

## ORIGINAL ARTICLE

# The impact of low socioeconomic status and primary health care access on emergency department presentations in young children in regional Queensland

Catherine McCosker,<sup>1,2</sup> Gavin Beccaria,<sup>3</sup> Lisa Beccaria<sup>4</sup> and Tanya Machin<sup>5</sup>

<sup>1</sup>Darling Downs Health, <sup>2</sup>School of Psychology and Wellbeing, <sup>5</sup>Faculty of Health, Engineering and Sciences, University of Southern Queensland, School of <sup>3</sup>Psychology and Wellbeing, and <sup>4</sup>Nursing and Midwifery, Centre for Health Research (CHR) University of Southern Queensland, Toowoomba, Queensland, Australia

**Aim:** The purpose of this study was to empirically evaluate if children from low socio-economic status (SES) families in regional southeast Queensland utilise acute care services for low acuity health care rather than utilising primary health services.

**Methods:** A retrospective audit of children under the age of 5 years presented at a regional hospital emergency department (ED) over a 12-month period. Medical records were examined for presenting problem, Australasian triage category, care outcomes, whether the child's parent/guardian held an Australian concession/health care card (AC/HCC) and accessed child health services or a general medical practitioner (GP).

**Results:** Eight hundred and eighty-eight children who had not reached their fifth birthday presented to ED between 1 June 2019 and 31 May 2020, with a total of 1691 presentations. Most children were brought to the ED by their parents with semi-urgent health concerns and were discharged home following medical review. Holding an AC/HCC was a significant predictor for hospital presentation. Holding an AC/HCC was not associated with access to child health services. However, accessing child health services resulted in a small but significant increase in hospital presentations.

**Conclusions:** The AC/HCC may be an important proxy to identify low SES individuals. These card holders tended to use acute services more frequently than those who did not qualify for an AC/HCC. Furthermore, families that engage with primary care services such as child health also accessed acute care services more frequently. The results indicate accessing primary health-care services does not ameliorate the use of acute care services.

**Key words:** Australian concession card; child; emergency department; health care card; primary health care.

## What is already known on this topic

1 International literature identifies that families with greater social disadvantage tend to access acute care services more frequently.

## What this paper adds

- 1 The Australian concession/health care card (AC/HCC) is a sensitive measure for identifying low SES individuals and families in Australian research.
- 2 In one regional setting in Queensland, families who held a AC/HCC accessed hospital acute care services more frequently than families who were not eligible for AC/HCCs.
- 3 Accessing primary health services such as child health does not ameliorate the frequency of acute care presentations by families with young children.

The association between social deprivation and poor health outcomes is documented extensively in the literature.<sup>1–3</sup> The long-term impact childhood deprivation has on adult health and well-being is equally well documented.<sup>4–6</sup> The availability of affordable and appropriate health services influences how family's access and utilise health care.

Poorer health outcomes are often experienced by those living in rural and regional Australia,<sup>7</sup> where access to health services may be limited. The Australian health-care system allows Australian's access to publicly funded hospitals with no associated costs, and access to primary health services such as General Practitioners (GPs) at a reduced fee.<sup>8</sup> GPs are medical doctors who work in private practice in the community and who provide generalist medical care across the lifespan. There is variance in out-of-pocket costs experienced by the patient due to individual GP fees. Child health services are community-based publicly funded primary health-care services that promote the health and well-being of young children and families.

**Correspondence:** Mrs Catherine McCosker, Darling Downs Health, Toowoomba, Qld., Australia; email: [catherine.mccosker@usq.edu.au](mailto:catherine.mccosker@usq.edu.au)

Conflict of interest: None declared.

Accepted for publication 25 May 2023.

They are staffed by Registered Nurses and are available in most Australian communities.

The international literature indicates that families with greater social disadvantage tend to use acute care services such as a hospital emergency department (ED) more often than families with greater economic resources.<sup>9–13</sup> In contrast, in Queensland Australia, Williams *et al.*<sup>14</sup> found that although presentations at a major metropolitan paediatric hospital ED were multifactorial, socio-economic factors did not contribute to the presentations. Although Alele *et al.*<sup>15</sup> reported on a large data set collected over a 4-year period in Cairns, Queensland, families of very high socio-economic status (SES) were 'twice as likely' to have a low acuity presentation to the hospital ED, compared with low SES families. Both Williams *et al.*<sup>14</sup> and Alele *et al.*<sup>15</sup> used the Australian Bureau of Statistics Socio-Economic Indexes for Areas (SEIFA) data and postcode as a means of indicating SES. This is consistent with the international literature where postcode and census data have been used to develop indices that measure a community's level of deprivation.<sup>12,13</sup> This block method of calculating SES does not reflect the individual or family status, but more accurately reflects the overall status of the community.<sup>16</sup> Block-level measures such as SEIFA data are insensitive to individual circumstances because the measures are unable to account for substantial variations in socio-economic levels within a community.<sup>17,18</sup> Therefore, postcodes in combination with SEIFA data may not be a sufficiently sensitive measure of SES at an individual or family level in regional Australia, where postcodes cover large geographical areas. The Australian Government provides a variety of low-income concession and health care cards for those residents whose income falls below the threshold of the means test for their family situation. Approximately 30% of people in living in regional communities hold an Australian concession/health care card (AC/HCC).<sup>19</sup> The AC/HCCs account for the age of card holder, income, the number of children within a family, disability and illness. Therefore, a more specific assessment of low SES for individuals and families within a regional setting could be whether the family reaches the threshold for holding an AC/HCC.<sup>8,16</sup>

The purpose of this study is to empirically evaluate if children from low SES families in regional Southeast Queensland (SE QLD) utilise acute care services for low acuity health care rather than utilising primary health services, and to further explore the relationships between type and frequency of presentation to acute care services and access to primary health services.

## Methods

This study was a non-experimental quantitative research design, conducted at a regional hospital in SE QLD. The medical records of all children who had not reached their fifth birthday and who presented to the regional hospital ED between 1 June 2019 and 31 May 2020 were audited. Ethics approval was gained from Human Research Ethics Committees at Darling Downs Health and the University prior to commencing this project. A medical record audit was identified as the best method available to collect the required information necessary to address the research questions. Using an audit process is a commonly used methodology for collecting retrospective data and provides a systematic format for collecting and collating data.<sup>20</sup> The audit tool was developed as a spreadsheet. The Emergency Department Information System

(EDIS) was used to identify the medical records of all children who met the criteria. A 12-month review period was chosen to account for potential seasonal variations in health conditions. The initial lockdowns and social restrictions associated with the SARS-CoV-2 pandemic commenced in Australia in March 2020. A small decrease in the number of ED presentations by young children was noted compared to the previous year. However, the impact of the pandemic was limited at this time in regional Queensland, unlike what was being experienced internationally.

The unit record number was used to match the medical record with the presentation as it was recorded on EDIS. A four-digit code was allocated to each medical record in order that the data could be de-identified prior to transfer to the secure data storage site. Each medical record was reviewed against the audit tool. Demographic details, such as age, date of presentation, gender and ethnicity, were collected. The eligibility to hold an AC/HCC was importantly noted as it was used to identify low SES families. The Australasian Triage Scale was recorded as it provided an indicator of the acuity of the presentation.<sup>21</sup> Five categories of triage were applied, ranging from Category 1 requiring immediate resuscitation to Category 5 being non-urgent.<sup>21</sup> The presenting problem/s as identified by the parent, medical diagnosis and outcomes such as discharge, admission or transfer to other health/hospital services were noted as the information gathered was expected to identify the type and acuity of the problem that contributed to the hospital presentation. Accessing child health services within the community. Following the audit, a further random selection of 5% of the charts was reviewed against the audit tool to verify the accuracy of the collected data. The data were checked for completeness and accuracy. Any potential errors in the data were rechecked against the medical record. Frequency analysis was applied to the demographic data and Pearson chi-square was used to test the relationship between child health attendance and holding an AC/HCC. Poisson regression was used to explore the relationships between acute care presentations and primary health presentations.

## Results

Approximately 1040 children under 5 years of age resided in the main postcode area during the study period.<sup>22</sup> A total of 888 children who had not reached their fifth birthday presented to the hospital in the designated 12-month period. About 34% ( $n = 302$ ) of children lived in families who held an AC/HCC. There was no documentation regarding a GP in 82.1% ( $n = 729$ ) medical records, whereas 71.3% ( $n = 633$ ) had accessed the local child health services with the average number of visits to child health being 5.56 ( $SD = 6.331$ ). No association between attending child health services and holding an AC/HCC was identified ( $\chi^2(1) = 0.04, P > 0.001$ ). The demographic characteristics of the children are displayed in Table 1.

For the designated period, there were 1691 presentations to the regional hospital ED of children younger than 5 years, with a mean number of 1.91 presentations ( $SD = 1.483$ ). The low number of ED presentations was evident across all ages. In 83.55% ( $n = 1412$ ) presentations, the family resided in the local postcode area. Most presentations (50.86%,  $n = 860$ ) were triaged as Category 4 – semi-urgent presentations. Most children, 95% ( $n = 1610$ ), were brought to ED by their parents/guardians using private transport, and 88.23% of presentations ( $n = 1492$ ) were discharged home. The characteristics of the ED presentations are displayed in Table 2.

**Table 1** Demographic characteristics of children under 5 years presenting to ED. [Correction added on June 22, 2023, after first online publication: Table 1 has been updated]

|                                       | <i>n</i> | %    |
|---------------------------------------|----------|------|
| Gender                                |          |      |
| Male                                  | 464      | 52.3 |
| Female                                | 424      | 47.7 |
| Ethnicity                             |          |      |
| Aboriginal/Torres Strait Islander     | 157      | 17.7 |
| Not Aboriginal/Torres Strait Islander | 698      | 78.6 |
| NESB†                                 | 16       | 1.8  |
| Not recorded                          | 17       | 1.9  |
| AC/HCC‡                               |          |      |
| No                                    | 586      | 66.0 |
| Yes                                   | 302      | 34.0 |
| General Practitioner                  |          |      |
| No                                    | 729      | 82.1 |
| Yes                                   | 159      | 17.9 |
| Child Health                          |          |      |
| No                                    | 255      | 28.7 |
| Yes                                   | 633      | 71.3 |
| Child Health                          |          |      |
| No + No AC/HCC‡                       | 167      | 18.8 |
| No + Yes AC/HCC                       | 88       | 10.0 |
| Yes + No AC/HCC                       | 419      | 47.2 |
| Yes + Yes AC/HCC                      | 214      | 24.0 |

† NESB = non-English-speaking background. ‡ Australian concession/health care card holder. ED, emergency department.

**Table 2** Characteristics of ED presentations for children under 5 years

|                | <i>n</i> | %      |
|----------------|----------|--------|
| Triage Code    |          |        |
| 1              | 1        | 0.0006 |
| 2              | 72       | 4.26   |
| 3              | 504      | 29.8   |
| 4              | 860      | 50.9   |
| 5              | 251      | 14.8   |
| No code        | 3        | 0.02   |
| Arrival        |          |        |
| Own transport  | 1610     | 95     |
| Ambulance      | 45       | 2.7    |
| 13 Health†     | 25       | 1.5    |
| Poisons Info.‡ | 3        | 0.2    |
| Other          | 8        | 0.5    |
| Outcome        |          |        |
| Home           | 1492     | 88.2   |
| Admitted       | 82       | 4.8    |
| Transferred    | 25       | 1.5    |
| Did not wait   | 83       | 4.9    |
| Other          | 6        | 0.4    |

† 13 Health = A 24-h confidential phone service that provides a health advice to people living in Queensland. ‡ Poisons information = A 24-h telephone service that provides information to the public and health professionals about poisonings from plants and animals. Medicines and chemicals. ED, emergency department.

Poisson regression was applied to identify if holding an AC/HCC or accessing a primary health-care provider such as a GP or child health services predicted ED presentations. A total of three cases, which had presented greater than 11 times to the ED, were deleted from the analysis to ensure equidispersion.<sup>23</sup> The likelihood ratio chi-square test indicated that the full model was a significant improvement in fit over a null model ( $P < 0.001$ ).

Holding an AC/HCC was a significant predictor for the number of ED presentations by a child under 5 years of age ( $b = 0.171$ ,  $SE = 0.0481$ ,  $P < 0.001$ ). It resulted in a 15.75% (7.4–24%) increase, on average, in hospital presentations.

Accessing child health services was a significant predictor for ED presentations ( $b = 0.140$ ,  $SE = 0.0638$ ,  $P < 0.05$ ). There was a 13% (1.4–23%) increase, on average, in ED presentations for children who had accessed child health services.

Having a GP was a significant predictor for ED presentations ( $b = 0.280$ ,  $SE = 0.0560$ ,  $P < 0.001$ ). On a closer analysis of the data pertaining to GP through chi-square tests, crosstabulation and boxplots against ethnicity, concession card and child health, the accuracy of medical record documentation in relation to the child has ever seen a GP was highly questionable. Therefore, no further analysis was conducted into the association between ED presentation and seeing a GP.

## Discussion

The purpose of this study was to evaluate if children from low SES families in regional SE QLD utilised acute care services for low acuity health care. Most presentations of young children at ED were for semi-urgent paediatric health concerns and they were discharged home following medical review. The results indicated that having an AC/HCC was associated with a significant increase in ED presentations. These findings are consistent with the international literature, where it is reported that families who experienced greater deprivation are more likely to access acute care services for non-acute presentations.<sup>9–13</sup> However, the findings are inconsistent with local results that either higher SES families utilised acute care services more frequently,<sup>15</sup> or that SES had no effect on the utilisation of emergency services for non-acute concerns.<sup>14</sup>

A major difference between this study and other Queensland research is the measure of SES. Alele *et al.*<sup>15</sup> and Williams *et al.*<sup>14</sup> used the block measures of postcode and SEIFA data for measuring SES. The use of block-level data is in keeping with the literature.<sup>16</sup> However, regional and rural Australian postcodes cover large geographical areas, where there is heterogeneity of income, education levels and resources. Due to the population density in major international cities, more homogeneity within an area or postcode can be expected. In this study, the family measure of low SES was holding an AC/HCC. This provided a measure that did not rely on self-report, residential address, or neighbourhood. Therefore, the AC/HCC may be a suitable measure of low SES that is useful with smaller, more diverse populations, and where the individual and family level of deprivation is the variable of concern. Further study is needed to replicate these results in other Australian localities that are rural, regional, and metropolitan.

It was anticipated that accessing primary care services would reduce the number of acute care presentations for a child. Investigation into the possible relationship between GP access and ED presentations was unable to be pursued due to a consistent lack

of documentation within the medical records. The results indicated that accessing child health services was associated with a small but significant increase in ED visits. One possible explanation for these results lies within the family's ability to access and engage with health services. Those families who engage with primary health services such as child health appear in this study, more likely to engage with other health services such as hospital ED services, in order to provide health care for their children. Although this can be seen as positive for the health outcomes of the child whose parents are able to search for and access appropriate health care, it raises questions about the health outcomes for those families who encounter difficulties accessing or engaging with health services, and this warrants further investigation.

Due to the medical records containing both hospital acute care records and primary health records such as child health, the relationship between ED access and primary health-care access was able to be explored with confidence. This study was conducted in a regional area in SE QLD; further studies in other regional and rural areas will be necessary to validate the transferability of these results. The medical record was the only source of data, and hence the results are as accurate as the documentation within the records. These results could have been strengthened by verifying medical record information directly with parents/guardians.

## Conclusions

Most families accessed acute care services for their young child for semi-urgent presentations, arrived via private transport and were subsequently discharged home. This study identified that the AC/HCC can be used to identify low SES families and individuals, and that holders of AC/HCC tend to use acute services more frequently than non-concession card holders. Furthermore, families that engage with primary care services such as child health also access acute care services more frequently. Further research is needed to investigate the effects of health service access and engagement on the health outcomes of young children in regional areas.

## Acknowledgement

Statistical support provided by Rachel King, School of Mathematics, Physics and Computing, University of Southern Queensland, Toowoomba, QLD for statistical consulting support. Open access publishing facilitated by University of Southern Queensland, as part of the Wiley - University of Southern Queensland agreement via the Council of Australian University Librarians.

## Ethics statement

Ethics approval was obtained from the University of Southern Queensland (H20REA240) and Darling Downs Health (LNR/2020/QTDD/66427).

## References

- 1 Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic disparities in health in the United States: What the patterns tell us. *Am J Public Health* 2010; **100**: S186–96.

- 2 Wagstaff A. Poverty and health sector inequalities. *Bull. World Health Organ.* 2002; **80**: 97–105.
- 3 Fiscella K, Franks P, Gold MR, Clancy CM. Inequality in quality: Addressing socioeconomic, racial, and ethnic disparities in health care. *JAMA* 2000; **283**: 2579–84.
- 4 Raphael D. Poverty in childhood and adverse health outcomes in adulthood. *Maturitas* 2011; **69**: 22–6.
- 5 Duncan GJ, Magnuson K, Kalil A, Ziol-Guest K. The importance of early childhood poverty. *Soc. Indic. Res.* 2011; **108**: 87–98.
- 6 Maggi S, Irwin LJ, Siddiqi A, Hertzman C. The social determinants of early child development: An overview. *J. Paediatr. Child Health* 2010; **46**: 627–35.
- 7 Queensland Health. *The Health of Queenslanders 2020. Report of the Chief Health Officer Queensland.* Brisbane: Queensland Government; 2020.
- 8 Australian Government. Health care and Medicare – Medicare – Services Australia. Available from: <https://www.servicesaustralia.gov.au/health-care-and-medicare?context=60092>
- 9 Beattie TF, Gorman DR, Walker JJ. The association between deprivation levels, attendance rate and triage category of children attending a children's accident and emergency department. *Emerg. Med. J.* 2001; **18**: 110–1.
- 10 Chin NP, Goepp JG, Malia T, Harris L, Poordabbagh A. Nonurgent use of a paediatric emergency department: A preliminary qualitative study. *Pediatr. Emerg. Care* 2006; **22**: 22–7.
- 11 Khan Y, Glazier RH, Moineddin R, Schull MJ. A population-based study of the association between socioeconomic status and emergency department utilization in Ontario, Canada. *Acad. Emerg. Med.* 2011; **18**: 836–43.
- 12 Flanagan CF, Stewart M. Factors associated with early neonatal attendance to a paediatric emergency department. *Arch. Dis. Child.* 2014; **99**: 239–43.
- 13 Hendry SJ, Beattie TF, Heaney D. Minor illness and injury: Factors influencing attendance at a paediatric accident and emergency department. *Arch. Dis. Child.* 2005; **90**: 629–33.
- 14 Williams A, O'Rourke P, Keogh S. Making choices: Why parents present to the emergency department for non-urgent care. *Arch. Dis. Child.* 2009; **94**: 817–20.
- 15 Alele FO, Callander EJ, Emeto TI, Mills J, Watt K. Socio-economic composition of low-acuity paediatric presentation at a regional hospital emergency department. *J. Paediatr. Child Health* 2018; **54**: 1341–7.
- 16 Lim P, Gemici S, Rice J, Karmel T. Socioeconomic status and the allocation of government resources in Australia: How well do geographic measures perform? *Educ. Train.* 2011; **53**: 570–86.
- 17 Mather T, Banks E, Joshy G, Bauman A, Phongsavan P, Korda RJ. Variation in health inequalities according to measures of socioeconomic status and age. *Aust. N. Z. J. Public Health* 2014; **38**: 436–40.
- 18 Walker AE, Becker NG. Health inequalities across socio-economic groups: Comparing geographic-area-based and individual-based indicators. *Public Health* 2005; **119**: 1097–104.
- 19 National Rural Health Alliance. Available from: <https://www.ruralhealth.org.au/book/health-card-holders>
- 20 Worster A, Haines T. Advanced statistics: Understanding medical record review (MRR) studies. *Acad. Emerg. Med.* 2004; **11**: 187–92.
- 21 The Australasian triage scale. *Emerg. Med.* 2002; **14**: 335–6.
- 22 Australian Bureau of Statistics. Census of Population and Housing 2021. Available from: <https://www.abs.gov.au/census/find-census-data/quickstats/2021/AUS>
- 23 Coxo S, West SG, Aiken LS. The analysis of count data: A gentle introduction to Poisson regression and its alternatives. *J. Pers. Assess.* 2009; **91**: 121–36.