



## Social exclusion, deprivation and child health: a spatial analysis of ambulatory care sensitive conditions in children aged 0–4 years in Victoria, Australia



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### ABSTRACT

Recent Australian policy initiatives regarding primary health care focus on planning services around community needs and delivering these at the local area. As in many other countries, there has also been a growing concern over social inequities in health outcomes. The aims of the analysis presented here were firstly to describe small area variations in hospital admissions for ambulatory care sensitive conditions (ACSC) among children aged 0–4 years between 2003 and 2009 in the state of Victoria, Australia, and secondly to explore the relationship of ACSC hospitalisations with socio-economic disadvantage using a comparative analysis of the Child Social Exclusion (CSE) index and the Composite Score of Deprivation (CSD). This is a cross sectional secondary data analysis, with data sourced from 2003 to 2009 ACSC data from the Victorian State Government Department of Health; the Australian Standard Geographical Classification of remoteness; the Australian 2006 Census of Population and Housing; and AMPCo General Practitioner data from 2010. The relationship between the indexes and child health outcomes was examined through bivariate analysis and visually through a series of maps. The results show there is significant variation in the geographical distribution of the relationship between ACSCs and socio-economic disadvantage, with both indexes capturing important social gradients in child health conditions. However, measures of access, such as geographical accessibility and workforce supply, detect additional small area variation in child health outcomes. This research has important implications for future primary health care policy and planning of services, as these findings confirm that not all areas are the same in terms of health outcomes, and there may be benefit in tailoring mechanisms for identifying areas of need depending on the outcome intended to be affected.

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### Introduction

Since the election of the Australian Labour Government in 2007, Australia's health reform policy has focussed on tackling major access and equity issues and the role that primary health care may have in addressing these (Australian Government, 2009, 2010). A key component of this is the need for health policy and planning to be socially inclusive and address existing socio-economic gradients in health and health care accessibility. As part of its reform agenda, and in response to the existing fragmented primary health care system, the Australian Government has set about establishing a network of primary health care organisations, known as Medicare

Locals. These are responsible for improving the delivery of primary health care services with a particular emphasis on planning services on the basis of local needs and finding solutions based on local knowledge (Australian Government, 2010). A geographic approach through small-area-level analysis of available data offers a potential avenue to identify local needs and assist in service planning. This study investigates geographic variation and inequalities of a child health outcome at the small-area-level that may assist in planning primary health care services based on local needs.

Understanding inequalities in health is fundamental for addressing access and equity issues relevant to the delivery of primary health care services. Inequalities in health arise because of inequalities in the conditions of daily life under which we are born, develop as young children, grow into teenage years and adulthood, and live into old age (Chittleborough, Baum, Taylor, & Hiller, 2006; Marmot et al., 2010; WHO, 2008). Furthermore, the nature of where people live, such as neighbourhood disadvantage, influences their

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health independent of individual characteristics (Diez Roux, 2001). Health research, in Australia and internationally, has examined social exclusion and socioeconomic deprivation at the small-area-level – both generally (Harding, McNamara, Daly, & Tanton, 2009; McLennan et al., 2011; Tanton, Harding, Daly, McNamara, & Yap, 2010; Vinson, 2007) and with specific reference to health (Adhikari, 2008; Banham, Jury, Woollacott, McDermott, & Baum, 2011; Butler, Petterson, Bazemore, & Douglas, 2010; Campbell, Reynolds, Cunningham, & Minnis 2011; Congdon, 2011; Krieger, Chen, Waterman, Rehkopf, & Subramanian, 2003; McGrail & Humphreys, 2009; Pearce, Richardson, Mitchell, & Shortt, 2011; Walsh, Bendel, Jones, & Hanlon, 2010). However, there has been little examination of this issue with specific reference to the early childhood years. These preschool years are viewed as an opportune time for intervention and hence prevention of the longer term consequences of social deprivation on health (WHO, 2008).

An important child health outcome relevant to primary health care is hospitalisations for ambulatory care sensitive conditions (ACSCs). These are also known as potentially preventable hospitalisations and are thought to be avoidable with the application of public health interventions and early disease management, usually delivered in an ambulatory setting such as primary care (Billings et al., 1993). There is an extensive literature examining determinants of ACSC hospitalisations including physician supply, self reported access, distance travelled to hospital, population density, rurality and disease prevalence (Ansari, Laditka, & Laditka, 2006; Friedman & Basu, 2001; Laditka, Laditka, & Mastanduno, 2009; Schreiber & Zielinski, 1997). Lower socioeconomic status has consistently been found to be associated with higher rates of ACSC hospital admission (Agha, Glazier, & Guttmann, 2007; Disano, Goulet, Muhajarine, Neudorf, & Harvey, 2010; Friedman & Basu, 2001; Schreiber & Zielinski, 1997). Hospitalisation for ACSCs has been used in a number of countries, including Australia, as an indicator of the accessibility to and overall adequacy, including quality of care and effectiveness, of primary health care in a given geographic area (Ansari et al., 2006; Council of Australian Governments, 2011; Friedman & Basu, 2001; Schreiber & Zielinski, 1997). The relationship of socioeconomic status and ACSC hospitalisations has also been described in children (Agha et al., 2007; Casanova, Colomer, & Starfield, 1996; Roos, Walld, Uhanova, & Bond, 2005; Steiner et al., 2003). Whilst ACSC hospitalisations in Australia have been studied, this has not been done specifically for children (Ansari, Carson, Serraglio, Barbeti, & Cicuttini, 2002, Ansari et al., 2006; Department of Health, 2009; Page, Ambrose, Glover, & Hetzel, 2007). This analysis contributes to addressing this gap.

Small-area-level analysis (as opposed to state or country wide) offers an advantage for examining health services in that it enables better understanding of geographic variation and inequalities in local needs and patterns of health. “Small-area” refers to a geographical unit that in some way represents a shared environment for a population, or an area that can be considered to be homogenous in the characteristics of the population residing in that area. Examples include administrative areas such as census tracts in the US and lower super output areas in the UK, or purposely structured geographies such as Primary Care Service Areas in the US representing primary care markets. In Australia, the most commonly utilised small-area for health research is either the Statistical Local Area (SLA) or Local Government Area (LGA) level. These areas can be aggregated to nest within Medicare Local and state boundaries. However, there is limited public reporting of health data at disaggregated scales, with the majority being reported at the State and Territory level. The analysis presented here is an example of a small-area-level analysis applied for understanding geographical inequalities in child health service needs relevant to contemporary health policy reform in Australia.

The National Centre for Social and Economic Modelling (NAT-SEM) has undertaken seminal work in developing small area measures of child well-being and social exclusion in Australia, including the Child Social Exclusion (CSE) index. This work has demonstrated pronounced geographical variation with high social exclusion risk in rural and regional areas and clusters in outer areas of Australia's capital cities (Harding et al., 2009; Tanton et al., 2010). However, the relationship of these indicators with child health outcomes has not been investigated. The Australian Primary Health Care Research Institute (APHCRI), in collaboration with the Robert Graham Centre in Washington DC, has developed a Composite Score of Deprivation (CSD) with specific relevance to primary health care (Butler et al., 2010). The CSD has been shown to be associated with health outcomes in general (such as mortality and diabetes rates), but these relationships have not been examined for children specifically. There are important lessons to be learned in how the CSD and the CSE indexes differ in their relationship with primary health care outcomes relevant to children, and whether these relationships vary geographically that could inform health service planning such as that required by Medicare Locals.

In summary, to date no studies have been undertaken in Australia examining how socioeconomic disadvantage and social exclusion at the small-area-level relates to child health outcomes relevant to the primary health care sector, such as ACSC hospitalisations. The analysis presented here has two aims. The first is to describe small-area variations in hospital admission for ambulatory care sensitive conditions in children aged 0–4 years in the Australian state of Victoria, over the 6 year period 2003–2009. The second is to explore the relationship between ACSC hospitalisations and socio-economic disadvantage using a comparative analysis of two indexes of socio-economic disadvantage – the CSD and CSE. It is anticipated that by conducting this analysis at a finer geographical scale than usually reported for policy and decision making purposes, it will enable improved understanding of the geographical patterning of an important child health outcome and the relationship with socio-economic disadvantage. This is intended as a starting point for informing decision making bodies, such as Medicare Locals, for planning services based on local needs and information.

## Methods

### *Data and indexes*

#### *Statistical geographies (LGA, SLA) and data aggregation*

The Australian Standard Geographical Classification (ASGC) is a hierarchical classification system of geographical areas and consists of a number of interrelated structures. It provides a common framework of statistical geography and enables the production of statistics which are comparable (see ABS, 2006).

The Statistical Local Area (SLA) was chosen as the spatial unit of analysis as it is the base spatial unit within the ABS Australian Standard Geographical Classification (ASGC) used to collect and disseminate statistics other than those collected from the Australian population censuses (ABS, 2006). It is viewed as the smallest unit with complete coverage of Australia that did not introduce the problems of data quality and confidentiality evident at the smaller Census Collection District level. As at 1 July 2006, there were 209 SLAs in the state of Victoria covering a population of a little over 5 million people.

However, data for the ambulatory care sensitive conditions investigated in this study were not available at the SLA level but rather for each Local Government Area (LGA) in Victoria. LGAs are the spatial units which represent the legally designated geographical areas over which incorporated local governing bodies

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