

Support for the Early Years and Australia's Future Health: The Australian Early Development Index

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Abstract

Substantial evidence supports the early years of child development as crucial to setting the foundation for competence and coping skills that will affect learning, behaviour and health throughout the life course. The subject of early child development must be a high priority for communities, and their governments - from macro policy development to local service delivery. With resources scarce it is vital that all policies and services for children and families are based on solid evidence. This evidence needs to be of high quality, replicable for benchmarking, freely available to all residing and working in the community and reflect the breadth of child development.

The Canadian designed Early Development Index (EDI) is a population level instrument that measures five developmental domains: language and cognitive skills, emotional maturity, physical health and well-being, communication skills/general knowledge and social competence. The EDI provides a scorecard for communities interested in learning what is going right and wrong for their children. It also provides evidence that communities can use to advocate for improvement of programs and facilities relevant to the early years. In 2002 the North Metropolitan Health Service (NMHS) piloted the EDI in seven suburbs, the first time the EDI had been utilised outside Canada. Positive results led to the development of Communities for Early Life[®] (CEL). CEL is a framework to facilitate NMHS' Population Health Program to work with local communities. Central to CEL is the results of the EDI.

In September 2003 the EDI was implemented throughout the NMHS and a number of rural sites involving over 4,600 five year-old children. The results indicate that the majority of suburbs are doing well in raising their children, however 26% of children were classified as vulnerable – scoring in the bottom 10% in one or more of the EDI domains. Within the CEL framework the NMHS are disseminating this information in the form of geographical maps, overlaid with community assets to highlight variations in suburbs. This is supporting communities to improve the delivery of Early Childhood Development programs and direct resources to the areas of greatest need. There is sufficient research to know that, with intervention, it is possible to improve the outlook for vulnerable children.

Keywords

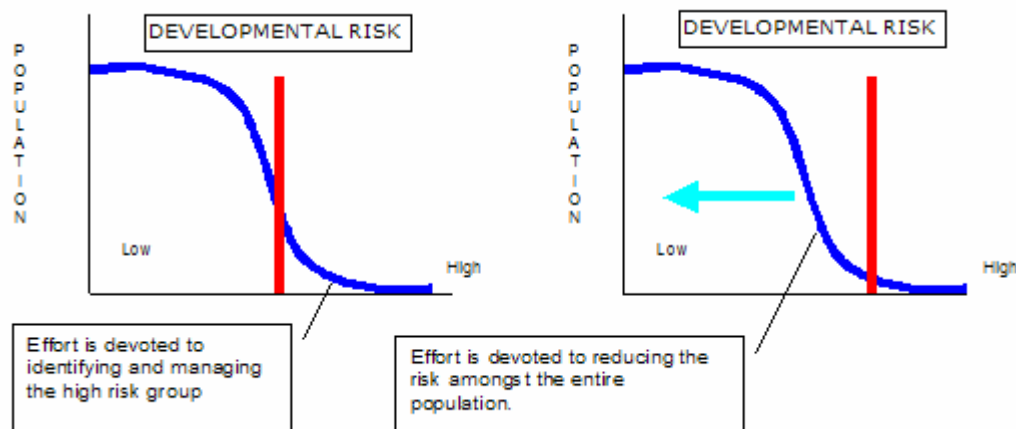
EDI, Early Development Instrument, community mobilisation

Introduction

Many, and an increasing number of children are beginning primary school with the behavioural, emotional, academic, and social development problems that may lead to school failure, poor health, addiction, welfare dependency and criminal behaviour (1). However, children who enter first grade with adequate social and communication skills, with the ability to cope with frustration and stress, and with age-appropriate motor, language and cognitive development levels are able to take advantage of the learning opportunities offered by school (2).

Conception to school age is a critically important time in brain development (3) and early childhood experiences have a decisive impact on the architecture of the brain, and thus on the nature and extent of adult capacities (4). The environment that shapes child development involves not only family and the immediate neighbourhood but also includes the socio-economic, political and cultural environment (5-8). In 1895 Emile Durkheim wrote “the group thinks, feels and acts entirely differently from the way it’s members would if they were isolated. If therefore we begin by studying these members separately we will understand nothing about what is taking place in the group.” (9). An over reliance on individual-level data and measurements has tended to lead to an over individualistic approach to the determinants of health (10). Individual level data may not be appropriate if we are seeking to determine social environmental influences on child development.

There is a growing appreciation of the value of the population health approach applied to adults (11-19), however this appreciation seems less apparent in the paediatric population where most efforts have focused on children’s disorders, disabilities and deficits (20-21). It is now realised that greater benefits would be achieved through the delivery of universal community based programs, reducing risk factors among the entire population. This is a key public health strategy (22) that has not, until recently, been applied to children (6). Those that are familiar with public health will recognise this as the Prevention Paradox: A preventative measure that brings large benefits to a community offers little to each participating individual, and so when many people receive a little benefit the total benefit to the community may be large (23). A population approach will see a shift in the entire curve to the left.



In Australia, despite the espoused value of child health and development indicators, none have utilised a population-based measure. The Canadian designed Early Development Instrument (EDI) provides the means to gain population level data on child development. It is a population-level measure of children’s readiness to learn at school entry (24).

The Population Health Program of the North Metropolitan Health Service of Perth, in collaboration with the West Coast and Swan District Education offices, followed the Canadian example by exploring the use of their Early Development Instrument (EDI) in Western Australia as a tool to gauge childhood development, to assist in policy formation and program development and to provide the impetus to mobilise communities.

Methods

An agreement was formed between the Population Health Program of the North Metropolitan Health Service, the Western Australian Department of Education & Training, and the Offord Centre at McMaster University to cover our use of the Early Development Instrument. It was understood that all Offord EDI materials and the modifications to existing materials remain Offord proprietary information.

The Early Development Instrument is a teacher-completed checklist designed at the Offord Centre, formally known as the Canadian Centre for Studies of Children at Risk, McMaster University. The EDI consists of 112 core questions addressing five areas: physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge (Table 1). Teachers complete the questionnaires based solely on personal observation without consulting the individual student. Teachers are also asked to provide information on any disabilities of the child, attendance at an early intervention program, history of non-parental care prior to entering pre-school and basic demographic data like gender, suburb of residence and primary language spoken.

Table 1: Five Domains of the EDI

EDI domain	Characteristics addressed
Physical health and well-being	Children's fine and gross motor skills, energy levels, fatigue and clumsiness
Social Competence	Self-confidence, tolerance, ability to get along with other children, to accept responsibility for their own actions, to work independently
Emotional health and maturity	Children's general emotional health and maturity. It also identifies minor problems with aggression, restlessness, distractibility or inattentiveness as well as excessive regular sadness.
Language and Cognitive development:	Mastery of the basics of reading and writing, interest in books, and numerical skills.
Communication skills and general knowledge	Children's general knowledge, their ability: to articulate clearly and their ability to understand and communicate in English.

In Canada, testing found the EDI to have good internal and test-retest reliability and external validity (24-27). In WA we conducted a series of multi-disciplinary meetings (including key teachers, principals, school psychologist, epidemiologist, public health physician, and health promotion practitioner) to review and reword the EDI to suit the Australian context. Minimal changes included replacing "washroom" with "bathroom" and changing the Canadian childcare arrangements to reflect the Western Australian childcare system. Associated changes were made to the Teacher Guidelines and the passive Parental Consent Form was developed. There is no recording of student name on the EDI. The new version of the EDI was piloted in a convenience sample of seven primary schools in 2002. Teachers indicated that the questionnaire was easy to complete and the Teacher Guidelines were largely comprehensive with minor suggestions made for refinement (28). The 2002 pilot study prompted the use of the EDI across the entire North Metropolitan Health Service and interested rural localities in the south of Western Australia in 2003.

In 2003, all schools, government and non-government, in the North Metropolitan Health Service region of Western Australia were informed of the project and invited to participate. Participation rates and numbers of students involved are shown in table 2.

Table 2: Participation Rates for the 2003 EDI North Metropolitan Area

	Government		Non-Government		TOTALS	
	Schools	Students	Schools	Students	Schools	Students
Target	111	4228	57	2165	168	6393
Recruited	95	3574	36	1350	131	4924
Participated	86%	85%	63%	62%	78%	77%
Returned	92	3337	29	982	121	4319
Participated	83%	79%	51%	45%	72%	68%

Schools chose not to participate for the following reasons: Teacher reluctance to take time out of class; some schools were recently involved in other research projects and the remaining schools had teachers that were ill. Materials from three schools were not returned. Two of these schools withdrew due to teacher illness and one due to the “industrial climate”. Eighty three percent of the government schools participated, representing 79% (n=3337) of children attending the government pre-primary year of 2003. There was a lower rate of participation in non-government schools.

The EDI was applied to children who turned five in 2003. The schools were allocated relief time for the pre-primary teachers to complete the checklists during a specified period of the school term. Teachers completed the EDI late third term having known the children for several months. Data on children who had been in the class less than 1 month were excluded from the analysis.

Data entry was performed locally. Data analysis was conducted utilising SPSS v.11.5 software package. Individual items on the checklist were summed into a single score for each of the five developmental domains and to give a total EDI score. Syntax for the computation of the domain scores was provided and results double-checked by McMaster University. A child who scored in the bottom 10% in one or more of the five developmental domains was classified as *vulnerable* and a child scoring in the bottom 10% in two or more of the development domains classified as *high-risk*. The aggregated Scores were allocated to the suburb of residence of the child, not the suburb the school was located in. The suburb level aggregated data set was imported into MapInfo v.7 software package to produce geographical thematic maps.

Results

The NMHS’s population is vast, covering approximately 980 square kilometres, and diverse, containing 38% of the Perth metropolitan population with a mix of old and young, rich and poor, and people of differing ethnic backgrounds and cultures. A package of socio-economic, demographic and health impact maps have been compiled to present to community groups across the Health Service including; unemployment rates, education levels, occupation types, family structure, family income, age ranges, percent Aboriginal, percent non-English speaking at home, teenage parents, suicide rates, child maltreatment reports, smoking rates, physical activity rates and use of public transport. Data for these maps have been sourced from the Australian Bureau of Statistics, Health Department data sets and Department of Community Development data sets. Added to these maps are the EDI results including a map for each of the following; social competence, emotional maturity, language and cognitive development, general knowledge and communication skills, physical health and well-being, vulnerable social competence, vulnerable emotional maturity, vulnerable language and cognitive development, vulnerable general knowledge and communication skills, and vulnerable physical health and well-being.

The patterns of child development across the suburbs are closely associated with the patterns of socio-economics across the suburbs, however there are a few exceptions. The maps also reveal suburbs that perform poorly on one developmental domain but well on others. These patterns provide communities an indication of how their children are going in comparison to other surrounding suburbs within the context of their socio-demographics. Figure 1; Unemployment, is an example of the socio-economic maps, and figure 2 is an example of the EDI maps; Vulnerable Physical Health and Well-being.

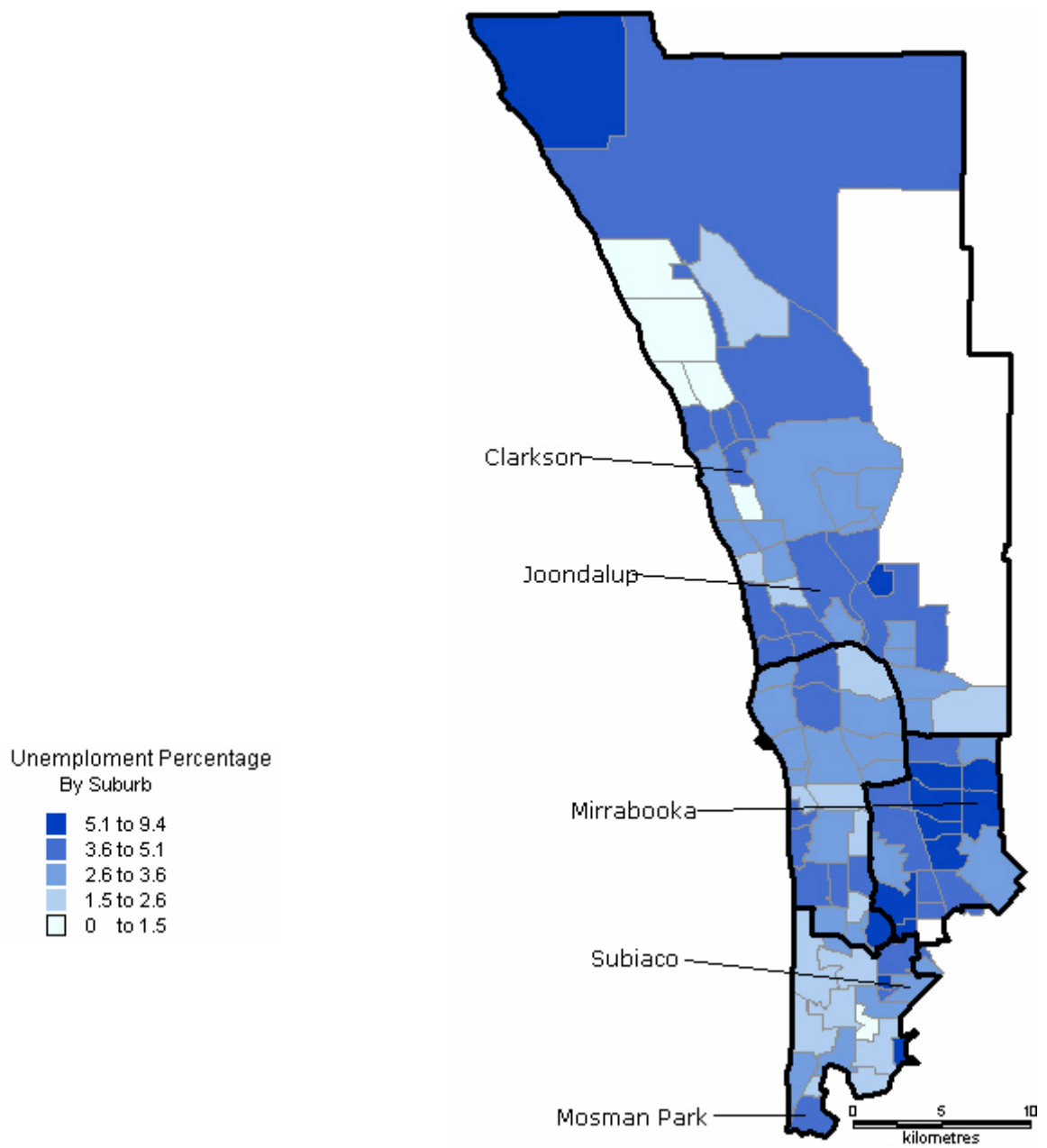


Figure 1: Unemployment in the North Metropolitan Region of Perth, Australian Bureau of Statistics, 2001 Census data.

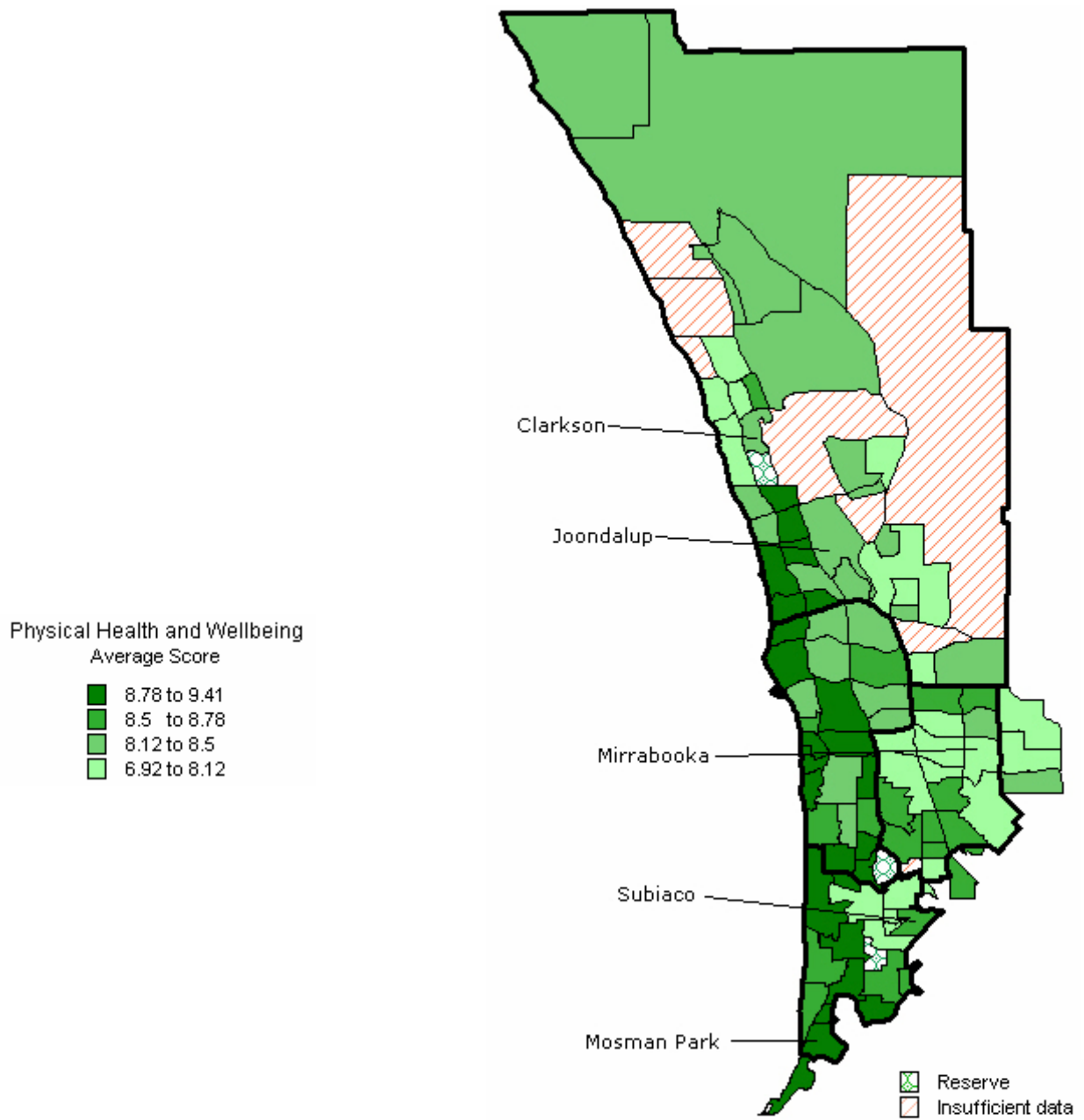


Figure 2: Vulnerable Physical Health and Well-being, NMHS 2003 EDI data.

EDI data was obtained for more than 60 suburbs across the NMHS and the selected rural communities. For the purposes of this paper 4 vastly different localities have been chosen to exemplify how the EDI has been utilised by these communities. Table 3 presents EDI outcome data and Table 4 presents socio-economic indicators for the selected 4 suburbs.

Table 3: EDI results for the selected suburbs.

Locality	Mean score Physical Health and Well-being	Mean score Social Competence	Mean score Emotional Maturity	Mean score Language and Cognitive	Mean score Communic. Skills & General Knowledge	Percent Vulnerable	Percent High Risk
1 (n=131)	7.91	7.53	7.72	7.27	5.3	39%	27%
2 (n=110)	7.69	7.97	7.66	8.3	6.03	32%	17%
3 (n=64)	7.85	8.39	8.32	7.41	5.73	29.7%	12.5%
4 (n=41)	9.0	8.4	7.86	8.58	7.36	17%	5%
WA average	8.34	8.06	7.83	7.98	6.21	29%	15%

Table 4: Socio-economic indicators for the selected suburbs

Locality	Unemployment rate	Percent non-English speaking at home	Percent Aboriginal	Percent completed high school
1	7.1	30.7	6.8	27.0
2	4.5	9.0	2.4	34.7
3	5.2	5.2	6.5	28.0
4	2.1	15.5	0.9	57.5
WA average	7.5	13.4	3.2	38.3

Data sourced from the Australian Bureau of Statistics – Census 2001 data.

Locality 1 is a metropolitan low socio-economic suburb with high proportions of both Aboriginal and ethnic communities. The area has established local government and non-government social agencies and has a proactive community group that had been established before the implementation of the EDI. The EDI results have been disseminated to the local agencies and community groups by presentations and reports. Interagency planning sessions to identify the needs in the community and to devise programs to address these needs are being conducted in conjunction with a comprehensive community assets audit being compiled. The Smith Family has recently received significant federal funding for early intervention programs and community capacity building around the early years for this and the surrounding suburbs. The EDI will be utilised as an evidence base to help inform the work and will be used as a tool to evaluate the strategies and interventions put in place.

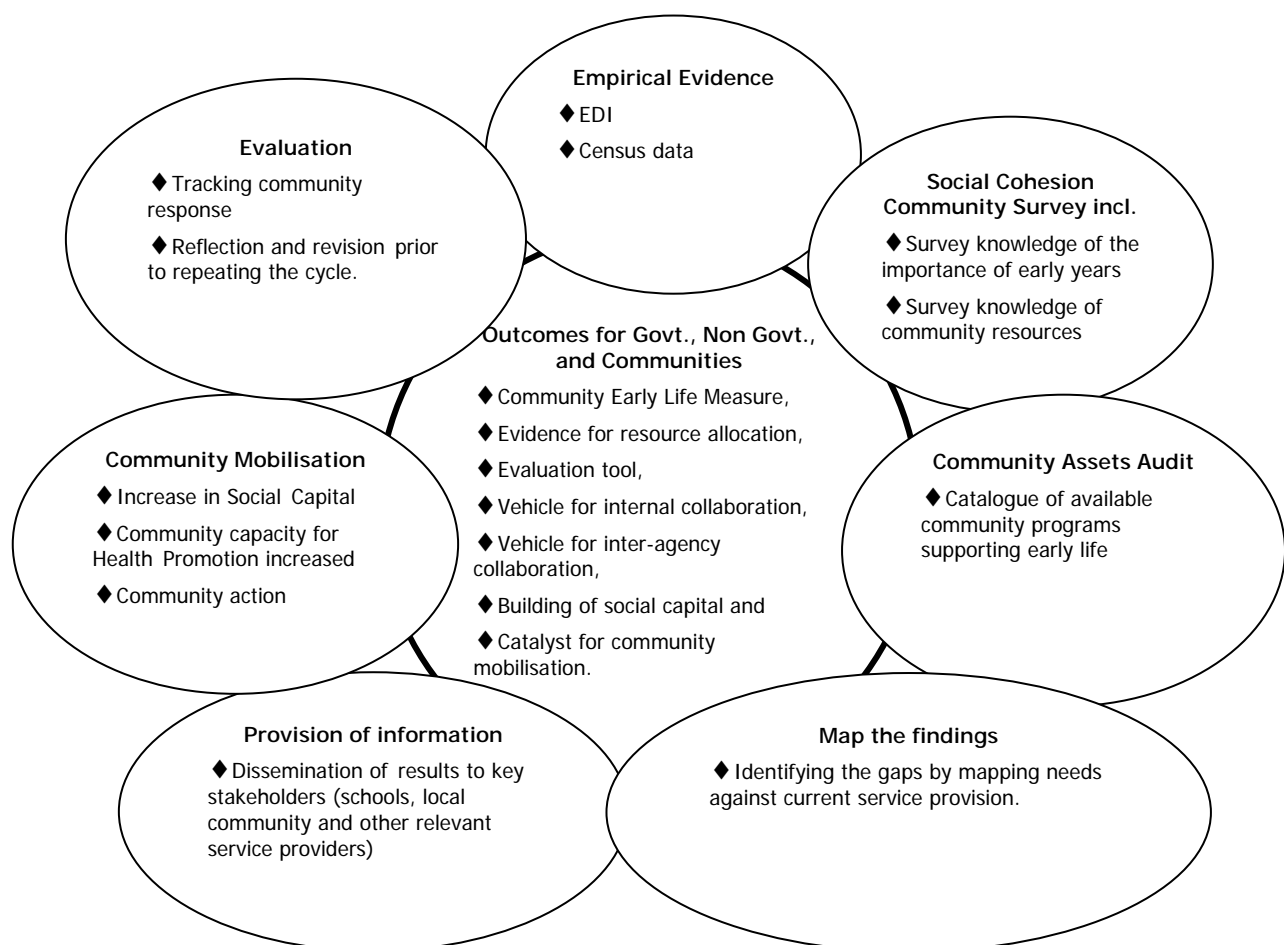
In Suburb two, the staff of a local primary school surveyed acknowledged the results of the EDI and recognised a need for early intervention and the importance of creating supportive partnerships with parents to improve students' long-term outcomes. The suburb is relatively young in terms of history and population age, low socio-economic and very isolated with minimal local government agency support in the area. A Parenting Information Café has been set up in the school grounds and a 0-3 year old program developed. The aim of this program is to actively engage parents in their children's early developmental learning process. A play-based learning program provides the parents with the skills to facilitate the best possible learning opportunities for their children. The funding and resources obtained from local, state and federal agencies for the implementation of these initiatives is directly attributed to the evidence base provided by the EDI. The "Café" has now become a central community location for many local government and non-government agencies to deliver and promote their services.

Locality 3 is a rural area in the Central Great Southern region of Western Australia. In 2002 a Speech Pathologist and local School Teacher joined forces to develop and establish 'A Smart Start' program. Objectives of this program involve establishing personal links with all families of children 0 - 4 years old, supporting parents with the skills and knowledge to provide their children with an optimal learning environment, developing resource materials to enhance literacy acquisition, and providing and promoting research-based developmental milestones. The over-riding outcome of 'A Smart Start' in each community is

to attain a 'shift in thinking' in each community, to one of community ownership and responsibility for nurturing their young. Across this area Child Health Nurses have taken on the role of 'first point of contact' and deliver the beginnings of the resource manual and the book gift on behalf of the shire. Volunteer mentors and distribution personnel are working within the community and a 'Smart Start' database is up and running. Information mornings, covering topics of parent's choice are being run regularly. A partnership has been formed with the State Library and local Libraries ensuring that each 'A Smart Start' library is well stocked with books for 0-4 year olds, and parenting books. At a local level, significant financial and 'in kind' contributions are being made within each local community by Health, Education, Local Schools, Local Service Clubs and Local businesses. Planning and implementation of the strategies is community driven at all levels. The community requested the support of the NMHS to enable them to conduct the EDI to be utilised across the rural region to provide a baseline to evaluate the effectiveness of the community based "A Smart Start" program.

Locality 4 is a high socio-economic inner metropolitan suburb. Within this suburb there were no established local community groups, community based parenting or intervention programs around the early years. Since the release of the EDI results, teachers have got together with health promotion and community nursing staff to develop a package of developmentally appropriate strategies to support early intervention. There is recognition of the need to promote awareness of the importance of the early years in the community and to involve parents and the local community. A local network is currently being established.

Each community has responded to the EDI results in a different fashion. The level of activity or mobilisation in a community appears to influence how the EDI results are being utilised. The Population Health Program, NMHS developed the Communities for Early Life Framework to facilitate the work of staff and other local community based organisations to work together. Central to the framework is the EDI.



Conclusion

The suburbs performing poorly on the EDI were generally associated with lower socio-economic indicators; however, there were some suburbs that did well despite poor socio-economic circumstances. For those suburbs where the children are doing well despite the difficult socio-economic environment, we need to look closer and investigate the factors that are unique to that suburb. These factors may be protecting and supporting positive child development.

This corroborates results from Canada, which have shown that some disadvantaged suburbs with low parent education and family income have performed better than expected on the EDI. When examined further having an integrated system of accessible, quality, and diverse early child development and parenting program supports in place seem to compensate for socio-economic disadvantage (6). This supports the idea that socio-economic characteristics are not the only factors in children's readiness to learn at school. Additionally, where appropriate and accessible early child development and parenting programs exist, community efforts appear to compensate for socio-economic risk (29-35).

Based on experience in Canada, it is anticipated that informing communities of the importance of the early years with the results of the EDI, will galvanise a range of agencies to work together to improve the environment in which children are nurtured. Evidence of effective early child development programs are available and Governments at a national, state and local level are recognising and implementing policies and strategies that will help support local endeavours. Communities across the NMHS are already starting to show signs of mobilisation. Initiatives that have stemmed or are supported by the EDI will be tracked over the following years to investigate the utility of the EDI in Australian communities.

The findings of this study have been and continue to be presented to schools and local communities in mapped form. Feedback at presentations establishes the mapped data as easily understood by visually highlighting those suburbs with vulnerable or high-risk children. The Early Developmental Instrument has provided the means to add child development indicators to existing demographic and social data in an easily understandable form. As the data is pooled and analysed by suburb, the information is specific at the local community level and it is the group rather than the individual that is the unit of observation. Provision of this data in a local community setting has provided the evidence for targeted interventions by identifying local areas of need, with the specific child development data determining appropriate intervention strategies.

A strength of the EDI is in fact that it applies to all children in the community and therefore interventions based on results of the EDI reflect the needs of all children and not only those targeted as being at risk. Our study suggests that the EDI may provide a valid measure of children's early developmental status, and has the potential to lead community action. Repeat measures of the EDI has the potential to be used as an evaluation tool for community services and programs impacting on families and early life. Federal funding from Family and Children's Services has now been provided to the Centre for Community Child Health, Royal Children's Hospital Melbourne and the Telethon Institute for Child Health Research, Perth to further the work presented in this paper. The federal funding will further adapt and validate the EDI to suit the Australian context, develop mechanisms to facilitate the use of the EDI as a tool to reorient community level services and systems for young children and their families and to encourage, evaluate and support the take-up of the EDI in a number of sites across Australia. Further information regarding this paper and the national initiative can be sourced from the following website; www.australianedi.org.au.

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