

**Neighbourhood Effects Influencing Early Childhood Development:
Conceptual Model and Trial Measurement Methodologies from the
Kids in Communities Study**

Author

Goldfeld, Sharon, Woolcock, Geoffrey, Katz, Ilan, Tanton, Robert, Brinkman, Sally, O'Connor, Elodie, Mathews, Talya, Giles-Corti, Billie

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Abstract

Socio-environmental factors, including the neighbourhoods in which children live and grow, are key determinants of children's developmental outcomes. Thus, it is important to examine and consider the relationships between these factors and the multiple contexts that influence children. Drawing on a broad disciplinary range of existing research, we aimed to develop a conceptual model of neighbourhood effects influencing early childhood development. The neighbourhood effects literature was reviewed with a specific focus on existing models and frameworks. This review was then further expanded through consultation with our cross-disciplinary research collaboration (Kids in Communities Study Collaboration). From this a theoretical model specific to early childhood development was developed. The hypothesised model comprised five interconnected domains: physical, social, service, socio-economic, and governance. A small trial of indicator measurement was conducted and findings were used to make a series of recommendations regarding measures or indicators which might provide useful and effective for neighbourhood effects research. The proposed model provides a useful and novel conceptual framework for classifying neighbourhood effects research. By synthesising disparate but related areas of research, the resultant five domains provide a useful approach to understanding and measuring child development in the context of community and environment, therefore advancing knowledge in this area. Expanding the current neighbourhood effects paradigm to accommodate broader constructs appears critical in considering the multiple environments that may act as key determinants of children's wellbeing and psychosocial outcomes.

Keywords: Australian Early Development Index (AEDI); community indicators; early childhood development; environment; neighbourhood.

1 Introduction

Optimal early life experiences increase the likelihood of children living healthy, productive and fulfilling lives. The science supporting the ecology of childhood suggests that socio-environmental factors including the family, the community, and institutional and service settings, are key determinants of children's wellbeing and psychosocial outcomes (Hertzman 2010).

The ecological view of early childhood development (ECD) focuses on the constant interaction between individuals and their social and physical environment (Bronfenbrenner 2004, 1992, 1977, 1979, 1986, 1994). Bronfenbrenner (1994) proposed that the ecological system is comprised of five subsystems, each of which contribute to our understanding of ECD: the *microsystem* refers to the immediate surroundings of the child (e.g. parents, siblings, other family members, peers, role models); the *mesosystem* refers to the relationship and connections between immediate settings (e.g. school, home, neighbourhood); the *exosystem* refers to indirect influences (e.g. parental workplace, schools boards, religious and community organisations, parental social networks); the *macrosystem* refers to the ideological interchange between the micro-, meso-, and exo-systems (e.g. social stigma); and the *chronosystem* refers to the changing nature of the system or environments over time (e.g. history of the neighbourhood).

This more sophisticated and complex approach to ECD highlights the importance of examining the multiple contexts that influence children as well as the relationships between these contexts (Leventhal and Brooks-Gunn 2000). There is increasing recognition by child development researchers that the environment, including the neighbourhoods in which children live and grow, is a key determinant of children's wellbeing and psychosocial outcomes (e.g. Prior 2005). This paper draws on the existing research to develop a conceptual model of neighbourhood effects influencing early childhood development; and reports on outcomes of a trial approach to measurement in communities.

There are some definitional differences between the terms neighbourhood and community.

Community generally may refer either to a place or a group of people with something in common, while neighbourhood concerns the concept of geographical nearness or proximity (Barry 1994). In the

Australian context, the term community tends to refer to the geographic construct of neighbourhoods. Thus, in this paper the terms neighbourhood and community are used interchangeably.

1.1 Concepts of neighbourhood effects

In 2002, Sampson, Morenoff, and Gannon-Rowley (2002) reviewed the available literature and proposed a set of consistent findings regarding neighbourhood effects and their relevance to children and adolescents: (1) social inequality (in the form of socio-economic and racial segregation) present within and between neighbourhoods; (2) social problems (such as crime and school dropout) which tend to cluster together in neighbourhoods; and (3) social inequality and social problems which cluster together. These findings are reasonably consistent even across different conceptualisations and measurements of neighbourhoods; with a noted increase in both the concentration of poverty and the concentration of affluence over time. In proposing a model of neighbourhood effects influencing ECD, we have taken into consideration these key findings.

Alongside the conceptual thinking are a number of methodological challenges in the study of neighbourhood effects, the largest of which is selection bias (Sampson et al. 2002). It is difficult to separate the effect of neighbourhood on children's developmental outcomes from the effect of the family, as families often choose where they live (Leventhal and Brooks-Gunn 2003). For example, parents who value educational achievement may choose to live in a neighbourhood with a highly-regarded school and encourage their child to do well at school. Good school performance may then either be due to the school (a neighbourhood effect) or the parents (a family effect), or a combination of both neighbourhood and family (Ellen and Turner 1997). Given this interplay, it is clear that exploration of neighbourhood effects that influence children's developmental outcomes will benefit from multi-level statistical analyses and as well as mixed methods approaches in order to clarify and specify these complex relationships.

Indeed the term eco-epidemiology (Susser and Susser 1996a, 1996b) was coined to emphasise the importance of examining multi-level causation and highlight the connection between epidemiology and public health. Importantly, it is argued that the static notion of risk factors should be studied alongside trajectories of health over the life course, the effects of social contexts, the spread of

diseases and behaviours, genetic causes, and historical trends (March and Susser 2006). Multi-level analysis is central to an examination of contextual factors in order to study the implications of inequalities (March and Susser 2006; Muhajarine et al. 2006). This means that, rather than simply examining whether neighbourhoods matter for children's developmental outcomes, it is more valuable to examine how characteristics of children, families, and neighbourhoods interact to shape a child's development (Swisher 2008). Using an eco-epidemiological approach to measuring neighbourhood effects is therefore central to the recognition of any multi-level causation.

1.2 Mechanisms of neighbourhood effects

There have been numerous attempts to explain the mechanisms through which neighbourhoods may influence individual behaviour, many of which share considerable overlap. In particular, Jencks and Mayer (1990), Leventhal and Brooks-Gunn (2000, 2003, 2008), Sampson, et al. (2002), and Galster (2012) have made significant contributions to this field of research. Table 1 details a summary of these existing models of neighbourhood effects.

INSERT TABLE 1 ABOUT HERE

The limitations of these existing models of neighbourhood effects include not being specifically designed with ECD in mind. However, examination of these proposed mechanisms of neighbourhood effects highlights the potential for researchers to document the impact of distinct mechanisms and hypothesise their likely influence on children's developmental outcomes.

2 Theoretical model

As a consequence of reviewing the existing literature, the Kids in Communities Study (KICS) collaboration have developed a model that attempts to wholly encapsulate the neighbourhood processes that influence children's developmental outcomes (Figure 1; Goldfeld et al. 2010) as best as possible, taking into account the conceptual thinking to date. The KICS collaboration includes members who cross the social, political, and health sciences, as well as both academic and government organisations, across Australia and Canada. Thus, development of the KICS theoretical model included a combination of expert input, and examination of the neighbourhood effects

literature reviewed above. Stemming primarily from Sampson et al.'s (2002) seminal classification of neighbourhood influences, but also referring to the mechanisms identified by Jencks and Mayer (1990), Leventhal and Brooks-Gunn (2000, 2003, 2008), and Galster (2012), the KICS model comprises five interconnected domains: physical, social, service, socio-economic, and governance. Each of these domains is detailed below.

INSERT FIGURE 1 ABOUT HERE

2.1 Physical domain

The physical environment encompasses Sampson et al.'s (2002) "routine activities" and includes parks, public transport, road safety, and housing. This categorisation taps more neatly into the physical setting literature and probably precedes neighbourhood effects research in chronology of genesis or, at least, in complexity. Physical setting scholarship dates back to before Jacobs (1961) and concentrates on urban planning, its social effects, and simply the shaping of the environment. Four types of neighbourhood models have been identified in the research literature about physical environments: *neighbourhood as site models* refer to the neighbourhood in their physical form (e.g. houses, buildings, parks, and streets; Bennett 1993); *neighbourhood disorder models* refer to the decline of the neighbourhood as a result of physical (and social) incivilities (Garbarino 1995; Wandersman and Nation 1998); *environment stress models* refer to noise, crowding, pollution, high-density, and high-rise buildings (Wandersman and Nation 1998); and *routine activities models* highlight local land use patterns and access to school and public transport (Sampson et al. 2002). These models used to frame discussion about the physical environments can be applied to promote understanding of the relationship between the physical environment and ECD. Greater understanding of this influence can be used by researchers to start thinking about how they may manipulate the physical environment in order to encourage better developmental outcomes for children.

2.2 Social domain

The social environment includes Sampson et al.'s (2002) "social ties/interaction" and "norms and collective efficacy", as well as social capital, neighbourhood attachment, crime, trust, and safety. This

domain also includes cultural influences, in recognition of the significant effects of culture and ethnicity on child development. Not surprisingly there is some overlap between the influence of social and physical environments, and both have the potential to bear upon children's development. Indeed, it is clear that physical barriers, such as rivers and freeways, can influence social interactions and service access, highlighting how the physical, social, and service domains are all interconnected, even at this simple level. Central to discussion of the social environment is exploration of community social capital (Coleman 1988; Coleman and Hoffer 1987). In particular, community capital consists of four components: social support networks; civic engagement in local institutions; trust and safety; and degree of religiosity (Coleman and Hoffer 1987). The social environments in which children grow, develop, and learn to interact have a potentially large bearing upon their developmental outcomes. Identifying the specific factors that contribute to this is complex, and the various models detailed in the literature to date provide only a basis upon which to undertake further research.

2.3 Socio-economic domain

Although not specifically included by Sampson et al. (2002), this is proposed as another discrete domain of influence. Much of the evidence relating to neighbourhood effects on children's developmental outcomes points to the salience of economic disadvantage as a key distal as well as proximal variable. Neighbourhood economic regeneration and development is also an area with significant policy implications at all levels of government. Combined with demographic considerations such as minority groups and ethnicity, this domain concentrates on the socio-demographic environment of communities. Various factors, such as affluence (Prior 2005; Eckersley 2004; Luthar 2003), poverty (Brooks-Gunn et al. 1993; Brooks-Gunn et al. 1999), and social exclusion (Atkinson 1998; Burchardt 2000; Bradshaw 2003), expose associations between family and neighbourhood economic positioning and children's developmental outcomes. These factors are influential at both the individual and neighbourhood level, and have potential impacts for children across key developmental domains, such as physical health and wellbeing, and social and emotional competence. Although economic factors such as poor neighbourhood socio-economic status may be regarded as risk factors, on their own they cannot be used to predict outcomes. It is only when

economic factors are viewed in combination with factors that mediate neighbourhood disadvantage, such as those identified in the discussion of the social and physical environments, that it becomes possible to deduce possible community level outcomes for children.

2.4 Service domain

Provision of services is based on Sampson et al.'s (2002) "institutional resources" and includes quantity, quality, access, and coordination of services. This domain concentrates on what is actually provided at the community level, and also provides for tangible policy solutions. Neighbourhood services cover a range of elements, including: access to parks and playgrounds; street lighting; footpaths; roads; access to public transport; shopping centres; and basic services such as banks and health care (Edwards 2006). Investigation into the relationship between socio-economic status and service provision reveals yet another way in which disadvantage may manifest; that is, through the delivery and availability of services that do not meet professional practice standards (Stanley and Kovacs 2003) or are inequitably distributed. For communities with poor socio-economic status, coupled with high diversity, the challenges to healthy child development and wellbeing are intensified as these communities require diversified and responsive services (Moore 2005). Finally, services that do not adopt a holistic view of children and deliver programs that are narrowly focused result in children with multiple needs often having some of their needs unmet (Preston-Shoot and Wigley 2005). Within the communities where such conditions prevail, service provision becomes a key community level factor that influences children's developmental outcomes.

2.5 Governance domain

The final domain is governance, and includes citizen engagement. While not specifically included by Sampson et al. (2002), it may include some elements of "norms and collective efficacy" but also includes innovative and successful implementation of policies through governance and leadership. It is important to recognise that governance and leadership influences over particular neighbourhood geographies may come from outside those borders; most notably, state and federal in the Australian context. Broader governance and leadership may in turn be mediated by more local "leaders" (such as local government), as well as service providers and stakeholders in neighbourhood boundaries who

work on ECD roundtables, or who lobby for investment and change. To date, little evidence exists to clearly tie governance to improved outcomes for children. What is apparent in the little research that does exist is that governance structures play a key role in driving change at a local level (O'Toole 2003). Members of marginalised groups are often denied access to decision-making forums and, thus, are unlikely to be in a position to influence policy (Painter and Philo 1995). There are benefits associated with transparent, accountable, and responsive governance structures (Department of Human Services 2006), indicating that when such models are employed, the impact at the community level is more likely to reflect community-level interests. The more responsive and inclusive governance and partnership structures are, the more likely that change will be driven by a desire to improve opportunities and services for all children.

Overall, there is sufficient research to suggest that the neighbourhoods and communities in which children live and grow have an important influence on ECD. The five identified domains – physical, social, service, socio-economic, and governance – may potentially interact to facilitate or hinder positive outcomes for children. Importantly, a model for understanding the neighbourhood effects of children's development outcomes must take into account dynamic and interactive social elements. Such a model should be refractive and malleable in that any interaction of an individual with his or her environment must inevitably make an impression on that environment (however minor); and the environment, which has been changed by the individual and others, will then continue to be a form of influence on the child.

The final aspect of this model is the interplay with the three tiers of Australian government policy: local, state, and federal. For this model, we propose that government policies are “filtered” as they are implemented, thereby differentially shaping each area of key neighbourhood influences. These influences may be directly experienced by children, but more likely are ultimately mediated through family. In recognising interplay not only between levels of government, but also between each of the five identified domains, the KICS model suggests a dynamic, eco-epidemiological approach to understanding children's developmental outcomes with a focus on constructs that may be amenable to change.

3 Trial measurement study

A small trial of measurement conducted by the KICS collaboration (Goldfeld et al. 2010) aimed to determine practical and robust methodologies for measuring the five domains (physical, social, socio-economic, service, and governance) of neighbourhood effects identified in the model. It was anticipated that the results would allow the collaboration to make a series of recommendations regarding which measures or indicators might provide useful and effective for neighbourhood effects research, particularly when taken to some level of scale.

Virtual working groups were established and led by various expert members of the KICS collaboration. The working groups then investigated and tested a combination of quantitative and qualitative methods for measuring communities' assets and challenges in the context of the five domains that may influence children's developmental outcomes. Identification of these methodologies were intended to provide guidance for neighbourhood effects researchers, as well as providing some benefit to communities looking to understand and explore the key neighbourhood influences on children's developmental outcomes. Following completion of the study (Goldfeld et al. 2010), it was determined both practical and feasible to measure neighbourhood effects that may be influencing children's developmental outcomes. A series of recommendations for methodologies which appear to be effective and practical ways to measure and/or describe the community context and its relationship to ECD were proposed (see Table 2; Goldfeld et al. 2010).

INSERT TABLE 2 ABOUT HERE

3.1 Physical domain

The physical domain working group aimed to develop a set of methodologies for measuring the influence of a community's built and natural environments (Goldfeld et al. 2010). Five important sub-domains of physical environment indicators were proposed: physical characteristics of buildings; building and housing ownership; park, leisure facility, and other community assets; proximity and accessibility of services and transport; and crime (especially vandalism). The key methodologies for

measuring these sub-domains were: Geographic Information System (GIS) maps, Google maps, neighbourhood observations, and walkability tools.

Data were collected for each of the sub-domains as following:

- *Physical characteristics of buildings*: Measures of quality, and density of high/low-rise buildings
- *Building and housing ownership*: Measures of rental housing, full ownership housing, part ownership housing, and public housing per capita
- *Park, leisure facility, and other community assets*: Measures of type, recreational area per capita, physical quality, and access to and quantity of green areas and leisure facilities
- *Proximity and accessibility of services and transport*: Measures of types of transport/transport routes, proximity of transport to key services and facilities, and walkability
- *Crime*: Measures of evidence of vandalism

3.2 Social domain

The social domain working group aimed to develop a set of indicators for measuring: social ties and community cohesion; crime/safety; neighbourhood attachment; and child friendliness (Goldfeld et al. 2010), each considered sub-domains. The primary methodologies were quantitative data collected through community surveys, and qualitative data collected through focus groups.

Data were collected for each of the sub-domains as following:

- *Social ties and community cohesion*: Measures of whether neighbours do favours for each other, and the number of neighbours spoken with for ten minutes or more in the last thirty days (data were not limited to families with children)
- *Crime/safety*: Measures of perceptions of neighbourhood safety, child abuse, vandalism/property damage, domestic violence, hooning, regulated public orders, behaviour in public, drug use, theft (vehicle), robbery, assault, and weapons/explosives
- *Neighbourhood attachment*: Measures of mobility, and liveability

- *Child friendliness*: Measures of perceptions of child friendliness of the community, and the proportion of households with children aged zero to four years

3.3 Socio-economic domain

Neighbourhood socio-economic status (SES) can be measured using the Socio-Economic Index for Areas (SEIFA; Australian Bureau of Statistics 2006) to create an index of advantage/disadvantage for postcode areas. The Index is derived from Census variables and allows ranking of regions/areas, in order to provide a method of determining social and economic well-being in a particular region. SEIFA comprises a suite of four indexes: Index of Relative Socio-Economic Disadvantage; Index of Relative Socio-Economic Advantage and Disadvantage; Index of Economic Resources; and Index of Education and Occupation (Australian Bureau of Statistics 2006). A matched community level data set was created, which included data from the Australian Early Development Index (AEDI; a relative population measure of early childhood development), SEIFA, and general Census data (Goldfeld et al. 2010). Analysis of this matched data set included examination of correlations between AEDI, SEIFA and Census variables, regressions with Census and SEIFA variables predicting AEDI variation, an analysis of potential school effects and area effects, and an analysis of AEDI developmental vulnerability.

3.4 Service domain

The service domain working group aimed to measure the service environment to determine the potential relationship between service delivery and children's developmental outcomes (Goldfeld et al. 2010). Following a review of the literature and discussions with key experts and stakeholders, it was determined that the most important constructs of the service domain were: quantity; cost; access; quality; and coordination.

Data were collected for each of the sub-domains as following:

- *Quantity*: Measures of total Early Years Services (EYS) quantity per capita for zero to four year olds

- *Cost*: GP services, childcare services, kindergarten services, outside school hours care, vacation care, and playgroups
- *Access*: Measures of access to public transport for all services, waitlists for childcare/kindergarten/ playgroup, hours and availability of General Practitioners, school enrolment restrictions, and Maternal and Child Health access
- *Quality*: Accreditation/licensing, class sizes for the first year of formal schooling, and group sizes for childcare/kindergarten
- *Coordination*: School transition programs (schools, kindergartens, childcare), and EYS partnerships

3.5 Governance domain

The challenge for the governance domain working group was to identify methodologies for describing and analysing the governance environment in which communities operate (Goldfeld et al. 2010).

However, this domain does not lend itself easily to quantitative analysis, and is interlinked with larger systems, such as local, state, and national level government; non-government; community; and private organisations. Thus, the governance domain was measured using two approaches: analysis of private citizen participation and engagement in governance activities, and qualitative analysis of the overall governance environment at the local government level. The key methodologies for measuring the governance domain were: grey literature analysis; interviews; focus groups; partnership meeting observations; and classification of governance structure. Data collected for the governance domain included measures of attendance at public meetings in the past twelve months, contact with stakeholders regarding a political issue in the past twelve months, and volunteering in the past twelve months.

3.6 Cross-domains

A combination of community surveys, focus groups, key stakeholder interviews, and small area level data were utilised.

4 Discussion

4.1 Summary

Healthy child development is the foundation for human capital and the basis for future community and economic development. A large and growing body of research emphasises the importance of the prenatal and early years for health and developmental outcomes throughout the life course (Shonkoff and Boyce 2009). For a growing number of children, sub-optimal developmental trajectories are well established by the time they start school, and become increasingly difficult and costly to modify with the passage of time (Feinstein et al. 2008).

Alongside this research, evidence (intervention, epidemiological, sociological, and qualitative) demonstrates the important influence the local environment has on the capacity of families to raise their children in ways that promote good developmental outcomes (Christensen 2003). The research into neighbourhood effects on children, originally motivated by the observation that disadvantage is often geographically concentrated and inter-generational (Brooks-Gunn et al. 1993), established the relationship between neighbourhood socio-economic status and children's developmental outcomes. Longitudinal research suggests structural characteristics such as poverty are mediated through community level social processes to influence the functioning of families and children (Kohen et al. 2008; Leventhal and Brooks-Gunn 2000).

Therefore, the neighbourhoods in which children live and grow are key determinants of wellbeing and psychosocial outcomes. Socio-environmental factors such as the family, the community, and institutional and service settings (Hertzman 2010) suggest that it is important to consider the multiple contexts that influence children's development, as well as the relationships between these constructs (Leventhal and Brooks-Gunn 2000). Investigation of how characteristics of children, families, and neighbourhoods interact to shape children's development is essential in order to study the implications of inequalities in childhood.

Drawing on a broad disciplinary range of existing research, we reviewed the neighbourhood effects literature with a focus on existing models and frameworks. To date, existing models of neighbourhood effects (e.g. Sampson et al. 2002; Jencks and Mayer 1990; Leventhal and Brooks-Gunn 2000, 2003, 2008; Galster 2012) are limited by not being specifically designed to incorporate ECD. Following our

review of the literature, we developed a conceptual framework with the aim of developing a model that wholly encapsulates the neighbourhood processes influencing ECD. In doing so, we provide a useful and novel approach to understanding and measuring child development in the context of community and environment.

The hypothesised model comprised five interconnected domains: physical, social, service, socio-economic, and governance. Thus, the model incorporates the physical setting: houses, buildings, parks, and streets that can be improved to enhance the lives of residents; social mechanisms which seem empirically to account best for child development outcomes; the level and quality of services and the availability of facilities within a local area; the socio-economic environment; and the quality of governance and leadership (including the interplay with the three tiers of government policy in Australia). Greater understanding of the five domains and how they potentially interact to facilitate or hinder positive outcomes for children facilitates a dynamic, eco-epidemiological approach to understanding ECD with a focus on constructs that are amenable to change.

Finally, we conducted a small trial of indicator measurement in order to determine practical and robust methodologies for measuring the five domains, and to make a series of recommendations regarding indicators which might provide useful and effective for neighbourhood effects research. Physical characteristics of buildings; building and housing ownership; park, leisure facility, and other community assets; proximity and accessibility of services and transport; and crime were identified as important sub-domains of the physical domain. Social ties and community cohesion; crime/safety; neighbourhood attachment; and child friendliness were considered sub-domains for the social domain. Neighbourhood socio-economic status was measured for the socio-economic domain. Quantity; cost; access; quality; and coordination were determined to be the most important constructs of the service domain. The governance domain was measured by analysing private citizen participation and engagement in governance activities; and the overall governance environment at the local government level.

4.2 Future directions

The KICS model provides a useful conceptual framework for classifying neighbourhood effects research in the context of ECD. Understanding and measuring each of the five domains reviewed here and examining their relationship with ECD outcomes appears to be key to advancing knowledge of the relationship between the neighbourhoods in which children live, learn, and grow, and their ongoing development. Despite creating some clarity in the area of measurement, the challenge remains as to the nature of the associations between each of these domains and sub-domains, and how to best confirm causality. This requires longitudinal data on outcome measures, as well as consideration of scale of measures and complex multi-method approaches to both control and examine the factors we propose as important.

The unique availability of census level outcome data of children's development (using the AEDI) at school entry provides an opportunity to empirically investigate these complex associations and mechanisms at a level of scale that may make it possible to draw robust conclusions. The AEDI is a relative population measure of early childhood development in communities across Australia, and is an Australian adaptation of the Canadian Early Development Instrument (Janus and Offord 2007). The AEDI provides information on five important domains of ECD: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills, and communication skills and general knowledge. Data were collected across Australia for more than 96% of 5 year olds in 2009 and 2012 (Centre for Community Child Health and Telethon Institute for Child Health Research 2009, 2012). Thus, it is now possible to potentially examine community level factors, utilising a multi-method investigation, across Australian states and territories, in order to identify modifiable community level factors that influence children's health and developmental outcomes in areas of advantage and disadvantage across Australia.

4.4 Conclusions

While neighbourhood effects research has traditionally focussed on the built and natural environments, the theoretical model of neighbourhood processes introduced here highlights a complex dynamic interplay of factors that places the child and the family in the context of a number of local environments. It is suggested that when these environments intersect with government policies, their

influence may play out in ways that may be more important for child development than previously thought. Our proposed measures could be utilised to help determine whether there are systematic community level factors that contribute to better or worse developmental outcomes for children. In a policy world that is increasingly focused on the importance of “place” (Byron 2010; Centre for Community Child Health 2011, 2012), identification of significant neighbourhood effects will have real benefits in terms of community planning and monitoring, as well as policy development at all levels of government.

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