected clusters of indicators reflect ecological constructs within the environment of the child; (b) to explore the relative contributions of these constructs to low birthweight infant development; and (c) to assess the mediating role of the parenting context, particularly for families receiving caregiver-focused intervention services.	NA	H, E&W, E	Health Status & Determinants	Infant Parent	NA
28	Jackson C. Henriksen L. Foshee VA. **The Authoritative Parenting Index: predicting health risk behaviours among children and adolescents.** Health Education and Behavior. Vol 25(3) Jun 1998, 319-337. Sage Publications Increased. US.	This research focuses on authoritative parenting which previous studies suggest can prevent health risk behaviours among youth. It evaluates the reliability and validity of a new survey measure of authoritative parenting. It identified parenting types that varied as hypothesized with multiple indicators of social competence and health risk behaviours among children and adolescents.	NA	E	Health Determinants	Parent	NA
29	Dekovic M. Meeus W. **Peer relations in adolescents: effects of parenting and adolescents' self-concept.** Journal of Adolescence. 20(2):163-76, 1997 Apr.	This study examined the link between the parent-adolescent relationship and the adolescent's relationship with peers. The proposed model assumes that the quality of the parent-child relationship affects the adolescent's self-concept, which in turn affects the adolescent's integration into the world of peers.	Questionnaire	E	Health Determinants	Child	Home
30	Dawson DA. **Parental alcohol dependence on perceived children's behaviour.** Journal of Substance Abuse. 4(4): 329-40, 1992	The relationship between maternal and paternal alcoholics and their children's behaviour was examined – a positive relationship was found even when controlled.	Cross-sectional	E	Health Determinants	Parent Child	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
4. Child Welfare							
31	Maddocks A. Griffiths L. Antao V. **Detecting child sexual abuse in general practice: a retrospective case-control study from Wales.** Scandinavian Journal of Primary Health Care. 17(4):210-4, 1999 Dec.	This study investigated if routine medical contacts provide indicators that would assist general practitioners in detecting male child abuse.	Case-control	H	Health Status	Child	GP's
32	Trocme N. MacLaurin B. Fallon B. **Canadian child welfare outcomes indicator matrix: an ecological approach to tracking service outcomes.** Journal of Aggression, Maltreatment & Trauma, 4(1):165-90, 2000.	The Client Outcomes in Child Welfare (COCW) Project was designed to examine the state of knowledge about outcomes measurement in Canada and initiate a consensus building process for a coordinated strategy in tracking outcomes across Canada. The Outcomes Indicator Matrix was developed as a first stage in a strategy that focuses initially on the administrative use of outcomes information.	Interviews with key informants, reviews of the literature and analysis of legislation, policy documents and information systems.	H, E	Health Status & Determinants	Child Parent Family Community	NA
33	Fluke JD. Edwards M. Kutzler P. Kuna J. Tooman G. **Safety, permanency, and in-home services: applying administrative data.** Child Welfare. 79(5):573-95, 2000 Sep-Oct.	This article describes the construction and use of safety and permanency indicators, two aspects of a full set of indicators that also includes child wellbeing and family functioning.	Cohort	H, E	Health Status & Determinants	Child	Home

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
34	Forrester D. Harwin J. **Monitoring children's rights globally: can child abuse be measured internationally?** Child Abuse Review. Vol 9(6) 427-438, 2000 Nov-Dec John Wiley & Sons Inc, US, http://www.wiley.com	This explains UNICEF's initiative in developing indicators to measure the compliance of countries that have ratified the United Nations Convention on the Rights of the Child, held in 1989. These countries are required to submit reports on measures that they have put into place to implement the Convention, but information in the reports is not standardized.	Descriptive	H, E	Health Status & Determinants	Child	Global
35	Zuravin SJ. Fontanella C. **Parenting behaviors and perceived parenting competence of child sexual abuse survivors.** Child Abuse & Neglect. 23(7):623-32, 1999 Jul.	This paper reports data testing two alternative hypotheses: (1) the relationship between child sexual abuse and subsequent parenting attitudes and behaviors is a function of the third variable, growing up experiences other than CSA; and (2) maternal depression mediates the relationship between CSA and the same parenting variables.	Retrospective survey.	H, E	Health Status & Determinants	Parent	Community
36	Zuravin SJ. **The ecology of child abuse and neglect: review of the literature and presentation of data.** Violence & Victims. Vol 4(2) Sum 1989, 101-120. Springer Publishing Co., US	Current knowledge about the ecological determinants of child maltreatment was assessed. Data was presented from an aggregate study of covariation between 7 community characteristics and maltreatment rates. Results refer to economic stress indicators and inadequate social support indicators.	NA	H, E	Health Status & Determinants	NA	Community
37	Cadzow SP. Armstrong KL. Fraser JA. **Stressed parents with infants: reassessing physical abuse risk factors.** Child Abuse & Neglect. 23(9):845-53, 1999 Sep.	This study aimed to examine the relationship between a range of potentially adverse psychosocial and demographic characteristics identified in the immediate postpartum period and child physical abuse potential at 7 months.	Randomized controlled trial	H, E	Health Status & Determinants	Family	Home

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
38	Garbarino J. Crouter A. **Defining the community context for parent-child relations: the correlates of child maltreatment.** Child Development. Vol 49(3) Sep 1978, 604-616. Blackwell Publishers Inc, US	This presents the results of studies designed to illustrate the use of child maltreatment report data as social indicators of the quality of life for families.	Description / discussion	H, E	Health Status & Determinants	NA	Community
39	MacMillan HL. Canadian Task Force on Preventive Health Care. **Preventive health care, 2000 update: prevention of child maltreatment.** CMAJ. 163(11):1451-8, 2000 Nov 28.	This reviews the evidence for the effectiveness of interventions aimed at preventing child maltreatment described in the scientific literature over the past 6 years.	Review	H, E	Health Status	Child	NA
40	Gordon D. Gibbons J. **Placing children on child protection registers: risk indicators and local authority differences.** British Journal of Social Work. Vol 28(3) Jun 1998, 423-436. Oxford Univ Press, England, http://www.oup.co.uk	This study sought to assess the reliability of local decision making, based on rates of children on protection registers, due to wide variation in rates in different authorities. Results show that indicators of child and family vulnerability were more important than local area in explaining selection for initial child protection conference and placement on registers.	Analysis	H, E	Health Status & Determinants	Child	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
41	Lynch M. Cicchetti D. **An ecological-transactional analysis of children and contexts: the longitudinal interplay among child maltreatment, community violence, and children's symptomatology.** Development & Psychopathology. 10(2):235-57, 1998 Spring.	With a sample of maltreated and nonmaltreated children between the ages of 7 and 12 years, this investigation employed a 1-year longitudinal design to conduct an ecological-transactional analysis of the mutual relationships among community violence, child maltreatment, and children's functioning over time.	Case-control longitudinal study	H, E	Health Determinants	Child	NA
5. Mother and Child							
42	Laurenti R. Buchalla CM. **Maternal and child health indicators: implications of the tenth revision of the international classification of diseases.** Pan American Journal of Public Health, 2(1):13-7, 1997 Jul.	This article seeks to highlight the changes in the 10th Revision of the International Classification of Diseases (ICD-10) and to discuss their consequences for the presentation and interpretation of indicators used in the evaluation of maternal and child health.	Discussion/ description.	H	Health Status	NA	Global
43	Peoples-Sheps MD. Guild PA. Farel AM. Cassady CE. Kennelly J. Potrzebowski PW. Waller CJ. **Model indicators for maternal and child health: an overview of process, product, and applications** Maternal & Child Health Journal. 2(4):241-56, 1998 Dec.	This article describes development, key characteristics, and major applications of a set of MCH Model Indicators (MCH MI) created to address decisions about health conditions to be monitored, elements to be included in data sets, and definitions of measures. A conceptual model with five domains was created to organize and guide development of the indicators. The development process included systematic specification of concepts, formulas, age/gender groups, and data sources, as well as recommendations for frequency of surveillance.	Review	H	Health Status	NA	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
44	Gondoli DM. Silverberg SB. **Maternal emotional distress and diminished responsiveness: the mediating role of parenting efficacy and parental perspective taking.** Developmental Psychology. Vol 33(5) Sep 1997, 861-868. American Psychological Assn, US, http://www.apa.org	The present study examined whether the inverse relationship between maternal emotional distress and maternal responsiveness was mediated by mothers' parenting efficacy and parental perspective taking.	Questionnaire / observational	E	Health Status & Determinants	Parent	NA
45	Najman JM. Williams GM. Nikles J. Spence S. Bor W. O'Callaghan M. Le Brocque R. Andersen MJ. **Mothers' mental illness and child behavior problems: cause-effect association or observation bias?** Journal of the American Academy of Child & Adolescent Psychiatry. 39(5):592-602, 2000 May.	This study examines data on the mental health of the mother from prior to the birth of her child to when the child reaches 14 years of age.	Prospective, longitudinal study.	H, E	Health Status & Determinants	Parent Child	NA
46	Herrera LR. Kakehashi M. **An international data analysis on the level of maternal and child health in relation to socioeconomic factors.** Hiroshima Journal of Medical Sciences. 50(1):9-16, 2001 Mar.	International data on health and socioeconomic factors were analyzed to understand the trends and the determinants of maternal and infant mortality in the late years.	Analysis	H, E&W	Health Status & Determinants	Child Parent	Global

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
47	Reed BA. Habicht JP. Niameogo C. **The effects of maternal education on child nutritional status depend on socio-environmental conditions.** International Journal of Epidemiology. 25(3):585-92, 1996 Jun.	Previous studies have shown an inconsistency in the association between maternal education and child nutritional status across socioeconomic levels. This may be because the beneficial effects of education are only significant when resources are sufficient but not abundant. This study tests these hypotheses.	NA	H, E&W, E	Health Determinants	Child	NA
48	Fair M. **The Canadian Birth Data Base: a new research tool to study reproductive outcomes** Health reports. 5(3):281-90, 1993	This describes an epidemiological tool to study reproductive outcome	Register – all live births	H, E	Health Status & Determinants	Infant Parent	Hospital
49	Victora CG. **Maternal education in relation to early and late child health outcomes: findings from a Brazilian cohort study** Social Science and Medicine 34(8):899-905, 1992 Apr	This describes the association found to exist between maternal education and a number of child health outcomes including PMR, IMR, height and weight.	Cohort study	H, E&W	Health Determinants	Infant Parent	Community
50	Walker LO. **Maternal identity and role attainment: long term relations to children's development** Nursing Research. 43(2):105-10, 1994 Mar-Apr.	Cohort study that examined the relationship between maternal role identity and later child outcomes including social competence.	Cohort / longitudinal study	H, E	Health Status & Determinants	Infant Parent	Hospital

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
6. Child							
51	Gissler M. Jarvelin MR. Louhiala P. Rahkonen O. Hemminki E. **Can children's health be predicted by perinatal health?** International Journal of Epidemiology. 28(2):276-80, 1999 Apr.	The purpose of this paper was to investigate how well children's health until age 7 years can be predicted by perinatal outcome using routine health registers.	Longitudinal	H, E&W, E	Health Status	Children up to 7 years	NA
52	Louhiala P. **Risk indicators of mental retardation: changes between 1967 and 1981.** Developmental Medicine & Child Neurology. 37(7):631-6, 1995 Jul.	The object of this case-control study was to investigate and analyse perinatal risk indicators of mental retardation.	Case-control	H	Health Status	Infant	NA
53	Najman JM. **Child developmental delay and socio-economic disadvantage in Australia – a longitudinal study.** Social Science and Medicine. 34(8):829-35, 1992 Apr	Relationship between socioeconomic status and child developmental delay.	Longitudinal study	H, E&W, E	Health Status & Determinants	Child Parent	Community
54	Kirby RS. **From public health to population health: epidemiological yardsticks for perinatal care.** Journal of Perinatology. 19(6 Pt 2):S16-20, 1999 Sep.	In this paper, the concept of "population health" is defined and operationalized for the broad perinatal healthcare context within the framework of population health informatics. Traditional indicators and outcome measures for perinatal health are compared with some newer measures and assessed for their relevance to population health.	Discussion / description	H	Health Status	Foetus Infant	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
55	Poduska JM. **Parent's perceptions of their first graders' need for mental health and educational services.** Journal of the American Academy of Child & Adolescent Psychiatry. 39(5):584-91, 2000 May.	The objectives of this study were to: (1) estimate the proportion of first graders perceived by their parents as needing mental health or educational services; (2) examine the validity of these perceptions; and (3) examine whether factors found to be associated with children's referral to or use of services are associated with parental perceptions	NA	H, E&W	Health Status & Determinants	Child	School
56	Gissler M. Keskimaki I. Teperi J. Jarvelin M. Hemminki E. **Regional equity in childhood health—register-based follow-up of the Finnish 1987 birth cohort.** Health & Place. 6(4):329-36, 2000 Dec.	The objective was to investigate regional health differences among Finnish children using a population-based longitudinal register data.	Longitudinal	H, E	Health Status & Determinants	Child	NA
57	Kohen DE. Soubhi H. Raina P. **Maternal reports of child injuries in Canada: trends and patterns by age and gender.** Injury Prevention. 6(3):223-8, 2000 Sep.	This study examines gender and age differences in maternal reports of injuries in a cross sectional group of children aged 0-11 years. The cause, nature, body part injured, and location of injury are explored, as are the associations with family socioeconomic indicators and associations with limitations in activities.	Data from Canadian NLSCY	H	Health Status & Determinants	Child	NA
58	Wise P. Chavkin W. Romero D. **Assessing the effects of welfare reform policies on reproductive and infant health.** American Journal of Public Health. 89(10):1514-21, 1999 Oct.	The welfare reform law of 1996 marked an historical moment in US policy toward the poor by ending the entitlement to cash assistance, by requiring work, and by establishing time limits. This article examines the potential impact on the health of women and children, the primary recipients of welfare benefits.	NA	H, E&W, E	Health Status & Determinants	Child	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
59	Mott JA. **Personal and family predictors of children's medically attended injuries that occurred in the home.** Injury Prevention. 5(3):189-93, 1999 Sep.	This study examined the independent contributions of demographic, behavioural and environmental antecedents of paediatric medically attended injuries that occurred in the home.	Retrospective cohort study	H, E&W, E	Health Status & Determinants	Child	NA
60	Daly JB. Wiggers JH. Considine RJ. **Infant exposure to environmental tobacco smoke: a prevalence study in Australia.** Australian & New Zealand Journal of Public Health. 25(2):132-7, 2001 Apr.	The objective of this study was to determine: the prevalence of exposure to environmental tobacco smoke among infants aged 0-12 months in two child health care settings; the accuracy of parent report indicators of exposure; and the factors associated with exposure to environmental tobacco smoke.	NA	H, E	Determinants	Infant	Clinic
61	Sack DA. Ahmed S. Razzaque A. Chakraborty J. Yunus M. **Improved indicators of infant mortality for integrated primary healthcare programmes.** Journal of Health, Population & Nutrition. 18(2):61-8, 2000 Sep.	The paper proposes new indicators of infant mortality, termed fertility-adjusted infant mortality ratio (FIMR), age-specific, fertility-adjusted IMR (AFIMR), and total infant mortality ratio (TIMR) that are more sensitive to rapid demographic changes.	NA	H	Health Status	Infant	NA
62	Whaley SE. Sigman M. Espinosa MP. Neumann CG. **Infant predictors of cognitive development in an undernourished Kenyan population.** Journal of Developmental & Behavioral Pediatrics. 19(3):169-77, 1998 Jun.	Assessments of infant sociability, motoric capacities and nutritional factors were performed to elucidate early influences on infant development in an undernourished Kenyan population.	Longitudinal	H, E&W	Health Status	Infant	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
63	Montgomery E. **Refugee children from the Middle East.** Scandinavian Journal of Social Medicine. Supplementum. 54:1-152, 1998.	This article maps the frequency (prevalence) of torture victims among parents in asylum seeking Middle Eastern refugee families, the occurrence (prevalence) of experiences of war and other forms of organised violence among the children in these families, and the occurrence (prevalence) of emotional symptoms and behavioural problems among the children. It also identifies risk indicators and modifying factors for anxiety symptoms among the children.	NA	H, E	Health Status & Determinants	Child Foetus	NA
64	Ladd GW. Cairns E. **Children: ethnic and political violence.** Child Development. 67(1):14-8, 1996 Feb.	Many indicators show that large numbers of children are directly or indirectly exposed to war, political repression, torture, and terrorism. There is growing evidence to suggest that children are at risk under these conditions, and that the consequences of growing up amid danger, chaos, and deprivation can be severe.	Descriptive	H, E	Health Determinants	NA	NA
65	Rahkonen O. Lahelma E. Huuhka M. **Past or present? Childhood living conditions and current socioeconomic status as determinants of adult health.** Social Science & Medicine. 44(3):327-36, 1997 Feb.	The aim was to study the associations of childhood living conditions, together with past and present socioeconomic status, with adult health among Finnish men and women. The data were derived from a Finnish nationwide interview Survey.	Survey	H, E&W, E	Health Determinants	Child Parent	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
66	Petrill SA. Thompson LA. Detterman DK. **The genetic and environmental variance underlying elementary cognitive tasks.** Behavior Genetics. 25(3):199-209, 1995 May	This study examined the genetic and environmental influences upon elementary cognitive tasks.	NA	H, E&W, E	Health Determinants	Child	NA
67	Ernst P. Demissie K.Joseph L. Locher U. Becklake MR. **Socioeconomic status and indicators of asthma in children.** American Journal of Respiratory & Critical Care Medicine. 152(2):570-5, 1995 Aug.	Differential access and utilization of medical care by the poor and rich may contribute to differences in asthma prevalence. This study looks at the relationship of socioeconomic status to various indicators of asthma in the Canadian context of universal access to medical care.	NA	H, E&W, E	Health Status & Determinants	Child	NA
68	Christoffel KK. Donovan M. Schofer J. Wills K. Lavigne JV. **Psychosocial factors in childhood pedestrian injury: a matched case-control study. Kid's'n'Cars Team.** Pediatrics. 97(1):33-42, 1996 Jan.	This study tests the hypothesis that psychosocial factors—such as hyperactivity and low family cohesion—contribute to the risk for child pedestrian injury (PI), even after controlling for known demographic risk factors.	Case-Control Study	H, E	Health Status & Determinants	Child	NA
69	Jackson C. Henriksen L. Dickinson D. Levine DW. **The early use of alcohol and tobacco: its relation to children's competence and parents' behavior.** American Journal of Public Health. 87(3):359-64, 1997 Mar.	Use of tobacco and alcohol during childhood predicts heavy use of these substances and use of illicit drugs during adolescence. This study aims to identify developmental correlates of tobacco and alcohol use among elementary-school children.	Cross-sectional survey	H, E	Health Determinants	Child	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
70	Dixit A. **Psychosocial development of urban children (below 2 years) using culture appropriate indicators of development.** Indian Pediatrics. 31(2):155-9, 1994 Feb.	This study looked at the nutritional status of 600 normal children using mid upper arm circumference and culture specific Basic Test Battery. This article was not able to be obtained in full text.	Cross sectional	H	Health Status	Child	Community
71	Dixit A. **Culture appropriate indicators for monitoring growth and development of urban and rural children.** Indian Pediatrics. 29(3): 291-9, 1992 Mar.	Nutritional status and culturally appropriate developmental assessment of 2000 children from urban and rural areas was examined. The authors developed a developmental tool for monitoring differences between urban and rural children. Income was a powerful predictor	Cross sectional	H	Health Status	Child	Community
72	Allen LH. **Functional indicators and outcomes of under-nutrition** Journal of Nutrition 120(8):924-32, 1990 Aug.	This describes the advantages and limitations of how undernutrition and hunger are identified in US children.	Discussion and review	H	Health Status	Child	NA
73	Lundberg O. **The impact of childhood living conditions on illness and mortality in adulthood.** Social Science and medicine. 36(8): 1047-52, 1993 Apr	The relationship between childhood indicators of economic and social hardship and adult mortality and illness is described – relationship between family conflict in childhood and adult morbidity was especially significant.	Longitudinal study	H, E	Health Determinants	Child	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
74	Bagley C. **The urban setting of juvenile pedestrian injuries: a study of behavioural ecology and social disadvantage.** Accident Analysis and Prevention. 24(6): 673-8, 1992 Dec	This research examines the relationship between pedestrian injuries, other indicators of behavioural problems (including juvenile delinquency) and social indicators which showed an association.	Secondary database analysis	H, E	Health Status & Determinants	Whole Population	Community
75	Bartley M. **Birthweight and later socioeconomic disadvantage: evidence from the 1958 British cohort study.** BMJ 309(6967):1475-8, 1994 Dec 3	Low birthweight associated with disadvantage on childhood and adolescence is described.	Longitudinal study	H, E	Health Status & Determinants	Child	Community
76	Pichoff BE. **Children at risk for accidental burns from hot tap water.** Texas Medicine. 90(11):54-8, 1994 Nov.	This studied the number of people with correct hot water temperature devices which regulate water temperature to less than 49°C.	Cross sectional household survey	H, E	Health Status	Whole Population	Military Establish-ments
77	Conrad KM. **Why children start smoking cigarettes: predictors of onset.** British Journal of Addiction. 87(12):1711-24, 1992 Dec.	This is a review of studies that have examined predictors of smoking.	Review	H	Health Determinants	Child	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
7. Social, Emotional and Behavioural Issues							
78	Squires JK. **Identifying social/emotional and behavioral problems in infants and toddlers.** Infant-Toddler Intervention: the Transdisciplinary Journal, 10(2):107-19, 2000 Jun.	Definitions of terms and issues involved in early identification of social/emotional competence in young children are presented in this article. Screening tools for identifying social/emotional difficulties in the birth to 3-year-old population and recommendations are made for effective early identification and intervention systems.	Discussion/ description	H	Health Status & Determinants	Child	NA
79	Terestman N. **Mood quality and intensity in nursery school children as predictors of behavior disorder.** American Journal of Orthopsychiatry. 50(1):125-38, 1980 Jan.	Findings based on ratings of mood quality and intensity of response, as temperamental attributes of preschool children, signalled emotional distress and identified children who required referral for clinical disorders within the subsequent five-year period. This suggests that negative mood and high intensity ratings may be effective indicators of children at risk.	NA	H	Health Status	Preschool children	NA
80	Sanson A. Oberklaid F. Pedlow R. Prior M. **Risk indicators: assessment of infancy predictors of pre-school behavioural maladjustment.** Journal of Child Psychology & Psychiatry & Allied Disciplines. 32(4):609-26, 1991 May.	Using data from a longitudinal study of a large representative sample of children, and a categorical approach to analysis, a set of infancy risk factors covering within-child, environmental and relationship variables was related to behavioural and emotional adjustment at 4-5 years.	Analysis / discussion	H, E&W, E	Health Status & Determinants	Children age 0-5 years	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
8. School, Readiness to Learn & Cognitive Development							
81	Cowen EL. **Relationships between retrospective parent reports of developmental milestones and school adjustment at ages 10 to 12 years.** Journal of the American Academy of Child and Adolescent Psychiatry. 33(3): 400-6, 1994 Mar-Apr.	Look at how retrospective parent reports of the child's achievement of early developmental milestones predicted later adaptation to stress and school adjustment in a highly stressed urban sample. Delayed early developmental milestones may be a risk factor for poorer school adjustment. Shows possible causal pathway.	Retrospective cohort	E&W, E	Health Status	Parent Child	Community
82	Berg I. **Absence from school and mental health.** British Journal of Psychiatry. 161:154-66, 1992 Aug.	This article addresses the relationship between school attendance and mental health.	Discussion	H, E&W, E	Health Determinants	Child	School
83	Hall JD. Bramlett RK. Barnett DW. Cox FW. **Classification of risk status in kindergarten screening: A comparison of alternative measures.** Journal of Psychoeducational Assessment. Vol 12(2) Jun 1994, 154-164. Psychoeducational Corp, US, www.people.memphis.edu/	This study examined the classification agreement associated with estimates of risk status across alternative measures for 92 kindergarten students and their caregivers. Educational risk was measured by the Developmental Indicators for the Assessment of Learning—Revised and Early Screening Profiles; family risk was measured by the Parenting Stress Index.	Analysis	E&W, E	Health Status & Determinants	Child Parent	Kindergarten

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
84	Blythe SG. **Early learning in the balance: priming the first ABC.** Support for Learning. Vol 15(4):154-158. 2000 Nov. Blackwell Publishers Ltd, England, poconnor@blackwellpublishers.co.uk	The author makes a case for an approach to learning in the early years that takes full account of children's "readiness" for the demands of formal schooling in terms of their neurological and physical development.	Discussion / Description	E&W, E	Health Status & Determinants	NA	NA
85	St Leger L. **Developing indicators to enhance school health.** Health Education Research. Vol 15(6):719-728. 2000 Dec. Oxford Univ Press, England, http://www.oup.co.uk	This paper discusses the development of indicators used to assess the processes and outcomes of school health promotion and education programs and initiatives.	Discussion	H, E&W, E	Health Status & Determinants	School Children	School
86	Havlinova M. Schneidrova D. **Stress characteristics in schoolchildren related to different educational strategies and school climates.** Central European Journal of Public Health. 3(4):205-9, 1995 Nov.	The goal of this paper is to verify the hypothesis that schools with different educational strategies and school climates, in the context of current diversification of educational system in the Czech Republic, have different impacts on the wellbeing and mental health of children. The following indicators of school stress were examined: general anxiety, school anxiety, emotional and psychosomatic balance, learning disabilities and behavioural disorders, type A behaviour, mental capacity, attitudes toward school, and social climate of a class as perceived by pupils.	NA	H, E&W, E	Health Determinants	School Children	School

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
87	Bennett N. **Annotation: Class Size and the Quality of Educational Outcomes.** Journal of Child Psychology & Psychiatry & Allied Disciplines. 39(6):797-804, 1998	This is a review of the evidence of the effects of class size on educational attainment. It concludes that there is reasonable grounds for believing that class sizes of 20 or less are more likely to result in higher achievement in the first years of schooling particularly among minority children. Certain factors need to be incorporated to achieve improved outcomes such as training for teachers to enable them to maximise the benefits of reduced pupil numbers.	Review	E&W	Health Determinant	School Children	School
88	Mendelsohn AL. Mogilner LN. Dreyer BP. Forman JA. Weinstein SC. Broderick M. Cheng KJ. Magloire T. Moore T. Napier C. **The impact of a clinic-based literacy intervention on language development in inner-city preschool children.** Pediatrics. 107(1):130-4, 2001 Jan.	This research aims to determine the effect of a clinic-based literacy intervention on the language development of preschool children. It used a literacy support program based on Reach Out and Read and measurement of success included parent-child reading activities and language development, and positive results were found.	Case-control study	E&W	Health Determinants	2-6 years	Medical clinic
89	High P. Hopman M. LaGasse L. Sege R. Moran J. Guiterrez C. Becker S. **Child-Centered Literacy Orientation: A Form of Social Capital?** Pediatrics. 103(4) Part 1of 2: 811	This describes the home literacy environment and identifies financial, human and social capital variables associated with the presence or lack of Child Centered Literacy Orientation (CCLO) in families with young children who regularly attend pediatric primary care facilities.	Cross-sectional case-control analysis	E&W	Health Determinants	1-5 years	Medical clinic

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
90	High PC. LaGasse L. Becker S. Ahlegre I. Gardner A. **Literacy Promotion in Primary Care Pediatrics: Can we make a difference?** Journal of the Ambulatory Pediatric Association: Clinical Care for Children. 105(4) Part 2 of 2:927-934, 2000 Apr.	This evaluates the effects of a literacy promoting intervention delivered by pediatric providers as part of well childcare on parent attitudes and behaviours and on child languages.	Randomised Controlled Trial	E&W	Health Determinants	5-11 months	Medical clinic
91	Blatchford P. Baines E. Kutnick P. Martin C. **Classroom contexts: connections between class size and within class grouping.** British Journal of Educational Psychology. 71 (Pt 2):283-302.	This examines associations between class size and within class groupings, in terms of size and number of groups and type of interaction between group members.	Analysis	E&W	Health Determinants	Year 2 and 5	School
92	Delgaudio W. Andrea M. **The unique and combined impact of health and caretaking risk factors on the school adjustment of urban first grade students.** Dissertation Abstracts International: Section B: the Sciences & Engineering. Vol 59(4-B), Oct 1998, 1882, US: Univ. Microfilms International.	The purpose of this study was to examine the relationships among risk factors and indicators of school adjustment for a population of first grade children. It aims to determine how aspects of child health and the caretaking environment related to school adjustment.	Analysis	E&W	Health Status & Determinants	School Children in First Grade	Urban School

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
93	Cowen EL. Lotyczewski BS. Weissberg RP. **Risk and resource indicators and their relationship to young children's school adjustment.** American Journal of Community Psychology. 12(3):353-67, 1984 Jun.	Relationships between risk-magnifying life situations and events, as well as resources, and school adjustment were explored in a large sample of first to fourth graders.	NA	E&W	Health Status & Determinants	School Children grades 1-4	School
94	Weisglas-Kuperus N. **Effects of Biological and social factors on the cognitive development of very low birth weight children.** Pediatrics. 92(5):658-65, 1993 Nov.	This reports the effects of biological and social factors on cognitive development of very low birth weight children. Children with less stimulating homes had poorer developmental outcomes regardless of biological effects after the age of 2. Before that, neurological effects were important.	Longitudinal-follow-up study	H, E&W, E		Child Family	Original hospital based high risk sample
9. Services & Interventions							
95	Jansson A. Isacsson A. Kornfalt R. Lindholm LH. **Quality in child healthcare: the views of mothers and public health nurses**. Scandinavian Journal of Caring Sciences, 12(4):195-204, 1998.	This assesses the views of mothers and public health nurses concerning a Child Health Promotion (CHP) programme and the first home visit to parents of newborn children as indicators of service quality. It lists some service quality indicators.	Survey	H, E	Health Determinants	Parent	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
96	Anonymous. **Early childcare and self-control, compliance, and problem behavior at twenty-four and thirty-six months. The NICHD Early Childcare Research Network.** Child Development. 69(4):1145-70, 1998 Aug.	To evaluate child-care effects on young children's self-control, compliance, and problem behavior, children enrolled in the NICHD Study of Early Childcare were tested and observed in the laboratory and in childcare at 24 and 36 months, and mothers and caregivers completed questionnaires. Indicators of child-care quantity, quality, stability, type, and age of entry, along with measures of family background, mothering, and child characteristics obtained through the first 3 years of life were used to predict 2 and 3 year child functioning.	Observation/ Questionnaire	H, E	Health Determinants	Child Parent Caregiver	Child-care
97	Bobadilla JL. **Evaluation of maternal health programs: approaches, methods and indicators.** International Journal of Gynaecology & Obstetrics. 38 Suppl:S67-73, 1992 Jun.	This describes how assessment of the success of a maternal health program includes assessing the dimensions of coverage, equity, quality, women's satisfaction, efficiency and cost-effectiveness. Various methods are described, including randomized clinical trials, randomized community trials, before and after studies, and observational studies, including the case-control approach and confidential inquiries into maternal deaths. Indicators to assess effectiveness of a maternal health program are also described.	Discussion/ description	H, E	Health Status & Determinants	NA	Maternal and Child Health Services
98	Barth RP. Hacking S. Ash JR. **Preventing child abuse: an experimental evaluation of the Child Parent Enrichment Project.** Journal of Primary Prevention. Vol 8(4):201-217. Sum 1988, Kluwer Academic /Plenum Publishers, US, www.wkap.NL/kaphtml.htm/JSORDINF	This describes an experimental evaluation of the Child Parent Enrichment Project. Analysis showed an advantage for the CPEP group in prenatal care, birth outcomes, better reports of child temperament, and better indicators of child welfare. CPEP mothers also tended to report better wellbeing.	Experimental evaluation	H, E	Health Status & Determinants	Infant Parent	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
99	Deater-Deckard K. Pinkerton R. Scarr S. **Childcare quality and children's behavioral adjustment: a four-year longitudinal study.** Journal of Child Psychology & Psychiatry & Allied Disciplines. 37(8):937-48, 1996 Nov.	This study explored the prediction of children's behavioral adjustment 4 years after assessments of daycare centre quality (e.g. caregiver-child interactions, caregiver-to-child ratios) and of the home and family environment (e.g. parental stress, discipline).	NA	H, E	Health Determinants	Child	Preschool
100	Reading R. **Measurement of social inequalities in health and use of health services among children in Northumberland.** Archives of Disease in Childhood. 68(5):626-31, 1993 May.	This reports a cross sectional analysis of school age children looking at social inequalities and a number of child health indicators. It discusses birth to teenage mothers, immunisation rate and mean height.	Population survey	H, E	Health Status	School Children	School
101	Cassady CE. Orth DA. Guyer B. Goggin ML. **Measuring the implementation of injury prevention programs in state health agencies.** Injury Prevention, 3(2):94-9, 1997 Jun.	The objective of this study was to identify the variables that influence the successful implementation of injury prevention programs	Discussion, description and analysis.	H,	Health Status & Determinants	General	NA
102	Grossman LK. Humbert AJ. Powell M. **Continuity of care between obstetrical and pediatric preventive care: indicators of nonattendance at the first well-child appointment.** Clinical Pediatrics. 35(11):563-9, 1996 Nov.	This study evaluates appointment behavior for first well-child visits for first-born children and identifies factors that target infants at increased likelihood for missing their first pediatric appointment.	Survey	H, E&W, E	Health Determinants	Infant Mother	Medical clinic

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
103	St Pierre RG. Layzer JI. **Using home visits for multiple purposes: the Comprehensive Child Development Program.** Future of Children. 9(1):134-51, 1999 Spring-Summer.	This article describes the Comprehensive Child Development Program (CCDP) program and reviews the results of the program evaluation. Assesses positive short- and long-term effects across a variety of child and parent wellbeing indicators.	Evaluation of 21 project sites and 4,410 families followed over five years.	H, E&W, E	Health Status & Determinants.	Child Parent Family	NA
10. The Environment							
104	McDonald TL. Treser CD. Hatlen JB. **Development of an environmental health addendum to the Assessment Protocol for Excellence in Public Health.** Journal of Public Health Policy. 15(2):203-17, 1994 Summer.	This discusses the process used to develop an environmental health addendum to the Assessment Protocol for Public Health (US).	Discussion	E	Health Status & Determinants	Community	Community
105	Cheadle A. Wagner E. Koepsell T. Kristal A. Patrick D. **Environmental indicators: a tool for evaluating community-based health-promotion programs.** American Journal of Preventive Medicine. 8(6):345-50, 1992 Nov-Dec.	This proposes using a class of community-level measures -environmental indicators -as part of the evaluation of community-based health-promotion programs.	Discussion/ description	E	Health Determinants	Community	Community
106	Briggs DJ. Field K. **Informing environmental health policy in urban areas: the HEADLAMP approach.** Reviews on Environmental Health. 15(1-2):169-86, 2000 Jan-Jun.	Describes the HEADLAMP approach which is designed to improve decision-making by providing indicators, based on sound science, to all relevant stakeholders, in an appropriate and usable form.	Descriptive	E	Health Determinants	General	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
107	Takano T. Nakamura K. **An analysis of health levels and various indicators of urban environments for Healthy Cities projects.** Journal of Epidemiology & Community Health. 55(4):263-70, 2001 Apr.	This identifies and categorises the various city indicators that are related to health levels. It demonstrates the extent of the influence on health of these categorised health determinants, and demonstrates both the interactive associations among the health determinants and the magnitude of influence of each health determinant on the people's health.	Descriptive	E	Health Determinants	Urban populations	Urban
108	Spiegel J. Yassi A. **The use of health indicators in environmental assessment.** Journal of Medical Systems. 21(5):275-89, 1997 Oct.	This paper presents the framework that is being developed by the World Health Organization (WHO) for addressing environmental health indicators, reports on findings of workshops in this area and examines the role of health professionals in environmental assessment in Canada. It presents a case study illustrating how human health has been addressed in a prominent EA conducted in northern Saskatchewan.	Discussion / description	E	Health Determinants	General	NA
109	Anonymous. **OECD/WHO-ECEH Workshop on Environmental and Environmental Health Information to support National Environmental Action Programmes (NEAP) and National Environmental Health Action Plans (NEHAPS): using data and indicators. Budapest, 22 and 23 May 1997.** International Journal of Occupational Medicine & Environmental Health. 11(3):273-8, 1998.	Neither abstract nor full text available.	NA	E	Health Determinants	NA	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
110	Gosselin P. Belanger D. Bibeault JF. Webster A. **Indicators for a sustainable society.** Canadian Journal of Public Health. Revue Canadienne de Sante Publique. 84(3):197-200, 1993 May-Jun.	This study presents a set of 20 indicators that could be suitable for monitoring the progress of our society on the path to sustainable development.	NA	E	Health Determinants	General	NA
111	De Kruijf HA. Van Vuuren DP. **Following sustainable development in relation to the north-south dialogue: ecosystem health and sustainability indicators.** Ecotoxicology & Environmental Safety. 40(1-2):4-14, 1998.	This discusses new tools for management in relation to sustainability (such as indicators), a major aspect of which is integrated attention to economic and sociocultural influences together with environmental issues.	NA	E	Health Determinants	General	NA
112	Briggs CM. Cutright P. **Structural and cultural determinants of child homicide: a cross-national analysis.** Violence & Victims. 9(1):3-16, 1994 Spring.	Models of structural characteristics that may influence national infant and child homicide victim rates are derived from prior research. Indicators of family stress/resources, female status and the culture of violence are discussed.	Statistical analysis	E	Health Determinants	Whole Population	NA
113	Pless-Mulloli T. Dunn CE. Bhopal R. Phillimore P. Moffatt S. Edwards J. **Is it feasible to construct a community profile of exposure to industrial air pollution?** Occupational & Environmental Medicine. 57(8):542-9, 2000 Aug.	This reports on an epidemiological investigation to assess the validity of residential proximity to industry as a measure of community exposure.	NA	E	Health Determinant	General	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
114	Eyles JD. **Health, environmental assessments and population health: tools for a complex process.** Canadian Journal of Public Health. Revue Canadienne de Sante Publique. 90 Suppl 1:S31-4, 1999 Nov-Dec.	Place is more than physical and natural environment. The role of biophysical environment has still to be articulated in population health discourse and its relations with human health are fraught with scientific uncertainty and dissension. The goal must be to add health to the process, yet the relevant features to include are complex.	Discussion	E	Health Determinants	NA	NA
115	Pastides H. **An epidemiological perspective on environmental health indicators.** World Health Statistics Quarterly – Rapport Trimestriel de Statistiques Sanitaires Mondiales. 48(2):140-3, 1995.	This article provides a framework for relating environmental health indicators to the methods of epidemiology including some guidance for selecting and evaluating the appropriateness of proposed environmental health indicators.	Discussion	E	Health Determinants	NA	NA
116	Young TK. Mollins CJ. **The impact of housing on health: an ecologic study from the Canadian Arctic.** Arctic Medical Research. 55(2):52-61, 1996 Apr.	An ecologic study was conducted to investigate the association between housing and health in 49 predominantly Native communities in the Northwest Territories (NWT) in the Canadian Arctic, making use of data from a housing survey and data relating to physical and social health routinely reported to various service delivery agencies.	Analysis	E	Health Determinants	NA	NA
117	Metzger R. Delgado JL. Herrell R. **Environmental health and Hispanic children.** Environmental Health Perspectives. 103 Suppl 6:25-32, 1995 Sep.	Ambient air pollution, worker exposure to chemicals, indoor air pollution, and drinking water quality are among the top four threats to human health and are all areas in which indicators point to elevated risk for Hispanic populations. Hispanic environmental health risk is discussed in this article.	Discussion	E	Health Determinant	NA	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
118	Cheadle A. **Environmental indicators: a tool for evaluating community based health promotion programs.** American Journal of Preventive Medicine. 8(6):435-50, 1992 Nov-Dec.	Proposes a set of community level measures to evaluate community based health promotion programs (Environmental indicators)	Discussion	E	Health Determinants	Community	Community
11. Community/Neighbourhood							
119	Runyan DK. Hunter WM. Socolar RR. Amaya-Jackson L. English D. Landsverk J. Dubowitz H. Browne DH. Bangdiwala SI. Mathew RM. **Children who prosper in unfavorable environments: the relationship to social capital.** Pediatrics. 101(1 Pt 1):12-8, 1998 Jan.	Examines the extent to which social capital is associated with positive developmental and behavioral outcomes in high-risk preschool children.	A cross-sectional case-control analysis	E	Health Determinants	Child Parent Community	Community
120	Garbarino J. Kostelny K. **Child maltreatment as a community problem.** Child Abuse & Neglect. 16(4):455-64, 1992 Jul-Aug.	This report reviews research on the community dimensions of child maltreatment and presents a study conducted in the United States designed to illuminate further the importance of social environmental effects on family functioning.	NA	E	Health Determinants	Community	Community
121	Coulton CJ. Korbin JE. Su M. Chow J. **Community level factors and child maltreatment rates.** Child Development. 66(5):1262-76, 1995 Oct.	Using census and administrative agency data for 177 urban census tracts, variation in rates of officially reported child maltreatment is found to be related to structural determinants of community social organization.	Analysis of existing data	E	Health Status & Determinants	Child Community	Community

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
122	Kline FM. **The influence of the community on a student's academic performance.** Child & Adolescent Psychiatric Clinics of North America. Vol 6(3):607-620. 1997 Jul.	This paper examines the impact of community, defined as life in association with others, on individual achievement, particularly those factors of communal life which make an individual more susceptible to academic failure. Key definitions and specific indicators often cited in the literature are presented.	Analysis	E	Health Determinants	NA	NA
123	Luthar SS. Cushing G. **Neighbourhood influences and child development: a prospective study of substance abusers' offspring.** Development & Psychopathology. 11(4):763-84, 1999 Fall.	Psychopathology and competence among drug abusers' offspring were examined in relation to characteristics of their neighbourhoods.	Prospective Cohort	E	Health Determinants	Child	Neighbour-hoods
124	Roberts EM. **Neighbourhood social environments and the distribution of low birthweight in Chicago.** American Journal of Public Health. 87(4):597-603, 1997 Apr.	This study examined the socioeconomic precursors of disparities in maternal health by measuring the associations of nine neighbourhood-level indicators of social phenomena with low infant birthweight.	NA	E	Health Status & Determinants	Infant Parent	NA
125	Harris E. Wills J. **Developing healthy local communities at local government level: lessons from the past decade.** Australian & New Zealand Journal of Public Health. 21(4 Spec No):403-12, 1997.	This paper outlines four approaches by the health sector to developing healthy communities based on local government areas in Australia in the past decade—Healthy Cities, the Healthy Localities project, municipal health plans, as well as programs to address specific health problems or issues.	Descriptive	E	NA	NA	Local Governments

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
126	Berman Y. Phillips D. **Indicators of social quality and social exclusion at national and community level.** Social Indicators Research. Vol 50(3) Apr 2000, 329-350. www.wkap.nl	This explores the domains and indicators of social inclusion and exclusion and their interaction at national and community level, within the context of the social quality construct and the notions of Demos and Ethnos.	Discussion	E	Health Determinants	NA	NA
127	Kawachi I. Kennedy BP. Wilkinson RG. **Crime: social disorganization and relative deprivation.** Social Science & Medicine. 48(6):719-31, 1999 Mar.	The purpose of this paper is to present a conceptual framework for investigating the influence of the social context on community health, using crime as the indicator of collective wellbeing.	Analysis of data on crimes	E	Health Determinants	Adult	NA
128	Schulz A. Williams D. Israel B. Becker A. Parker E. James SA. Jackson J. **Unfair treatment, neighbourhood effects, and mental health in the Detroit metropolitan area.** Journal of Health & Social Behavior. 41(3):314-32, 2000 Sep.	This paper proposes that mental and emotional wellbeing are influenced by aspects of the social context, including experiences of unfair treatment and the concentration of households with incomes below the poverty level. It also proposes that differential exposure to these factors influences racial differences in mental wellbeing.	Analysis / Survey	E	Health Status & Determinants	Adult	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
129	Yen I. Kaplan GA. **Neighbourhood Social Environment and Risk of Death: Multilevel Evidence from the Alameda County Study.** American Journal of Epidemiology. 149(10):898-907, 1999.	The authors examined the effect of overall neighbourhood social environment on 11-year risk of death. Mortality risks were significantly higher in neighbourhoods with a low social environment, even after account was taken of individual income level, education, race/ethnicity, perceived health status, smoking status, body mass index, and alcohol consumption.	Analysis of mortality data and neighbour-hood social environment	H, E	Health Determinants	Adult	Community
12. Other (including quality of life, poverty, mental illness, intellectual disability)							
130	Diener E. Suh E. **Measuring quality of life: Economic, social, and subjective indicators.** Social Indicators Research. Vol 40(1-2) 1997, 189-216. www.wkap.nl	In this paper, the authors discuss the following approaches to defining and measuring quality of life: social indicators such as health and levels of crime, subjective wellbeing measures (assessing people's evaluative reactions to their lives and societies), and economic indices.	Discussion	H, E&W, E	Health Determinants	NA	NA
131	Gwatkin DR. **Health inequalities and the health of the poor: what do we know? what can we do?** Bulletin of the World Health Organization. 78(1):3-18, 2000.	This presents the initial findings from a new generation of research that has been undertaken in response to renewed concern for health inequalities.	Review	NA	NA	NA	NA
132	Olin SC. Mednick SA. **Risk factors of psychosis: identifying vulnerable populations premorbidly.** Schizophrenia Bulletin. 22(2):223-40, 1996	This article reviews premorbid indicators of psychosis that may be relevant to primary intervention.	Review	H	Health Status	Child	NA

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
133	Judge K. Mulligan JA. Benzeval M. **Income inequality and population health.** Social Science & Medicine. 46(4-5):567-79, 1998 Feb-Mar.	This paper aims to systematically review the evidence about the relationship between different measures of income distribution and indicators of population health.	Review	H, E	Health Determinants	NA	NA
134	Felce D. Perry J. **Quality of life: its definition and measurement.** Research in Developmental Disabilities. 16(1):51-74, 1995 Jan-Feb.	A model of quality of life is proposed that integrates objective and subjective indicators, a broad range of life domains, and individual values.	NA	H, E	Health Status	NA	NA
135	Guildea ZE. Fone DL. Dunstan FD. Sibert JR. Cartlidge PH. **Social deprivation and the causes of stillbirth and infant mortality.** Archives of Disease in Childhood. 84(4):307-10, 2001 Apr.	This paper investigates the relation between social deprivation and causes of stillbirth and infant mortality.	Analysis	H, E	Health Status	Infant	NA
136	Ellwood RP. O'Mullane DM. **Identification of areas with high levels of untreated dental caries.** Community Dentistry & Oral Epidemiology. 24(1):1-6, 1996 Feb.	The associations between three demographic indicators, based on census data, and dental health outcomes were assessed for electoral wards within county districts. Using the data derived from the five most easterly county districts, the three indicators were assessed.	Analysis	H, E	Health Status & Determinants	Child	Dentist

	Paper	Description of article	Type of Article / Study	Indicator Domain	Health Status/ Determinants	Population	Setting
137	Najman J. **Socioeconomic disadvantage and child morbidity: an Australian Longitudinal Study.** Social science and medicine. 36(8): 1053-61, 1993 Apr.	Results from the QLD Mater study are presented. Presents a standard set of indicators using maternal reports on children's health.	Longitudinal Study	H, E	Health Status	Child Parent	Hospital
138	Hogan DP. Rogers ML. Msall ME. **Functional limitations and key indicators of wellbeing in children with disability.** Archives of Pediatrics & Adolescent Medicine, 154(10):1042-8, 2000 Oct.	Abstract not available.	NA	H	Health Status & Determinants	Disabled Children	NA
139	Neff EJA. Dale JC. **Assessment of quality of life in school-aged children: a method -- phase I.** Maternal-Child Nursing Journal, 19(4 Ninth Matern Child Nurs Conf Proc Part 3):313-20, 1990 Winter.	Part one of a programme of research directed toward the assessment of the Quality of Life (QOL) in chronically ill school-aged children is discussed. It describes empirically derived QOL indicators of specific value to school-aged children.	NA	H	Health Status & Determinants	Children age 4 -12 years with a chronic illness	School

Appendix 4. Established Programs for Child Health, Development and Wellbeing

There is very clear evidence that good early child development programs that involve parents or other primary care givers of young children can impact upon how they interact with and care for children at home and can vastly improve outcomes for children's learning, behaviour and health later in life.[31] It is thought that the earlier these programs are begun the better the outcome.[31] Chronology and history of evolution of programs:

The Perry Preschool Project

The Perry Preschool Project involved a randomised trial in which families were allocated to either an intensive pre-school program or to a control group with no extra support.[4] A twenty year follow up demonstrated strong and lasting positive effects for the intervention group including an increased likelihood of completing secondary school, increased likelihood of employment, avoidance of teenage pregnancy and of a criminal record.[4] It also concluded that economic benefits accompanied these positive outcomes with regard to reduced costs in the areas of welfare and the criminal justice system.[4] Another valuable finding was that the best results were obtained when home visits were included in the program and mothers were taught how to engage in pre-school education with their children through structured play.[4]

Head Start

The Head Start program was commenced in 1965 in the United States and provides comprehensive early child development services to low-income children from birth to five, pregnant women, their families (About Head Start) and communities (Evaluating Head Start). It does this by providing preschool-aged children with education, nutritious meals, and access to health, mental health and social services that support their early development (Evaluating Head Start). The program is guided by the following principles:

- A comprehensive, interdisciplinary approach to services is utilised including education, health, nutrition, social services and parent involvement.
- A family centred approach is utilised and the program is designed to encourage and support the parent's role as the principle influence on the child, with the roles of primary educator, nurturer and advocate.
- Programs are intended to be community-based so that specific models of service provision deriving out of the needs of diverse communities can be utilised (Evaluating Head Start).

The range of Head Start services are tailored to each child's and family's developmental, ethnic, cultural and linguistic heritage and experience (About Head Start).

Indicators for program outcomes from Head Start's second progress report (1998) include:

- Head Start children's emergent literacy
- Head Start children's Language skills
- Head Start children's numerical skills
- Head Start children's general memory, reasoning and problem solving
- Head Start children's musical ability and creativity
- Head Start children's gross and fine motor skills
- Head Start children's initiative and attitudes towards learning
- Head Start children's task mastery
- Head Start children's positive social behaviour and behaviour problems
- Head Start children's social interaction with peers
- The extent to which Head Start children experience normal height and weight growth rates
- Head Start children's home environment safety
- Head Start children's learning environment in the home
- Head Start parents' limit setting and disciplinary methods
- Head Start parents' sense of control over their own lives
- Head Start parents' depression
- Head Start parents' social support networks
- Head Start parents' receipt of needed employment, job training, education and literacy services
- Of the total number of paid staff or volunteers, the number and percent who are current or former Head Start parents
- The number and percent of head start children who received needed dental services
- The number and percent of head start children who received needed mental health services
- The number and percent of head start children who received needed immunisations
- The number and percent of head start children who received meals and snacks meeting nutritional needs

Measurement of how well Head Start serves children with disabilities:

a) Number and percent with Individualized Education Plans (IEP's)
b) Number and percent receiving services in their IEP's
c) Number and percent fully engaged in program activities

Percent of Head Start Parents who are able to better meet the special needs of their children's disabilities because of Head Start

A range of specific measurement of cognitive and literacy skills:

- gross and fine motor skills
- social and emotional behaviour assessment results
- physical health measures such as height and weight
- various parent related measures, and
- program implementation measures, for example measures to assess program links with other services (Head Start program performance measures).

A review of various programs noted that Head Start has diverse components and has proved difficult to assess, but evidence from Head Start programs supports the conclusion that good preschool programs that involve parents improve children's outcomes.[31]

Early Head Start

Early Head Start grew out of recommendations of the 1993 Advisory Committee on Head Start Quality and Expansion and the 1994 advisory Committee on Services for families with Infants and Toddlers. It began in 1995 and serves families on low incomes with toddlers and infants and during pregnancy. The goal of Early Head Start is to provide intensive and comprehensive services from before birth and continuing through the first three years to improve the child's development with regards to health, resilience, social competence, cognition and language. The program emphasised family support and involvement for promoting child development. It also emphasises staff development and community resources.[4]

Evaluation of the program has found that by 2 years of age Early Head start children were functioning significantly better than non-Early Head Start peers across a range of cognitive, language and social-emotional development measures.[137]

The Early Years Study

Many of the principles of this review were highlighted in the Early Years Study of children's health in Ontario. For example, the principle of promoting children's readiness to learn prior to entry into formal schooling.[31] This study highlighted the importance of nurturing by parents and its long lasting effect on children's ability to learn.[31] Following on from this, a number of school-aged performance measures are very sensitive to children's readiness to learn in preschool.[31]

The Early Years Study also highlighted that the conditions of early childhood are "at the core of mathematics skills and language development."[31] It also highlighted the importance of parental involvement in early childhood development programs.[31] Most importantly, the study concluded that good early child development programs and parenting are able to improve children's chances of developing to their full potential. The study also endorsed the use of a community-based approach to programs.[31]

Sure Start

Sure Start is a nation wide program in the United Kingdom that commenced in 1999 in response to growing concern about the effects of children growing up in disadvantaged circumstances.[11] It is concerned with removing are-based disadvantage and enhancing community development.[4] It has involved the development of improved and coordinated local services for families that are owned by local communities so that children will be able to thrive when they enter primary school.[4] The thinking behind Sue Start is similar to Head Start (ie an emphasis on early childhood education and children growing up in disadvantage). A third strand of thinking is that arising out of more European-based concerns with social exclusion.[4] Social exclusion is the result of disadvantage which leads to the dynamic interaction of poverty, poor education and inadequate services which mutually reinforce one another resulting in barriers to normal development.[4] It has been argued that reversing the social exclusion process requires new ways of providing social support, health education and welfare services.[4]

The aim of the Sure Start program from the UK is as follows:

> "To work with parents-to-be, parents and children to promote the physical, intellectual and social development of babies and young children – particularly those who are disadvantaged – so that they can flourish at home and when they get to school, and thereby break the cycle of disadvantage for the current generation of young people."[11]

The objectives of Sure Start are as follows:

- Improving social and emotional development
- Improving health
- Improving children's ability to learn
- Strengthening families and communities

which are consistent with a social model of health.

Appendix 5. Models of Health

The Western Biomedical Model

The Western medical perspective explains illness, and therefore by implication health, by reference to processes inside the body which manifest as physical or mental signs (ie symptoms).[40] Treatment is concerned with diagnosis through clinical investigation and prescribing remedies such as drugs, surgery or talk that will alleviate the afore-mentioned signs.[40] This approach is generally regarded as scientific.[40]

When health and illness are conceptualised in this way, the cause of illness is seen as coming from within the biological system.[40] However, already mentioned, it is becoming increasingly accepted that there are other influences that play a vital role in the health and wellbeing of individuals and populations.

It follows that whilst Western medical approaches to health are effective in treating certain conditions at the individual level, the health care systems that have evolved out of this model are insufficient to produce healthy communities in their own right. This view is increasingly supported.[40]

A Behavioural Model of Health

A behavioural model of health grew out of the realisation that certain behaviours can profoundly effect individual health. The emphasis in this model of health in terms of intervention is on encouragement and support for changing individual behaviour. An obvious example of a behavioural approach to the management of coronary heart disease would include advice about changes in diet, increased exercise and smoking cessation as required. Over time using this approach, it became clear that changing individual behaviour is extremely difficult. Some success is possible but it has become increasingly apparent that environmental factors contribute to development of certain behaviours, as well as contributing to health status in other ways.

An Ecological Model of Health

It appears from the literature that what has been called an ecological model of health encompasses a social model of health. This model makes the assumption that health and wellbeing are affected by the interaction of biology, behaviour and the environment.[233] It also assumes that age, gender, race, ethnicity and socioeconomic variations shape the context in which individuals live and therefore directly and indirectly influence health risks and resources.[233] This approach suggests that intervention should be at the individual level or

downstream (eg concerning physiological functions and life-style factors), the community-level or midstream (eg population based strategies) and societal level or upstream (eg public policies). In support of population programs, evidence is emerging that societal level phenomena are very important determinants of health.[233] It has been stated that greater attention must be given to upstream interventions, as individual interventions (as implemented under the biomedical model) do not address the broader social and economic forces that influence risk factors that are related to these societal factors.[233]

A benefit of using this approach is that there is often a patterned consistency of disease rates amongst certain social groups, which assists in looking at the importance of social and environmental factors in disease aetiology. In identifying and/or developing intervention programs to prevent or control disease, this information is invaluable.[233]

There is impressive evidence that an environmental approach to health and illness that arrises from using such a model works.[233] It has been argued that much of the decrease in incidence of fatal infectious diseases in the developed world is primarily due to improvements in hygiene and increases in standards of living,[233] and that the marked reduction in mortality from motor vehicle accidents in the last 50 years is mainly the result of better designed cars, safer roads and changes in social norms regarding seat belt use and alcohol consumption.

Appendix 6. Child-reported indicators of what constitutes a good place to grow up

Social Integration - Young people feel at home in the community and interact with age groups outside of their own in public and semi-public places. They have a sense of being valued and of belonging. There are a variety of places for children's people's activities, including: places to meet people, talk or play games; places for sport; local shops for snacks and other goods; places to be alone or away from continuous adult supervision; and action to observe on the street or in other public places.

Safety and freedom of movement - There is a feeling of safety, even in areas where crime is present, because young people are familiar with the local area and usually under the protective eyes of adults. Because there is a sense of safety young people are able to move about freely to meet friends and find stimulating things to do.

Peer gathering places - Young people are able to claim spaces as their own such as corners and niches in the community, where they can play and socialise - for example a street corner, a place in a local park, plaza, coffee shop or store, a playing field, a community center or a vacant lot.

Green areas - No matter how limited (even if a single tree), green areas are accessible to young people, including sports playing fields, tree-shaded parks and "safe, overgrown 'wild' areas.[24,11]

Appendix 7. The US National Centre on Educational Outcomes (NCEO) Model of Indicators.

Introduction to the NCEO Model

The process of defining appropriate children's outcomes and indicators for use in State Strengthening projects led the National Outcome Work Group for Children through a review of models that might provide a theoretical foundation for the group's work. After significant review and discussion, efforts focused on a model published by the NCEO,[234] which was designed with public education and special education settings in mind. The Children's Work Group concluded that the NCEO model mapped well onto a broader child development research literature base and was applicable to a wide range of programs seeking to improve outcomes for children, with minimal adaptation. Members of the Work Group proposed an adaptation of the NCEO model for use in more informal community-based program settings,[235] and the group has continued to refine the indicators for use in designing and evaluating CYFAR and State Strengthening Projects. Senior staff of the NCEO graciously agreed to review applications of the model by the Children's Work Group and provided permission to reproduce parts of the model for this website.

The NCEO model was the result of a two year development process under the leadership of James Ysseldyke and Martha Thurlow at the University of Minnesota. The process began with identification of five alternative approaches to child outcomes: an educational model, a sociological model, a political/pragmatic model, a psychological model, and a developmental model. The general model, with eight domains of child outcomes and related indicators, emerged from a consensus-building process that included state departments of education, federal agencies, professional associations, parents and advocacy groups.[234]

In subsequent reports, the NCEO applied the conceptual model and outcome domains to different age and grade levels, with adjustments for the age and developmental level of the child.[236-239] On this website, the Children's Work Group considers each outcome domain separately with appropriate literature review and discussion of indicators and measures.

In the conceptual model, **Resources** (both human and financial) are used to provide a **Learning Opportunity and Process** (any educational or other program intervention process that results in change in any of eight **Outcome Domains**).

The Outcome Domains identified are:

1) Presence & Participation,
2) Family Involvement / Accommodation & Adaptation,
3) Physical Health,
4) Responsibility & Independence,
5) Contribution & Citizenship,
6) Academic & Functional Literacy,
7) Personal & Social Adjustment, and
8) Satisfaction.

For each domain, the NCEO model specifies several outcome components, indicators of achievement, and suggested data sources. **Indicators** are defined as symbolic representations of one or more outcomes, which can be used in making comparisons.[239] Indicators, then, are those statistics that are derived from assessments of children with respect to a particular outcome. The NCEO model (as adapted for community-based programs) divides outcomes into two types: **educational or program outcomes** which are the result of interactions between individuals and school or program experiences; and **enabling outcomes** which are the result of interactions between individuals and life experiences that provide them with the opportunity to attain educational or program outcomes.[234] The first two outcome domains listed, (Presence & Participation and Family Involvement/Accommodation & Adaptation), are enabling outcomes because they enable the participant to reach educational or program outcomes. However, they are listed as separate outcome domains because they need to be measured as part of a meaningful evaluation.

A schematic diagram of the model elements (Domains, Outcomes, Indicators, and Data Sources) follows. Though a diagram can hardly do justice to the model and the extensive process involved in developing it, it does allow a quick overview of the ways outcomes are defined in eight major areas, and of the ways indicators for the outcomes are proposed. The indicators for each domain have required some adaptation for informal and community programs such as State Strengthening projects, and these modifications are considered as part of in-depth discussions of each domain area elsewhere on this website.

NCEO Model

Key Outcome Domains and Outcome Components in the NCEO Model:

PRESENCE AND PARTICIPATION

Outcome Domain:

- Is enrolled for the school, program, or activity experience
- Participates actively in planned school or program activities
- Attends school or program regularly and completes the program

FAMILY INVOLVEMENT / ACCOMMODATION AND ADAPTATION

Outcome Domain:

- Demonstrates involvement and support for child's needs
- Has access to resources to support child
- Makes adaptations, accommodations, or compensations necessary to achieve outcomes in each of the major domains

PHYSICAL HEALTH

Outcome Domain:

- Demonstrates age-appropriate physical development
- Has access to basic health care
- Is aware of basic safety and health care needs
- Is physically fit

RESPONSIBILITY AND INDEPENDENCE

Outcome Domain:

- Demonstrates age-appropriate independence
- Gets about in the environment
- Demonstrates age-appropriate responsibility for self

CONTRIBUTION AND CITIZENSHIP

Outcome Domain:

- Complies with rules, limits, and routines
- Volunteers for age-appropriate tasks at home, school, and in the community

ACADEMIC AND FUNCTIONAL LITERACY

Outcome Domain:

- Demonstrates competence in communication
- Demonstrates competence in problem-solving
- Demonstrates competence in pre-academic and academic skills
- Demonstrates competence in using technology

PERSONAL AND SOCIAL ADJUSTMENT

Outcome Domain:

- Copes effectively with personal challenges, frustrations, and stressors
- Has a good self image
- Respects cultural and individual differences
- Gets along with other people

SATISFACTION

Outcome Domain:

- Parent/guardian satisfaction with the program services that children receive
- Community satisfaction with the program services that children receive
- Child satisfaction with program experience

Appendix 8. Summary of Evidence and Indicators Table

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
HEALTH				
Parental health and wellbeing				
General health & wellbeing	✓	✓	✓	✓
Antenatal care	✓	×	✓	✓
Adolescent births	✓	×	✓	✓
Smoking, alcohol and other drugs				
Children exposed to passive smoking	✓	✓	✓	✓
Proportion of pregnant women who smoke	✓	✓	✓	✓
Population Smoking rate	✓	×	✓	✓
Alcohol use	✓	×	✓	✓
Drug abuse	×	×	✓	×
Overall population substance use	×	×	✓	✓
Parental substance abuse	✓	✓	✓	×
Parental alcohol abuse	✓	✓	✓	×
Illicit drug use	✓	×	✓	✓
Binge Drinking	×	×	✓	✓
Teen smoking	×	×	✓	✓
Teen drinking	×	×	✓	✓
Food and Nutrition				
Food security	✓	×	✓	✓
Diet quality	✓	×	✓	✓
Overweight and Obesity	✓	×	✓	✓
Weight Status	✓	×	×	✓
Frequency of eating breakfast	✓	×	×	✓
Breastfeeding	✓	✓	✓	✓

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
Play and recreation				
Participation in play and recreation	✓	✓	✓	✓
Physical activity	×	×	✓	×
Childcare quality	✓	×	✓	×
Television viewing	×	×	✓	×
Toy library in local area	×	×	×	×
Child Welfare				
Recurrence of abuse	×	×	✓	×
Renotification rate	✓	✓	✓	✓
Child injury and death	✓	×	✓	
Cognitive functioning	×	×	✓	×
Child's behaviour	×	×	✓	×
Placement rate	✓	×	×	×
Placement disruption	✓	×	×	×
Time to achieve permanence	✓	×	×	×
Housing stability	✓	×		×
Parenting capacity	×	×	✓	×
Ethno-cultural placement matching	✓	×	✓	×
EDUCATION AND WORK				
Education & learning				
School				
School class size	✓	✓	✓	✓
School attendance	✓	✓	×	×
Receipt of special ed	×	×	✓	×
School completion	✓	✓	✓	✓
Readiness to Learn				
Exposure to reading at home*	×	×	✓	×
Exposure to prenumeracy experiences	×	×	✓	×
Approaches to learning	×	×	✓	×
Emergent literacy and numeracy development*	×	×	✓	×
Proportion of kindergarteners "unready" for kindergarten	×	×	×	×
Parental attitudes/expectations	×	×	✓	×
Access to instruction in native language*	×	×	✓	×
Preschool				
Quality of care*	×	×	✓	×
Stability of care	×	×	✓	×
Proportion of eligible children in early intervention programs (attendance at preschool)*	×	×	✓	✓

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
Proportion of children (in this instance eight years or younger) spending time without a carer or parent present for some of the day	×	×	✓	×
Ratio of child-care costs to family income*	×	×	✓	×
Proportion of children in childcare facilities of their parents choice	×	×	✓	×
Parental education				
Educational attainment	✓	✓	✓	✓
Reading & Literacy				
Age at which reading to child commenced	×	×	✓	×
Parental level of literacy	✓	✓	✓	✓
Meeting year 3 benchmark for literacy	✓	✓	×	✓
Income and living conditions				
Income & poverty	✓	✓	✓	✓
Consumption and ownership of goods and services	×	×	×	×
General living conditions	×	×	✓	×
Employment factors and parental health and wellbeing				
Employment status	✓	✓	✓	✓
Work arrangements	×	×	✓	×
Working conditions	×	×	✓	×

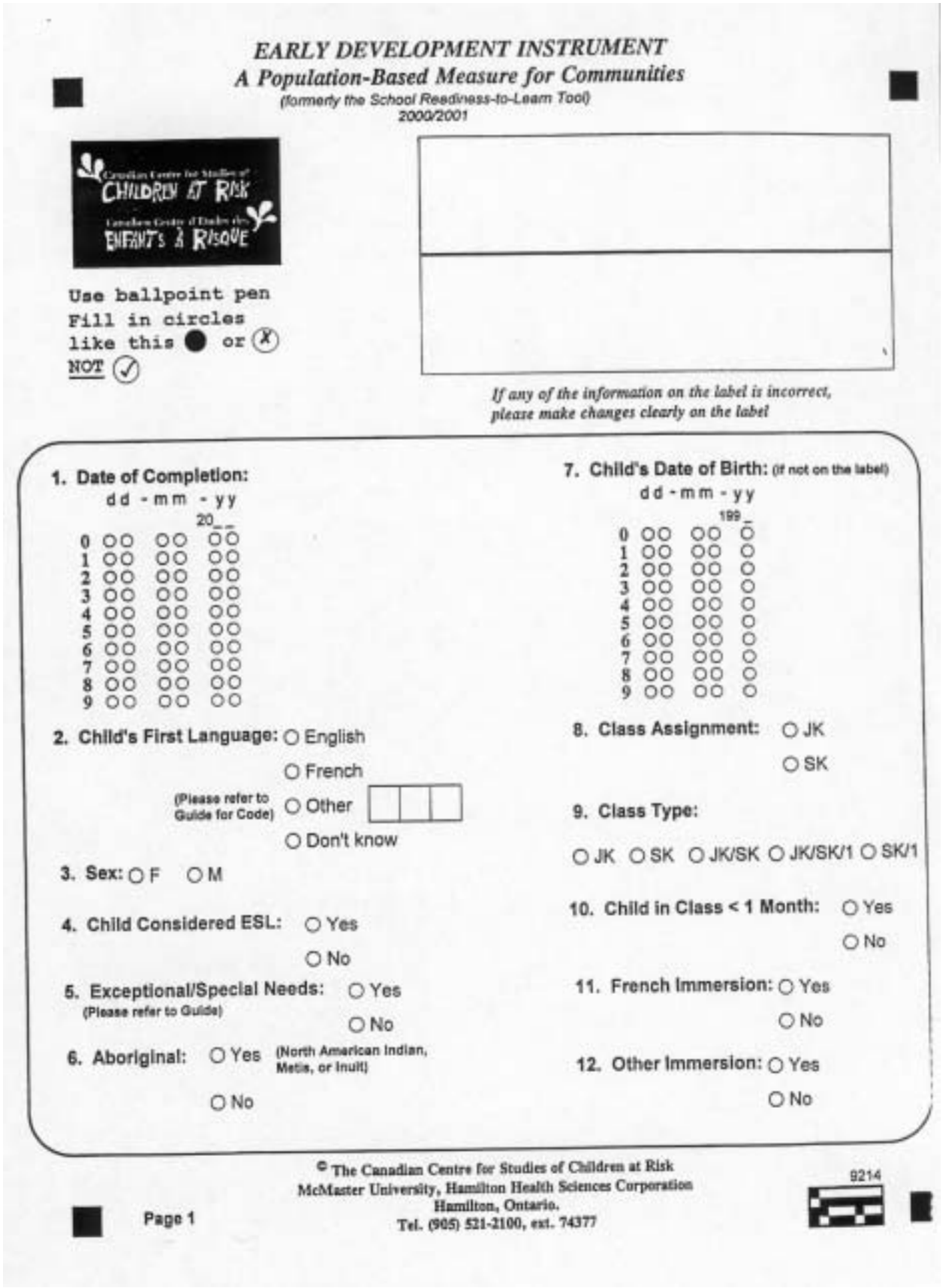
Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
CHILD FRIENDLY ENVIRONMENT				
Physical environment				
Natural environment including ecosystem health and sustainability				
Atmospheric pollution/Air quality	×	✓	✓	✓
Water quality	×	✓	✓	✓
Water consumption per capital	×	✓	×	✓
Household waste management (Collection treatment and quality)	×	✓	×	✓
Waste generation and management	✓	✓	✓	✓
Land use (relative surface area of green spaces in the city, public access to green spaces, derelict industrial sites, pedestrian streets, cycling in the city)	✓	✓	×	✓
Green areas that are accessible to children from formal sports fields to shaded parks an safe, overgrown 'wild' areas	✓	×	×	×
Behaviors that demonstrate concern for the environment e.g. recycling	✓	✓	×	✓
Peoples Perception of pollution	✓	✓	×	✓
Greenhouse gases emissions and gas emissions leading to ozone layer depletion	✓	✓	✓	✓
Major atmospheric pollutants emissions	✓	✓	✓	✓
Total protected areas	✓	✓	✓	✓
Marine fisheries catches	✓	✓	✓	✓
Forest: ratio of regeneration success rate over harvest rate	✓	✓	✓	✓
Energy consumption per capita	✓	✓	✓	✓
Toxic waste production (other than aquatic and atmospheric)	✓	✓	✓	✓
Public aid for development and debt	✓	✓	✓	✓
Public transport use compared to car use	✓	✓	✓	✓
Recycling	✓	✓	✓	✓
Military expenditures in relation to other government expenditures	✓	✓	✓	✓
Caloric intake and proportions from vegetable and animal source	✓	✓	✓	✓

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
Crime and Safety				
Crime rate e.g. homicide rate	✓	×	×	✓
Rate of crimes against persons	×	×	×	✓
Rate of drug arrests	×	×	×	✓
Rate of violent crime	×	×	×	✓
Rate of juvenile contact with police	×	×	×	✓
Domestic violence	×	×	✓	✓
Accidents, fire protection, emergency services	✓	×	✓	✓
Perception of neighbourhood safety	✓	✓	✓	✓
Antisocial behaviour in schools	×	×	✓	✓
Children's self-reported safety promoting behaviours	✓	✓	✓	×
Transport				
No. of seats on public transport related to population	✓	✓	×	✓
Public transport network cover	✓	✓	×	✓
Opportunities for and convenience of travel on public transport	✓	✓	×	✓
Facilities for Play and Recreation				
Number of facilities (for children) for recreation (e.g. number of parks)	×	×	✓	✓
Number of, & participation in, recreation and cultural art's programs/activities (for children).	×	×	✓	✓
Proportion of the general population who believe there is abundant opportunity for recreation, cultural events & fun.	×	×	✓	✓
Richness of the home environment. – eg opportunities for reading, outings, music.	×	×	✓	✓
Child's play environment in and outside the home must be safe	×	×	✓	✓
Housing				
Access to affordable housing	✓	×	✓	✓
Homeless children and their families	✓	✓	✓	✓
Secure land tenure	✓	✓	×	×
Overcrowding (preschool HOME scale, in Eurosocial). Concentration of people per room	✓	×	✓	✓

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
General				
Excessive noise	×	×	×	✓
Amount and type of television viewing	×	×	×	✓
Social Environment				
Formal Social Connections				
The availability and access to appropriate parental support and programs when needed	×	×	✓	✓
Church attendance	×	×	✓	✓
Informal Social connections				
Daily activities as measure of structure/chaos in child's life	×	×	×	✓
Conflict resolution, measured by the proportion of people that feel they must try to resolve differences peacefully	×	×	×	✓
Faith in others measured as the proportion of people confident somebody would help them in times of need	×	×	×	✓
Young people feel welcome throughout the community and interact with age-groups other than their own and they have a sense of belonging and of being valued.	✓	✓	×	×
Sibling and peer relationships	✓	×	×	×
Social connectedness	×	×	✓	×
Parenting				
Disciplinary techniques (Ind's of Social and Fam Funct)	×	×	×	×
Rules of behaviour	×	×	×	×
House rules for child regarding homework, TV viewing, bedtime	×	×	×	×
Monitoring behaviour	×	×	×	×
Parent-child communication	×	×	×	×
Communication frequency, styles and/or content of communication	×	×	×	×
Positive interaction	×	×	×	×
Warmth	×	×	×	×
Acceptance/punitiveness	×	×	×	×
Hostility	×	×	×	×
Aversive parenting	×	×	×	×
Consistent parenting	×	×	×	×
Modeling	×	×	×	×

Domain/Indicator	Evidence of background to indicator development	Evidence of methodology used to develop the indicators	Evidence-base for causal relationship to outcome	Evidence of potential or current use of indicator
Parent-child conflict	×	×	×	×
Conflict between parents	×	×	×	×
Reports of physical violence within the family	×	×	×	×
Satisfaction with parenting	×	×	×	×
Perceived stress	×	×	×	×
Stressful life events	×	×	×	×
Perceived level of social support		×	×	×
Parental self-efficiency	×	×	✓	×
Strains/gains of work to parenting	×	×	✓	×
SERVICE DELIVERY				
Health Promotion, prevention and early detection				
Immunisation	✓	✓	✓	✓
Injury	×	×	✓	✓
Primary Care				
ACSCs	✓	✓	✓	✓
Service sensitive conditions	×	×	×	✓

Appendix 9. Early Development Instrument



EARLY DEVELOPMENT INSTRUMENT
A Population-Based Measure for Communities
(formerly the School Readiness-to-Learn Tool)
2000/2001

Canadian Centre for Studies of CHILDREN AT RISK
Centre canadien d'études des ENFANTS À RISQUE

Use ballpoint pen
Fill in circles
like this ● or (✗)
NOT (✓)

If any of the information on the label is incorrect, please make changes clearly on the label

1. Date of Completion:
dd - mm - yy
20__

	dd	mm	yy
0	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○
7	○	○	○
8	○	○	○
9	○	○	○

2. Child's First Language: ○ English ○ French ○ Other ☐☐☐ ○ Don't know
(Please refer to Guide for Code)

3. Sex: ○ F ○ M

4. Child Considered ESL: ○ Yes ○ No

5. Exceptional/Special Needs: ○ Yes ○ No
(Please refer to Guide)

6. Aboriginal: ○ Yes ○ No
(North American Indian, Metis, or Inuit)

7. Child's Date of Birth: (if not on the label)
dd - mm - yy
199_

	dd	mm	yy
0	○	○	○
1	○	○	○
2	○	○	○
3	○	○	○
4	○	○	○
5	○	○	○
6	○	○	○
7	○	○	○
8	○	○	○
9	○	○	○

8. Class Assignment: ○ JK ○ SK

9. Class Type:
○ JK ○ SK ○ JK/SK ○ JK/SK/1 ○ SK/1

10. Child in Class < 1 Month: ○ Yes ○ No

11. French Immersion: ○ Yes ○ No

12. Other Immersion: ○ Yes ○ No

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Section A - Physical Well-being

1. About how many regular days has this child been absent since the beginning of school in the fall? Number of days: ☐☐.☐

Since the start of school in the fall, how often has this child arrived:

	never	rarely	some-times	usually	always	don't know
2. over- or underdressed for school-related activities	○	○	○	○	○	○
3. too tired to do school work	○	○	○	○	○	○
4. late	○	○	○	○	○	○
5. hungry	○	○	○	○	○	○

Would you say that this child:

	yes	no	don't know
6. is independent in washroom habits most of the time	○	○	○
7. shows an established hand preference (right vs. left or vice versa)	○	○	○
8. is well coordinated (i.e., moves without running into or tripping over things)	○	○	○

How would you rate this child's:

	excellent	good	average	poor	very poor	don't know
9. proficiency at holding a pen, crayons, or a brush	○	○	○	○	○	○
10. ability to manipulate objects	○	○	○	○	○	○
11. ability to climb stairs	○	○	○	○	○	○
12. level of energy throughout the school day	○	○	○	○	○	○
13. overall physical development	○	○	○	○	○	○

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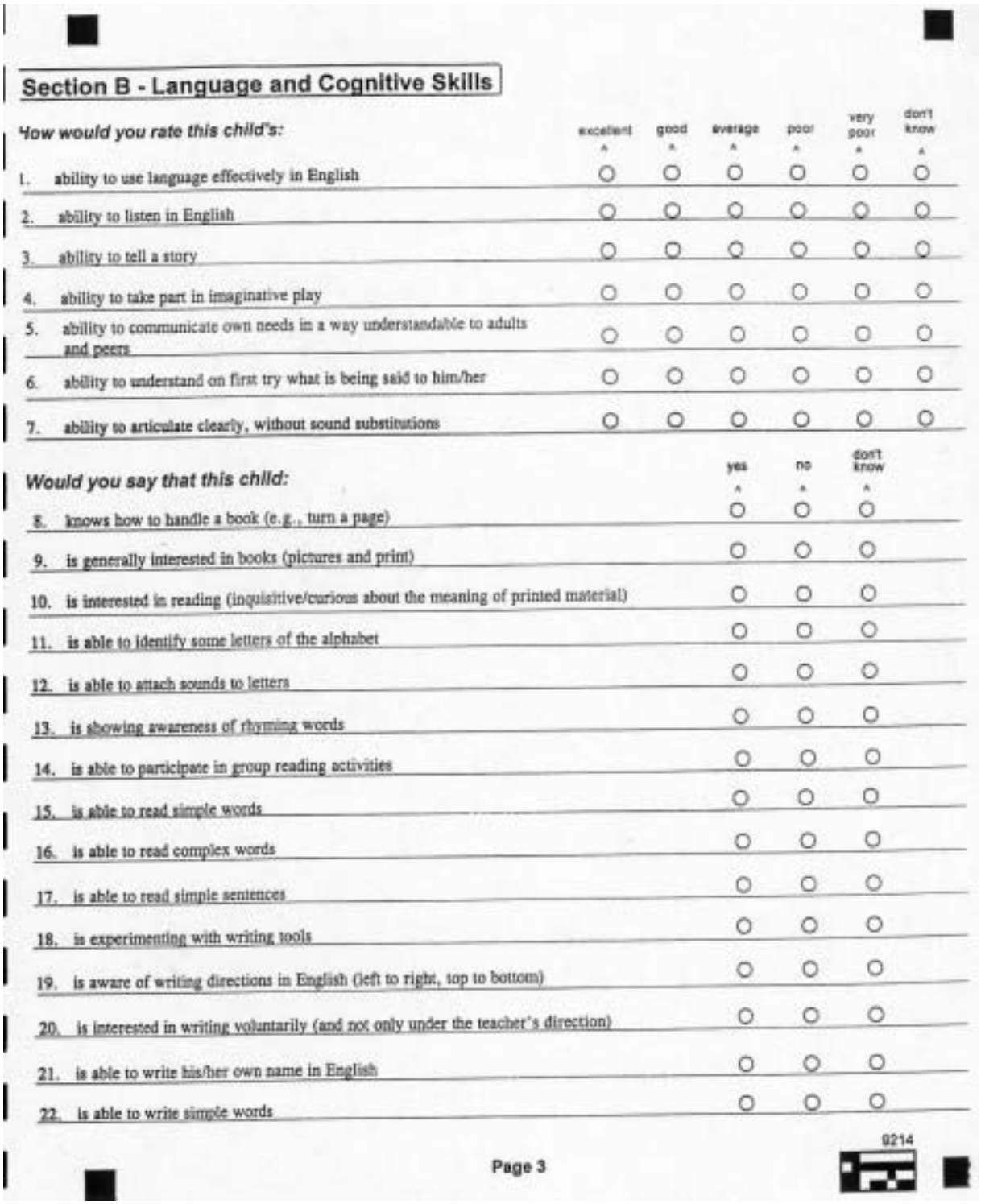

Section B - Language and Cognitive Skills

How would you rate this child's:	excellent	good	average	poor	very poor	don't know
1. ability to use language effectively in English	○	○	○	○	○	○
2. ability to listen in English	○	○	○	○	○	○
3. ability to tell a story	○	○	○	○	○	○
4. ability to take part in imaginative play	○	○	○	○	○	○
5. ability to communicate own needs in a way understandable to adults and peers	○	○	○	○	○	○
6. ability to understand on first try what is being said to him/her	○	○	○	○	○	○
7. ability to articulate clearly, without sound substitutions	○	○	○	○	○	○

Would you say that this child:	yes	no	don't know
8. knows how to handle a book (e.g., turn a page)	○	○	○
9. is generally interested in books (pictures and print)	○	○	○
10. is interested in reading (inquisitive/curious about the meaning of printed material)	○	○	○
11. is able to identify some letters of the alphabet	○	○	○
12. is able to attach sounds to letters	○	○	○
13. is showing awareness of rhyming words	○	○	○
14. is able to participate in group reading activities	○	○	○
15. is able to read simple words	○	○	○
16. is able to read complex words	○	○	○
17. is able to read simple sentences	○	○	○
18. is experimenting with writing tools	○	○	○
19. is aware of writing directions in English (left to right, top to bottom)	○	○	○
20. is interested in writing voluntarily (and not only under the teacher's direction)	○	○	○
21. is able to write his/her own name in English	○	○	○
22. is able to write simple words	○	○	○

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Section B - Language and Cognitive Skills

Would you say that this child:	yes	no	don't know
23. is able to write simple sentences	○	○	○
24. is able to remember things easily	○	○	○
25. is interested in mathematics	○	○	○
26. is interested in games involving numbers	○	○	○
27. is able to sort and classify objects by a common characteristic (e.g., shape, colour, size)	○	○	○
28. is able to use one-to-one correspondence	○	○	○
29. is able to count to 20	○	○	○
30. is able to recognize numbers 1 - 10	○	○	○
31. is able to say which number is bigger of the two	○	○	○
32. is able to recognize geometric shapes (e.g., triangle, circle, square)	○	○	○
33. understands simple time concepts (e.g., today, summer, bedtime)	○	○	○
34. demonstrates special numeracy skills or talents	○	○	○
35. demonstrates special literacy skills or talents	○	○	○
36. demonstrates special skills or talents in arts	○	○	○
37. demonstrates special skills or talents in music	○	○	○
38. demonstrates special skills or talents in athletics/dance	○	○	○
39. demonstrates special skills or talents in problem solving in a creative way	○	○	○
40. demonstrates special skills or talents in other areas (please specify)	○	○	○
41. can communicate adequately in his/her first language (based on your observation or parent/guardian information)	○	○	○

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Section C - Social and Emotional Development

How would you rate this child's:	excellent	good	average	poor	very poor	don't know
1. overall social/emotional development	○	○	○	○	○	○
2. ability to get along with peers	○	○	○	○	○	○

Below is a list of statements that describe some of the feelings and behaviours of children. For each statement, please fill in the circle that best describes this child now or within the past six months.

Would you say that this child:	often or very true	sometimes or somewhat true	never or not true	don't know
3. plays and works cooperatively with other children at the level appropriate for his/her age	○	○	○	○
4. is able to play with various children	○	○	○	○
5. follows rules and instructions	○	○	○	○
6. respects the property of others	○	○	○	○
7. demonstrates self-control	○	○	○	○
8. shows self-confidence	○	○	○	○
9. demonstrates respect for adults	○	○	○	○
10. demonstrates respect for other children	○	○	○	○
11. accepts responsibility for actions	○	○	○	○
12. listens attentively	○	○	○	○
13. follows directions	○	○	○	○
14. completes work on time	○	○	○	○
15. works independently	○	○	○	○
16. takes care of school materials	○	○	○	○
17. works neatly and carefully	○	○	○	○
18. is curious about the world	○	○	○	○
19. is eager to play with a new toy	○	○	○	○
20. is eager to play a new game	○	○	○	○
21. is eager to play with/read a new book	○	○	○	○

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Would you say that this child:	often or very true	sometimes or somewhat true	never or not true	don't know
22. is able to solve day-to-day problems by him/herself	○	○	○	○
23. is able to follow one-step instructions	○	○	○	○
24. is able to follow class routines without reminders	○	○	○	○
25. is able to adjust to changes in routines	○	○	○	○
26. answers questions showing knowledge about the world (e.g., leaves fall in the autumn, apple is a fruit, dogs bark, etc.)	○	○	○	○
27. shows tolerance to someone who made a mistake (e.g., when a child gives a wrong answer to a question posed by the teacher)	○	○	○	○
28. will try to help someone who has been hurt	○	○	○	○
29. volunteers to help clear up a mess someone else has made	○	○	○	○
30. if there is a quarrel or dispute will try to stop it	○	○	○	○
31. offers to help other children who have difficulty with a task	○	○	○	○
32. comforts a child who is crying or upset	○	○	○	○
33. spontaneously helps to pick up objects which another child has dropped (e.g., pencils, books)	○	○	○	○
34. will invite bystanders to join in a game	○	○	○	○
35. helps other children who are feeling sick	○	○	○	○

Would you say that this child:	often or very true	sometimes or somewhat true	never or not true	don't know
36. is upset when left by parent/guardian	○	○	○	○
37. gets into physical fights	○	○	○	○
38. bullies or is mean to others	○	○	○	○
39. kicks, bites, hits other children or adults	○	○	○	○
40. takes things that do not belong to him/her	○	○	○	○
41. laughs at other children's discomfort	○	○	○	○
42. can't sit still, is restless	○	○	○	○
43. is distractible, has trouble sticking to any activity.	○	○	○	○
44. fidgets	○	○	○	○
45. is disobedient	○	○	○	○

Would you say that this child:	often or very true	sometimes or somewhat true	never or not true	don't know
46. has temper tantrums	○	○	○	○
47. is impulsive, acts without thinking	○	○	○	○
48. has difficulty awaiting turn in games or groups	○	○	○	○
49. cannot settle to anything for more than a few moments	○	○	○	○
50. is inattentive	○	○	○	○
51. seems to be unhappy, sad or depressed	○	○	○	○
52. appears fearful or anxious	○	○	○	○
53. appears worried	○	○	○	○
54. cries a lot	○	○	○	○
55. is nervous, high-strung or tense	○	○	○	○
56. is incapable of making decisions	○	○	○	○
57. is excessively shy	○	○	○	○
58. sucks a thumb most of the time	○	○	○	○

Section D - General

Do any of the problems listed below influence this student's ability to do school work in a regular classroom? Please base your answer on medical diagnosis or parent/guardian information. Mark all that apply:

	yes	no	don't know
1. physical disability	○	○	○
2. visual impairment	○	○	○
3. hearing impairment	○	○	○
4. speech impairment	○	○	○
5. learning disability	○	○	○
6. emotional problem	○	○	○
7. behavioural problem	○	○	○
8. home environment/problems at home	○	○	○
9. other (specify below, please print)	○	○	○

10. Do you feel that this child needs further assessment? yes ○ no ○ don't know ○ *(if yes, specify below, please print)*

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Section E - Comments

To the best of your knowledge, please mark all that apply to this child:

	yes	no	don't know
1. attended an early intervention program (specify if known, please print) _____	○	○	○
2. has been in non-parental care on a regular basis prior to kindergarten entry	○	○	○

If yes, please specify: *(please refer to Guide for examples)*

2a. Centre-based, licensed, non-profit	○	2e. Other home-based, unlicensed, relative	○
2b. Centre-based, licensed, for profit	○	2f. Child's home, non-relative	○
2c. Other home-based, licensed	○	2g. Child's home, relative	○
2d. Other home-based, unlicensed, non-relative	○	2h. Other	○

	full-time	part-time	don't know
2i. To the best of your knowledge, prior to the child's entry to kindergarten, was this arrangement	○	○	○

	yes	no	don't know
3. attended other language or religion classes (specify if known, please print) _____	○	○	○
4. attended an organized pre-school/nursery school (only if part-time, and if it was not the main child-care arrangement)	○	○	○
5. attended junior kindergarten	○	○	○
6. _____	○	○	○
7. _____	○	○	○

If you have any additional comments about this child and her/his readiness for school, list them below, please print.

_____

_____

_____

_____

_____

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BIBLIOGRAPHY

1. Shore R. Rethinking the Brain. New Insights into Early Development. New York: Families and Work Institute, 1997.

2. Champlain Counts. A Report on the Health of our Chittenden County Community. 2001. Chittenden County. USA, Champlain Initiative. Creating Healthy Communities.

3. Lamb ME. The investigation of child sexual abuse: An interdisciplinary consensus statement. *Journal of Child Sexual Abuse* **3**:1994-106.

4. Melhuish, E., Belsky, J., Tunstill, J., Meadows, P., Barnes, J., Leyland, A., Anning, A., Ball, M., Katz, I., and Kurtz, Z. National Evaluation of Sure Start: A Proposal To the Sure Start Unit. 2001. London, Child Health Unit, Office of National Statistics.

5. Moore, K. Eurosocial Report No. 56. New Indicators of wellbeing. 1995. Washington, Eurosocial Centre for Social Welfare Policy and Research.

6. America's Children: Key National Indicators of Wellbeing 2001. 2001. Washington, Federal Interagency Forum on Child and Family Statistics.

7. Santiago-Borrero PJ. Maternal and child health and health care in Puerto Rico. *Lamberty, Gontran (Ed); Coll, Cynthia Garcia (Ed)* 1994:1-53.

8. O'Sullivan, B. and Alperstein, G. Child and Youth Health Report Card. 2001. Sydney, Central Sydney Area Health Service.

9. Web, K., Maks, G., Lund-Adams, M., and Abaraham, B. Towards a National System for Monitoring Breastfeeding in Australia: A Discussion Paper. 2001. Australian Food and Nutrition Monitoring Unit.

10. Moore K.A. and Halle T.G. Preventing Problems vs. Promoting the Positive: What Do We Want for Our Children. Suggested New Indicators. Communitarian Network. 2001.

11. Department of Education and Employment. Sure Start - A guide for fourth wave programs. Nottingham: DFEE, 2001.

12. Lewit EM.Schuurman Baker. Class Size. *The Future of Children* 1997;**7**:112-21.

13. Blatchford P.Mortimore P. The issue of class size for young children in schools: What can we learn from research? *Oxford Review of Education* 2001;**20**:411-28.

14. Janus M.Offord DR. Readiness to learn at school. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 2000;**1**:71-5.

15. Mendelsohn AL, Mogilner LN, Dreyer BP, Forman JA, Weinstein SC, Broderick M *et al*. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. *Pediatrics* 2001;**107**:130-4.

16. High PC, LaGasse L, Becker S, Ahlgren I, Gardner A. Literacy promotion in primary care pediatrics: can we make a difference? *Pediatrics* 2000;**105**:927-34.

17. Needlman R, Fried LE, Morley DS. Clinic-based intervention to promote literacy. *Am.J.Dis.Child* 1991;**145**:881-4.

18. High P, Hopmann M, LaGasse L, Sege R, Moran J, Guiterrez C *et al*. Child centered literacy orientation: a form of social capital? *Pediatrics* 1999;**103**:e55.

19. High P, Hopmann M, LaGasse L, Linn H. Evaluation of a clinic-based intervention to promote literacy: a pilot study. *Archives of Pediatrics & Adolescent Medicine* 1998;**152**:459-65.

20. Ministerial Council on Education. National Report on Schooling in Australia-1999. Year 3 Reading National Benchmark Results, 1999. Employment, Training and Youth Affairs. 1999.

21. UNICEF. Children's Rights and Habitat - Working Towards Child Friendly Cities. UNICEF. 2001.

22. Quality of Life in Jacksonville: Indicators for Progress. Jacksonville chamber of Commerce and the City of Jacksonville. 2000. Jacksonville, Jacksonville Community Council Inc.

23. Doyle E, Brunning D Cryer C Hedley S Russell Hodgson C. Healthy Cities Indicators: Analysis of data from across Europe. World Health Organisation, Regional Office for Europe, Copenhagen. 2001.

24. The Child and Youth Friendly Community Project, Society for children and youth of British Columbia. Creating Better Cities with Children and Youth. 2001.

25. Indicators for country analysis on early child development. Survival, growth and health status indicators. World Bank web site. 2001 http://www.worldbank.org/children/design/starting/indicat.htm

26. Indicators for country Analysis on Early Child Development. 2001. www.worldbank.org/children/design/starting/indicat.htm

27. Zubrick SR, Williams AA, Silburn SR, Vimpani G. Indicators of Social and Family Functioning. Canberra: Department of Family and Community Services, 2000.

28. The Victorian Ambulatory Care Sensitive Conditions Study: Preliminary Analyses. 2001. Victorian Government Department of Human Services. Public Health Division.

29. Karoly, L. Early Childhood Interventions: Benefits, Costs, and Savings. 1998. RAND. Rand Research Brief.

30. Sawyer, M. G., Arney, F. M., Baghurst, P. A., Clark, J. J., Graetz, B. W., Kosky, R. J., Nurcombe, B., Patton, G. C., Prior, M. R., Raphael, B., Ray, J., Whaites, L. J., and Zubrick, S. R. Child and adolescent component of the national survey of mental health and wellbeing. 2000. Australia, Commonwealth of Australia.

31. The Canadian Institute for Advanced Research. Reversing the Real Brain Drain. Early Years Study. McCain, M. N. and Mustard, J. F. 1-182. 2002.

32. Shonkoff JP, Phillips A. From Neurons to Neighborhoods. The Science of Early Childhood Development. Washington: National Academy Press, 2000.

33. Dwyer S. Improving delivery of a health-promoting-environments program: experiences from Queensland Health. *Australian & New Zealand Journal of Public Health* 1997;**21**:398-402.

34. Queensland University of Technology. Socioeconomic determinants of health: towards a national research program and a policy and intervention agenda. 1999. 1-283. Commonwealth Department of Health and Aged Care.

35. Australian Institute of Health and Welfare. Draft indicators for monitoring and reporting child health and wellbeing. 2000. ACT, Australian Institute of Health and Welfare.

36. Twigg L, Moon G, Jones K. Predicting small-area health-related behaviour: a comparison of smoking and drinking indicators. *Social Science & Medicine* 2000;**50**:1109-20.

37. Keating DP, Hertzman C. Developmental Health and the Wealth of Nations: Social, Biological, and Educational Dynamics. New York: The Guilford Press, 1999.

38. Page Glascoe, F. Wellbeing. 2001. Unpublished Paper.

39. Learmonth G. The Health of Nations. Open University Press: Milton Keynes, 1985.

40. Davis A, George J. States of Health. Health and Illness in Australia. Sydney: Harper Educational, 1993.

41. Berkman LF, Kawachi I. Social Epidemiology. New York: Oxford University Press, 2000.

42. Department of Human Services. Draft Guidelines for Health Promotion in Primary Care Partnerships. 2000. Melbourne, Aged, Community and Mental Health Division and the Public Health Division, Victorian Government Department of Human Services.

43. Bronfenbrenner U. The Ecology of Human Development. Cambridge: Harvard University Press, 2001.

44. Waters, E. B. Measuring Child Health and Wellbeing. 2001.

45. World Health Organisation. Official record of the World Health Organisation. 2. 1948. Geneva, World Health Organisation.

46. Trewin, D. Measuring Wellbeing. Framework for Australian Social Statistics. 2001. 12-10-2001. Canberra, Australian Bureau of Statistics.

47. Ysseldyke, J. E., Thurlow, M. L., and Erickson, R. N. Educational Outcomes and indicators for early childhood (Age 6). 1993. Minneapolis, National Centre on Educational Outcomes.

48. Doherty G. Zero to Six. The Basis for School Readiness. Canada, Quebec: Human Resources Development, 1997.

49. US Department of Health & Human Services. The Administration for Children and Families. About Head Start. 2001.

50. Department of Education and Employment. Sure Start: Making a difference for children and families. 2001. Nottingham, DfES Publications.

51. National Longitudinal Survey on Children and Youth. Measuring Readiness to Learn. 2001. http://socialunion.gc.ca/nca/nca5-e.html

52. Hauser RM, Brown BV, Prosser WR. Indicators of Children's Wellbeing. New York: Russell Sage Foundation, 1997.

53. Minimum data set of European mental health indicators. 2000. ISSN 1235-4775 Helsinki, Stakes.

54. Australian Bureau of Statistics. Measuring Wellbeing. Framework for Australian Social Statistics. Trewin, D. (4160.0), 1-297. 12-10-2001. Canberra, Australian Bureau of Statistics.

55. Measuring Readiness to Learn. Canada, National Children's Agenda. 27-8-2001 http://socialunion.gc.ca/nca/nca5_e.html

56. KidStat Databook. Minneapolis Child Health Indicators: Data form the CHAMP (Community Health Assessment and Monitoring Project) survey, 2001. Minneapolis Department of Health and Family Support. 2001.

57. Department of Human Services. Improving the Lives of Young Victorians in Our Community (A summary Report). Melbourne, Community Care Division, Department of Human Services, Victorian Government. 2000. 1-42

58. Najman JM, Williams GM, Nikles J, Spence S, Bor W, O'Callaghan M *et al*. Mothers' mental illness and child behavior problems: cause-effect association or observation bias? *Journal of the American Academy of Child & Adolescent Psychiatry* 2000;**39**:592-602.

59. Waters E, Doyle J, Wright M, Wake M, Salmon L. The influence of parental gender, health and illness on child health reports. *Pediatrics* 2000;**106**:1422-8.

60. Anti-cancer council website. www.accv.org.au . 2002.

61. Australian Drug Foundation. 2001. http://www.adf.org.au/index.htm

62. Walsh, R. A., Lowe, J. B., and Hopkins, P. J. Quitting Smoking in pregnancy. Medical Journal of Australia 175, 320-323. 2001. 17-12-2001.

63. Cook DG, Whincup PH, Jarvis MJ, Strachan DP, Papacosta O, Bryant A. Passive Exposure to Tobacco Smoke in Children Aged 5-7 years Individual, Family, and Community Factors. *BMJ* 1994;**308**:384-9.

64. Ford, DJ., Scragg, R., Weir, J., and Gaiser, J. A national survey of cigarette smoking in fourth-form school children in New Zealand. New Zealand Medical Journal 108, 454-457. 1995.

65. Brook JS, Whiteman M, Balka EB, Cohen P. Parent drug use, parent personality, and parenting. *Journal of Genetic Psychology* 1995;**156**:137-51.

66. Dawson DA. The effect of parental alcohol dependence on perceived children's behavior. *Journal of Substance Abuse* 1992;**4**:329-40.

67. Suess G, Grossman K, Sroufe LA. Effects of infant attachment to mother and father on quality of adaption in preschool. *International Journal of Behavioural Management* 1992;**15**:43-65.

68. Jackson C, Henriksen L, Dickinson D, Levine D. The early use of alcohol and tobacco: Its relation to children's competence and parents' behavior. *American Journal of Public Health* US;**87**:Mar:1-364.

69. Peoples-Sheps MD, Guild PA, Farel AM, Cassady CE, Kennelly J, Potrzebowski PW *et al*. Model indicators for maternal and child health: an overview of process, product, and applications. *Maternal & Child Health Journal* 1998;**2**:241-56.

70. Sure Start: A guide for fifth wave programmes. 1-32. 2001. Nottingham, DfES Publications.

71. Healthy People 2010: Understanding and Improving Health. U.S.Department of Health and Human Services , 1-63. 2000.

72. Eurosocial Report. New Social Indicators of Child Wellbeing. Marin, B. 56. 1995. Vienna, European centre for Social Welfare Policy and Research.

73. National Public Health Partnership. Eat Well Australia. An Agenda for Action for Public Health Nutrition. 1-126. 2002. Canberra.

74. Public Health Association of Australia. Periconceptional Folate. Policy Statements 2000. 2000. ACT, Australia, Public Health Association of Australia.

75. Nutrition Australia website. www.nutritionaustralia.org/Nutrition_for_all_ages/Children/children_index.asp. 2001.

76. Federal Interagency Forum on Child and Family Statistics. America's Children" Key National Indicators of Wellbeing. 2001. Washington, D.C., US Government Printing Office. Federal Interagency Forum on Child and Family Statistics.

77. Nutrition and physical activity for Australian children. eMJA . 17-12-2001.

78. Parsons TJ, Power C, Logan S, Summerbell CD. Childhood predictors of adult obesity: a systematic review. *International Journal of Obesity* 1999;**23**:1-41.

79. Dental Health Services Victoria. School Dental Service 2001. Dental Health Services Victoria . 2001.

80. Slade GD, Spencer AJ, Davies MJ. Intra-oral distribution and impact of caries experience among South Australian school children. *Aust Dental J* 1996;**41**:343-50.

81. Phillips DA, Love JM. Indicators for School Readiness, Schooling, and Childcare in Early to Middle Childhood. In Hauser RM, Brown BV, Prosser WR, eds. *Indicators of Children's Wellbeing*, pp 125-51. New York: Russell Sage Foundation, 1997.

82. Fields, J., Smith, K., Bass, L. E., and Lugaila, T. A Child's Day: Home, School, and Play (Selected Indicators of Child Wellbeing). 2001. www.census.gov/prod/2001pubs/p70-68.pdf

83. Andrews AB,.Ben Arieh A. Measuring and monitoring children's wellbeing across the world. *Social Work* 1999;**44**:105-15.

84. Gonzalez-Mena J. Multicultural Issues in Childcare. California: Mayfield Publishing Company, 1993.

85. Perry BD. Neurodevelopment and the neurophysiology of trauma I: Conceptional considerations for clinical work with maltreated children. *The Advisor* 1993;**6**:-1.

86. Tomison AM. Child Maltreatment and Mental Disorder. *Child Abuse Prevention* 1996;Discussion Paper No.3:1-12.

87. Tomison, A. M. and Wise, S. Community-based approaches in preventing child maltreatment. Issues Paper 11, 1-45. 1999.

88. Forrester D,.Harwin J. Monitoring children's rights globally: Can child abuse be measured internationally? *Child Abuse Review* 427;**9**:Nov-Dec.

89. Fluke JD, Edwards M, Kutzler P, Kuna J, Tooman G. Safety, permanency, and in-home services: applying administrative data. *Child Welfare* 2000;**79**:573-95.

90. Trocme N, MacLaurin B, Fallon B. Canadian child welfare outcomes indicator matrix: An ecological approach to tracking service outcomes. *Journal of Aggression, Maltreatment & Trauma* 2000;**4**:2000-190.

91. Forrester D. Monitoring children's rights globally: Can child abuse be measured internationally? *Child Abuse Review* 427;**9**:Nov-Dec.

92. Haveman R,.Wolfe B. Schooling and economic wellbeing: The role of nonmarket effects. *Journal of Human Resources* 1984;**19**:377-407.

93. Hawkins J, Lishner D. Schooling and delinquency. In Johnson EH, ed. *Handbook of Crime and Delinquency Prevention*, pp 179-221. New York: The Guilford Press, 1987.

94. Hinshaw SP,.Anderson CA. Externalizing behavior problems and academic underachievement in childhood and adolescence: Causal relationships and underlying mechanisms. *Psychological Bulletin* 1996;**111**:127-54.

95. Loeber R, Stouthamer-Loeber M. Prediction. In Quay H, ed. *Handbook of Juvenile Delinquency*, pp 325-92. New York: Wiley, 1987.

96. Rutter M, Giller H, Hagell A. Antisocial Behaviour by Young People. New York: Cambridge University Press, 1998.

97. Steinberg L, Blinde P, Chan K. Dropping out among language minority youth. *Review of Educational Research* 1984;**54**:113-32.

98. Chen C, Lee S, Stevenson H. Long-term prediction of academic achievement of American, Chinese, and Japanese adolescents. *Journal of Educational Psychology* 1996;**88**:750-9.

99. Cunningham A,.Stanovich K. Early reading acquisition and its relation to reading experience and ability 10 years later. *Developmental Psychology* 1997;**33**:934-45.

100. Luster T,.McAdoo H. Family and child influences on educational attainment: A secondary analysis of the High/Scope Perry preschool data. *Developmental Psychology* 1996;**32**:26-39.

101. Weller D, Schnittjer C, Tuten B. Predicting achievement in grades three through ten using the metropolitan reading test. *Journal of Research in Childhood Education* 1992;**6**:121-9.

102. Hess R,.Hahn R. Prediction of school failure and the Hess School Readiness Scale. *Psychology in the Schools* 1974;**11**:134-6.

103. Stevenson H,.Newman R. Long-term prediction of achievement and attitudes in mathematics and reading. *Child Development* 1986;**57**:646-59.

104. Baydar N, Brooks-Gunn J, Furstenberg FFJ. Early warning signs of functional illiteracy: Predictors in childhood and adolescence. *Child Development* 1993;**64**:815-29.

105. Janus, M., Offord, D., and Walsh, C. Population-level assessment of readiness to learn at school for 5-year-olds in Canada: Relation to child and parent measures. 2001.

106. Readiness to Learn, Child Development and Learning Outcomes: Potential Measures of Readiness to Learn. www.hrdc-drhc.gc.ca . 1998. The Applied Research Branch, Strategy Policy, Human Resources Development Canada. 1999.

107. Reconsidering Children's Early Development and Learning: Toward Common views and vocabulary. www.negp.gov/Reports/child-ea.htm . 2001. Washington, D.C., National Education Goals Panel.

108. Bennett N. Annotation: Class Size and the Quality of Educational Outcomes. *Journal of Child Psychology & Psychiatry* 1998;**39**:797-804.

109. Word, E., Johnston, J., Bain, H. P., and et al. Student/Teacher Achievement Ratio (STAR): Tennessee's K-3 class size study. 35-35. 1990. Nashville, Tennessee Department of Education. Final Summary Report 1985-1990.

110. Ogletree EJ, McHenry E. Chicago Teachers and School Reform. 1990.

111. National Commission on Education. Learning to Succeed. 1993. London, Heinemann.

112. Satya Brink & Allen Zeesman. Measuring Social Wellbeing: An Index of Social Health for Canada. Human Resources Development, Canada. 2001.

113. O'Hare WP,.Ritualo AR. KIDS COUNT: identifying and helping America's most vulnerable. *Statistical Bulletin - Metropolitan Insurance Companies* 2000;**81**:26-32.

114. Melhuish, E., Belsky, J., Tunstill, J., Meadows, P., Barnes, J., Leyland, A., Anning, A., Ball, M., Katz, I., and Kurtz, Z. National Evaluation of Sure Start: A proposal to the Sure Start Unit. 2001.

115. Delgaudio Weiss AM. The unique and combined impact of health and care-taking risk factors on the school adjustment of urban first grade students. *Dissertation Abstracts International: Section B: the Sciences & Engineering* 2000;**59**:4-B

116. Berg I. Absence from school and mental health. *British Journal of Psychiatry* 1992;**161**:154-66.

117. Early Development Instrument (EDI): A population-based Measure for Communities. 2001. Hamilton Health Sciences Corporation, The Canadian Centre for Studies of Children at Risk.

118. Offord, D., Janus, M., and Walsh, C. Population-Level Assessment of Readiness to Learn at School for 5-Year Olds in Canada. 2001. Ontario, The Canadian Centre for Studies of Children at Risk, McMaster University.

119. Janus M,.Offord D. Development of a Community-Level Measure of School Readiness to Learn for 4-5 Year -Old Children. Project Description. *School Readiness to Learn Project* 2001.

120. West J. New indicators of School Readiness from the ELCS-K. *The Child Indicator* 2000;**2**:3

121. West, J., Denton, K., and Germino-Hausken, E. America's Kindergartners. 2000. U.S.A, National Centre for Education Statistics, U.S. Department of Education.

122. Benasich, A. A., Brooks-Gunn, J., and McCormick, M. D. Behavioral Problems in the Two-to-Five Year-Old: Measurement and Prognostic Ability. 1992.

123. Lee V, Brooks-Gunn J, Schnur E, Liaw T. Are Head Start Effects Sustained? A Longitudinal Comparison of Disadvantaged Children Attending Head Start, No Preschool, and Other Preschool Programs. *Child Development* 1990;**61**:495-507.

124. Crouter AC, MacDermid SM, McHale SM, Perry-Jenkins M. Parental Monitoring and Perceptions of Children's School Performance and Conduct in Dual- and Single-Earner Families. *Developmental Psychology* 1990;**26**:649-57.

125. Dishion T. The Family Ecology of Boy's Peer Relations in Middle Childhood. *Child Development* 1990;**61**:874-92.

126. Zill, N. and Nord, C. W. Running in Place: How American Families are Faring in a Changing Economy and an Individualistic Society. 1994. Washington, D.C., Child Trends.

127. Alexander, K. L. and Entwisle, D. R. Achievement in the First Two Years of Schools:Patterns and Processes. Monographs of the Society for Research in Child Development. 53(2, serial no. 218). 1988. Chicago, University of Chicago Press.

128. School Readiness: Helping communities Get Children Ready for School and Schools Ready for Children. 2001. Washington, Child Trends.

129. Hayes C, Palmer J, Zaslow M. Who Cares for America's Children: Childcare Policy for the 1990s. Washington, D.C.: National Academy Press, 1990.

130. Meyers MK. Childcare in JOBS Employment and Training Program: What Difference Does Quality Make? *Journal of Marriage and the Family* 1993;**55**:767-83.

131. Children's Services Regulations 1998. Statutory Rule. S.R. No. 59/1998. 2001. 26-5-1998.

132. Zill, N. Parental Schooling & Children's Health. US Department of Health & Human Services. 111, 34-43. 1996. Public Health Reports.

133. Millar WJ,.Chen J. Maternal education and risk factors for small-for-gestational-age births. *Health Reports* 1998;**10**:43-51.

134. Clay MM. By Different Paths to Common Outcomes. New York: Stenhouse Publishers, 1998.

135. Golova N, Alario AJ, Vivier PM, Rodriguez M, High PC. Literacy promotion for Hispanic families in a primary care setting: a randomized, controlled trial. *Pediatrics* 1999;**103**:993-7.

136. Snow, C. E., Dickinson, D. K., and Tabors, P. O. The Home-School Study of Language and Literacy Development. 2001.

137. US Department of Health & Human Services. Building their futures: How early head start programs are enhancing the lives of infants and toddlers in low-income families. US Department of Health & Human Services, Administration for Children and Families. 2001. Washington, DC, Department of Health & Human Services.

138. The State of Literacy in America: Estimates at the Local, State, and National Levels. www.nifl.gov/reders/!intro.htm . 2001. NIFL.

139. Weiss BD, Blanchard JS, McGee DL, Hart G, Warren B, Burgoon M *et al*. Illiteracy among Medicaid recipients and its relationship to health care costs. *Journal of Health Care for the Poor and Underserved* 1994;**5**:99-111.

140. Weiss, B. D. Health Literacy - The Hidden Risk Factor. 1999. Boston. Reach Out and Read Conference.

141. Mayer SE. Indicators of Children's Economic Wellbeing and Parental Employment. In Hauser RM, Brown BV, Prosser WR, eds. *Indicators of Children's Wellbeing*, pp 237-57. New York: Russell Sage Foundation, 1997.

142. Probert B. Mothers in the labour force. A step forward and two back? *Family Matters* 1999;**54**:60-4.

143. Curtis LJ, Dooley MD, Lipman EL, Feeny DH. The role of permanent income and family structure in the determination of child health in Canada. *Health Economics* 2001;**10**:287-302.

144. Jantti, M. and Bradbury, B. Child Wellbeing in Rich and Transition Countries, Child poverty across the Industrialized world:Evidence from the Luxembourg Income Study. 31-8-1999.

145. Towards a Public Health Approach to Reducing Child Poverty and Enhancing Resiliency. 1-15. 1998. Ontario, Ontario Public Health Association.

146. Ahmed, N. Poverty on the rise. The Age . 28-11-2001. 1.

147. Harding, A. and Szukalska, A. Trends in Child Poverty in Australia: 1982 to 1995-96. Discussion Paper no. 42. 1999. Canberra, National Centre for Social and Economic Modelling, University of Canberra.

148. Jolly DL, Nolan T, Moller J, Vimpani G. The impact of poverty and disadvantage on child health. *Journal of Paediatrics & Child Health* 1991;**27**:203-17.

149. Brotherhood of St Laurence. 'No Child...', Child poverty: the facts. 2001. Melbourne, Publications Unit, Brotherhood of St Laurence.

150. Carson CA,.Zucconi SL. Epidemiologic indicators of health status to guide health care management decision making. *Journal of Health Administration Education* 1993;**11**:551-62.

151. Beauman, K. J. Extended Measures of Well Being, Meeting Basic Needs. US Department of Commerce, Economic and Statistics Administration, US Census Bureau . 2001.

152. Wolcott I. Big Business, Small Business, Family Business. *Family Matters* 1992;**31**:56-60.

153. Zero Population Growth. Kid-Friendly Cities Report Card 2000. 2001. http://www.kidfriendlycities.org/2001/natavg.html

154. Runyan DK, Hunter WM, Socolar RR, Amaya-Jackson L, English D, Landsverk J *et al*. Children who prosper in unfavorable environments: the relationship to social capital. *Pediatrics* 1998;**101**:12-8.

155. Luthar SS,.Cushing G. Neighbourhood influences and child development: a prospective study of substance abusers' offspring. *Development & Psychopathology* 1999;**11**:763-84.

156. Berman Y,.Phillips D. Indicators of social quality and social exclusion at national and community level. *Social Indicators Research* 2000;**50**:-350.

157. Vimpani G. The role of social cohesiveness in promoting child development. *Youth Suicide Prevention Bulletin* 2001;**5**:20-4.

158. Kline FM. The influence of the community on a student's academic performance. *Child & Adolescent Psychiatric Clinics of North America* 1997;**6**:-620.

159. Roberts EM. Neighborhood social environments and the distribution of low birthweight in Chicago. *American Journal of Public Health* 1997;**87**:597-603.

160. McDonald TL, Treser CD, Hatlen JB. Development of an environmental health addendum to the Assessment Protocol for Excellence in Public Health. *Journal of Public Health Policy* 1994;**15**:203-17.

161. Briggs DJ,.Field K. Informing environmental health policy in urban areas: the HEADLAMP approach. *Reviews on Environmental Health* 2000;**15**:169-86.

162. Songsore J,.Goldstein G. Health and Environment Analysis for Decision-Making (HEADLAMP): field study in Accra, Ghana. *World Health Statistics Quarterly - Rapport Trimestriel de Statistiques Sanitaires Mondiales* 1995;**48**:108-17.

163. Spiegel J,.Yassi A. The use of health indicators in environmental assessment. *Journal of Medical Systems* 1997;**21**:275-89.

164. OECD/WHO-ECEH Workshop on Environmental and Environmental Health Information to support National Environmental Action Programmes (NEAP) and National Environmental Health Action Plans (NEHAPS): using data and indicators. Budapest, 22 and 23 May 1997. *International Journal of Occupational Medicine & Environmental Health* 1998;**11**:273-8.

165. Chuchkova M. The Healthy Cities Project of the World Health Organization and the approach to its realization. [Bulgarian]. *Problemi na Khigienata* 1994;**19**:3-9.

166. Andrews AB. Measuring and monitoring children's wellbeing across the world. *Social Work* 1999;**44**:Mar-115.

167. Ben-Arieh, A. International project on indicators of children's wellbeing. 2001. http://www.worldbank.org/children/design/starting/61.htm

168. Gilley, T. Access for Growth. Services for mothers and babies. 1993. Melbourne, Brotherhood of St. Laurence.

169. National Health Strategy. Enough to make you sick: how income and environment affect health. 1992. Melbourne, National Health Strategy Unit. National health Strategy Paper No.1.

170. From the Centers for Disease Control and Prevention. Indicators of nicotine addiction among women-United States, 1991-1992. *JAMA* 1995;**273**:842.

171. De Kruijf HA,.Van Vuuren DP. Following sustainable development in relation to the north-south dialogue: ecosystem health and sustainability indicators. *Ecotoxicology & Environmental Safety* 1998;**40**:4-14.

172. Gosselin P, Belanger D, Bibeault JF, Webster A. Indicators for a sustainable society. *Canadian Journal of Public Health* 1993;**84**:197-200.

173. Our Planet, Our Health: Report of the WHO commission on Health and Environment. 1992. Geneva, World Health Organisation.

174. Canadian Public Health Association. Human and Ecosystem Health. 1992. Ottawa, Ontario, Canadian Public Health Association.

175. Millar JS,.Hull C. Measuring Human Wellness. *Social Indicators Research* 1997;**40**:147-58.

176. Fields, J. M and Smith, K. E. Poverty, Family Structure, and Child Wellbeing Indicators from the SIPP. Population Division Working Paper No. 23. 1998 Population Division. U.S. Bureau of the Census www.census.gov/population/www/documentation/twps0023.html

177. Day, L., Ashby, K., and Stathakis, V. Unintentional Farm Injury. *Hazard.* Edition no.33 (Victorian Injury surveillance System), 1-16. 1997. Melbourne, Sands and McDougall Printing.

178. Coleman J.S. Social capital in the creation of human capital. *American Journal of Sociology* 1988;**94**:95-120.

179. Parcel TL. Family social capital and children's behaviour problems. *Social Psychology Quarterly* 1993;**56**:120-35.

180. Putnam R. Making Democracy Work: Civic Transitions in Modern Italy. Princeton: Princeton University Press, 1993.

181. Maris RW. Social and familial risk factors in suicidal behavior. *Psychiatric Clinics of North America* 1997;**20**:519-50.

182. Duncan, G. J. and Raudenbush, S. In, Getting context right in studies of child development. Neighbourhoods and Adolescent Development: How Can We Determine the Links? 1999.

183. Manski C. Identification of endogenous social effects: The reflection problem. *Review of Economic Studies* 1993;**60**:531-42.

184. Laurie, V. How to Grow a Baby. *The Weekend Australian Magazine,* 25-26. 2001.

185. Wwerner EE. High Risk Children in Young adulthood: A longitudinal study from birth to 32 years. *American Journal of Orthopsychiat* 1989;**59**:72-81.

186. Centre for Community Child Health. A Review of the Early Childhood Literature. Foley, D., Goldfeld, S., McLoughlin, J., Nagorcka, J., Oberklaid, F., and Wake, M. 2000. Canberra, AusInfo.

187. Moore, T. and Martin, A. NSW First Three Years of Childhood Project 2001. 1-129. 2001.

188. Biederman J, Milberger S, Faraone SV, Kiely K, Guite J, Mick E *et al*. Family-environment risk factors for attention-deficit hyperactivity disorder. A test of Rutter's indicators of adversity. *Archives of General Psychiatry* 1995;**52**:464-70.

189. Rutter M, Quinton D. Psychiatric disorder: ecological factors and concepts of causation. *Ecological Factors in Human Development*, pp 173-87. Amsterdam: North-Holland Publishing Co., 1977.

190. Rutter M, Cox A, Tupling C, Berger M, Yule W. Attainment and adjustment in two geographical area's, 1: the prevalence of psychiatric disorders. *British Journal of Psychiatry* 1975;**126**:493-509.

191. Early childcare and self-control, compliance, and problem behavior at twenty-four and thirty-six months. The NICHD Early Childcare Research Network. *Child Development* 1998; **69**:1145-70.

192. Greene BF, Kilili S. Have to be? Issues and Examples Associated with Empirical Assessments of Parenting Adequacy in Cases of Child Abuse and Neglect. In Lutzker, ed. *Handbook of Child Abuse Research and Treatment*, New York: Plenum Press, 1998.

193. Jackson C, Henriksen L, Foshee V. The Authoritative Parenting Index: Predicting health risk behaviors among children and adolescents. *Health Education & Behavior* **25**:Jun-337.

194. Cassidy J. The ability to negotiate the environment. *Child Development* 1986;**57**:103-6.

195. Frankel K.Bates JE. Mother-toddler problem solving: Antecedents of attachment, home behaviour, and temperament. *Child Development* 1990;**61**:810-9.

196. Matas L, Arend RA, Sroufe LA. Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development* 1978;**49**:547-56.

197. Arend R, Gove FL, Sroufe LA. Continuity of individual adaptation from infancy to kindergarten: A predictive study of ego-resiliency and curiosity in preschoolers. *Child Development* 1979;**50**:950-9.

198. Parke RD. Fatherhood. Cambridge: Harvard, 1996.

199. Dekovic M,.Meeus W. Peer relations in adolescents: effects of parenting and adolescents' self-concept. *Journal of Adolescence* 1997;**20**:163-76.

200. Sandefur G, Mosley J. Family Structure, Stability, and the Wellbeing of Children. In Hauser RM, Brown BV, Prosser WR, eds. *Indicators of Children's Wellbeing*, pp 328-45. New York: Russell Sage Foundation, 1997.

201. Brown BB, Mounts N, Lamborn SD, Steinberg LD. Parenting practices and peer group affiliation in adolescence. *Child Development* 1993;**64**:467-82.

202. Baumrind D. Effects of authoritative parental control on child behaviour. *Child Development* 1996;**37**:887-907.

203. Baumrind D. Parental disciplinary patterns and social competence in children. *Youth and Society* 1978;**9**:239-75.

204. Baumrind D. Rearing competent children. In Damon W, ed. *New Directions in Child Development: Child Development, Today and Tomorrow*, pp 349-78. San Francisco: Jossey-Bass, 1989.

205. Baumrind D. The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence* 1991;**11**:56-95.

206. Brook JS, Whiteman M, Balka EB, Cohen P. Parent drug use, parent personality, and parenting. *Journal of Genetic Psychology* 1995;**156**:137-51.

207. White MS. Ego development in adult women. *Journal of Personality* 1985;**53**:561-74.

208. Polansky NA, Gaudin JA, Kilpatrick AC. The Material Characteristics Scale: A cross-validation. *Child Welfare* 1992;**71**:271-80.

209. Lam WKK. Sociodemographic and parenting pathways of low birthweight infant development. *Dissertation Abstracts International: Section B: the Sciences & Engineering* 2000;**58**.

210. Knight GP, Virdin LM, Roosa M. Socialization and family correlates of mental health outcomes among Hispanic and Anglo American children: consideration of cross-ethnic scalar equivalence. *Child Development* 1994;**65**:212-24.

211. McLanahan S, Sandefur G. Growing up with a single parent: What hurts, what helps. Cambridge: Harvard University Press, 1994.

212. Amato PR. Life-span adjustment of children to their parents' divorce. *Future of Children* 2000;**4**:(Spr)164.

213. Reed BA, Habicht JP, Niameogo C. The effects of maternal education on child nutritional status depend on socio-environmental conditions. *International Journal of Epidemiology* 1996;**25**:585-92.

214. Victorian Government. Growing Victoria Together. Department of Premier and Cabinet. 2001. Melbourne.

215. World Health Organisation. Ottawa charter for health promotion. 1986. Ottowa, World Health Organisation. International Conference on Health Promotion. 17-11-1986.

216. McGrath P, Cappelli M, Wiseman D, Khalil N, et al. Teacher awareness program on child abuse: Randomized controlled trial. *Child Abuse & Neglect* US;**11**:1987-132.

217. Waters E, Haby M, Wake M, Salmon L. Public health and illness prevention in children: current practices of Victorian GPs and barriers to participation. *Medical Journal of Australia* 2000;**173**:68-71.

218. Waters, E., Shield, J., Nolan, T., Green, J., Elkington, J., Moller, J., Hunter, K., and Haynes, K. Evidence-Based Health Promotion: No. 4 Child Injury Prevention. 2001. Melbourne, Department of Human Services.

219. Claes M. The social network of adolescents: Proximity of relationship and personal adaptation. [French]. *Cahiers Internationaux de Psychologie Sociale* 1905;No 21 Mar 1994, 5-22. De Boeck-Universite, Belgium.

220. Giovino GA. Epidemiology of tobacco use among US adolescents. *Nicotine & Tobacco Research* 1999; **1**:S31-S40.

221. Goldfeld, S. Utilisation of health services in the first 12 months of life. 2001.

222. Mandl K, Tronick E, Troyen B, Alpert H, Homer C. Infant Health Care and Maternal Depression. *Archives of Pediatrics & Adolescent Medicine* 1999;**153**:808-13.

223. Howes C. Caregiver behavior in center and family day care. *Journal of Applied Developmental Psychology* 1999;**4**:Jan-Mar.

224. Newacheck PW,.Halfon N. The Association Between Mother's and Children's Use of Physician Services. *Medical Care* 1986;**24**:30-8.

225. Lucas CA,.Rosenthal TC. Access to health care in rural western New York State. *New York State Journal of Medicine* 1992;**92**:465-9.

226. Wood DL, Hayward RA, Corey CR, Freeman HE, Shapiro MF. Access to medical care for children and adolescents in the United States. *Pediatrics* 1990;**86**:666-73.

227. Blendon RJ, Aiken LH, Freeman HE, Corey CR. Access to medical care for black and white Americans. A matter of continuing concern. *JAMA* 1989;**261**:278-81.

228. Roth L,.Fox ER. Children of homeless families: health status and access to health care. *Journal of Community Health* 1990;**15**:275-84.

229. Cunningham PJ. Access to care in the Indian Health Service. *Health Affairs* 1993;**12**:224-33.

230. Flores G,.Vega L. Barriers to health care access for Latino children: a review. *Family Medicine* 1998;**30**:196-205.

231. Forrest C,.Starfield B. Entry into primary care and continuity: the effect of access. *American Journal of Public Health* 1998;**88**:1330-6.

232. Rice DP,.Danchik KM. Health service access and utilization by children. *Urban Health* 1980;**9**:26-7.

233. Smedley BD, Syme SL. Promoting Health Intervention strategies from social and behavioral research. Washington DC: National Academy Press, 2001.

234. Ysseldyke, J. E. and Thurlow, M. Developing a Model of Educational Outcomes. University of Minnesota, College of Education. 1. 1993. Minneapolis, National Centre on Educational Outcomes.

235. Peisher, A. V. and Bales, D. W. An application of the conceptual model of outcomes of the National Centre on Educational Outcomes for the children, Youth and Families At Risk. National Working Group for Children. 1998.

236. Ysseldyke, J. E. Educational Outcomes and Indicators for Early Childhood (Age 3). 1993. Minneapolis, National Centre on Educational Outcomes.

237. Ysseldyke, J. E. Educational Outcomes and Indicators for Grade 4. 1994. Minneapolis, National Centre on Educational Outcomes.

238. Ysseldyke, J. E. Educational Outcomes and Indicators for Grade 8. 1994. Minneapolis, National Centre on Educational Outcomes.

239. Thurlow, M. L. and Ysseldyke, J. E. Can All Really Mean All in Defining and Assessing Student Outcomes? Synthesis Report 5. National Association of State Directors of Special Education. 1993. Minneapolis, National Centre on Educational Outcomes.