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ORIGINAL ARTICLE

Socio-economic composition of low-acuity paediatric presentation at a regional hospital emergency department

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Aim: Despite increasing rates of emergency department (ED) utilisation, little is known about low-acuity presentations in children ≤5 years. The aims of the study were to estimate the proportion and cost of low-acuity presentations in children ≤5 years presenting to the ED and to determine the relative effect of socio-economic status (SES) on paediatric low-acuity presentations at the ED.

Methods: This is a retrospective observational study of children ≤5 years presenting to the Cairns Hospital ED over 4 years. A multivariate logistic regression model was used to assess the association between SES and low-acuity presentations. Cost of low-acuity presentations was calculated based on triage score and admission status, using costs obtained from the National Hospital Cost Data Collection.

Results: A total of 23 086 children were included in the study, of whom 56.7% were male (mean age = 1.85 ± 1.63 years). Approximately one-third of ED visits were low-acuity presentations (32.4%), and low-acuity presentations increased progressively with SES. In multivariate analysis, children from families with very high SES were twice as likely to have a low-acuity presentation (odds ratio 2.17; 95% confidence interval, 1.66–2.85). Low-acuity ED presentations cost the health-care system in excess of A$895 000–A$1 110 000 per year.

Conclusions: These findings demonstrate that a significant proportion of paediatric ED visits are of low acuity and that these visits yield a substantial cost to the health system. Further research is required regarding care givers' rationale and potentially other reasons underlying these low-acuity ED presentations.

Key words: child, pre-school; emergency services, hospital; infant; infant, newborn; social class.

What is already known on this topic

1 There is an increasing use of the emergency department (ED) for low-acuity presentations.
2 Low-acuity presentations at the ED are associated with poor continuity of care.

What this paper adds

1 The frequency of low-acuity visits increased progressively with socio-economic status (SES).
2 Children from families with very low SES are less likely to visit the ED for low-acuity conditions than those from families with very high SES.
3 These visits cost the health system in excess of A$895 000–A$1 110 000 per year.

The aim of emergency departments (EDs) is to provide immediate care and treatment for urgent illnesses.[1] However, the use of EDs for low-acuity presentations has increased.[2] Different terminologies have been used to define low-acuity visits (those that could have been managed in a primary care setting and do not require the specialised services of the ED),[3] such as inappropriate, non-emergent, non-urgent, primary care type and general practice type,[4,5] but there is no agreed-upon definition.[6] The relative cost and the impact of low-acuity presentations on ED crowding and resources remains a subject of debate[7–9] Williams demonstrated that the cost of low-acuity visits was relatively low.[10] By contrast, Bamezai *et al*. reported that the cost of less-urgent presentations to the ED was high.[11] Given the complexity of hospitals as multiservice organisations, measuring the costs for services is complex and may account for this variability.[12]

The proportion of paediatric-related low-acuity ED visits ranges from 15 to 90%.[13–16] Given that paediatric patients are a vulnerable population and require special care for growth and development, the continuous use of the ED for low-acuity presentation places the child at an increased risk of poor continuity of care.[17] Previous research suggests that factors such as parental-perceived severity of the illness, health insurance, primary care cost, unavailability of general practitioner (GP) services, the convenience of the ED and socio-economic status (SES) are associated with low-acuity ED presentations.[18–20]

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Table 1 Descriptive characteristics by type of emergency department (ED) presentation

Characteristics	Low acuity, *n* (%)	Non-low acuity, *n* (%)	Total, *n* (%)	*P* value
Age, years				
0	1584 (21.1)	4555 (29.2)	6139 (26.6)	<0.001
1–2	3114 (41.6)	6244 (40.0)	9358 (40.5)	
3–5	2789 (37.3)	4800 (30.8)	7589 (32.9)	
Gender†				
Male	4140 (55.3)	8948 (57.4)	13 088 (56.7)	0.003
Female	3346 (44.7)	6649 (42.6)	9995 (43.3)	
SES				
Very low	374 (5.0)	1440 (9.2)	1814 (7.9)	
Low	2520 (33.7)	5232 (33.5)	7752 (33.6)	
Medium	3728 (49.8)	7271 (46.6)	10 999 (47.6)	
High	748 (10.0)	1459 (9.4)	2207 (9.6)	<0.001
Very high	117 (1.6)	197 (1.3)	314 (1.4)	
Day of presentation				
Weekday	5043 (67.4)	10 951 (70.2)	15 994 (69.3)	<0.001
Weekend	2444 (32.6)	4648 (29.8)	7092 (30.7)	
Access time				
Non-after hours	2162 (28.9)	4617 (29.6)	6779 (29.4)	0.260
After-hours	5325 (71.1)	10 987 (70.4)	16 307 (70.6)	
Primary diagnoses (ICD-10-AM)				
Infectious and parasitic diseases	1116 (14.9)	2483 (15.9)	3599 (15.6)	<0.001
Diseases of the eye and adnexa	59 (0.8)	89 (0.6)	148 (0.6)	
Diseases of the ear and mastoid process	239 (3.2)	264 (1.7)	503 (2.2)	
Diseases of the respiratory system	984 (13.1)	4527 (29.0)	5511 (23.9)	
Diseases of the digestive system	206 (2.8)	328 (2.1)	534 (2.2)	
Diseases of the skin and subcutaneous tissue	376 (5.0)	689 (4.4)	1065 (4.6)	
Genitourinary system disorders	118 (1.6)	450 (2.9)	568 (2.5)	
Perinatal period conditions and congenital deformations	63 (0.8)	296 (1.9)	359 (1.6)	
Symptoms and signs not elsewhere classified	515 (6.9)	1898 (12.2)	2413 (10.5)	
Injury and poisoning plus external causes of morbidity	2576 (34.4)	3349 (21.5)	5925 (25.7)	
Factors influencing health status and contact with health services‡	1182 (15.8)	783 (5.0)	1965 (8.5)	
Other§	53 (0.7)	443 (2.8)	496 (2.1)	

†Numbers do not add up to 23 086 due to missing data for that variable. ‡Factors influencing health status and contact with health services: did not wait, reviews, scheduled ED follow-up and dressing change. §For the purposes of analyses, the category 'other' comprised International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) diagnosis of: Neoplasms, diseases of the blood and blood-forming organs; endocrine, nutritional and metabolic disorders; mental and behavioural disorders; diseases of the nervous system; diseases of the circulatory system; musculoskeletal and connective tissue disorders. SES, socio-economic status.

SES as a social determinant of health is associated with health inequities and poor health outcomes.[20] Individuals from families with lower SES are more likely to utilise health services disproportionately than those who are least deprived.[21] This disproportionate use of health services may be influenced by the national health system.[17] In Australia, the universal health system provides free treatment for patients at public hospitals, among other services.[22] Theoretically, assuming equal access to health care, the use of the ED for low-acuity conditions should not vary by SES.[23] However, there is some evidence to suggest a possible higher use of the ED by the socially disadvantaged for low-acuity conditions.[24] Despite the increased rate of ED utilisation for low-acuity conditions, little is known about low-acuity presentations of paediatric patients aged 0–5 years.

The aims of this study were to estimate, for the first time, the proportion and cost of low-acuity ED presentations in children ≤5 years and to determine the relative effect of SES on these rates in order to address these gaps in policy planning.

Methods

Study design and setting

This is a retrospective analysis (analytical cross-sectional study) of paediatric presentations to Cairns Hospital ED over a 4-year period. Cairns Hospital is a large-scale regional public hospital in Cairns, Australia (daily presentation rates rose from 130 in 2010 to 164 patients in 2013).[25] The hospital provides a wide range of services for the population in Cairns and nearby communities. It is the only public hospital in Cairns. ED service is part of the hospital's care system and is provided free of charge.

Table 2 Acuity of paediatric emergency department presentations by year

	2010	2011	2012	2013	*P* value
Low acuity, *n* (%)	1768 (35.6)	1904 (34.1)	1835 (29.9)	1980 (30.9)	<0.001
Non-low acuity, *n* (%)	3199 (64.4)	3684 (65.9)	4295 (70.1)	4421 (69.1)	
Total, *n*	4967	5588	6130	6401	

Data source

Data were extracted from the ED information system (EDIS) on demographics (age, gender and residential postcode), time of admission and discharge, admission status, triage category, referral source, the reason for presentation and discharge diagnosis (International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM)). EDIS is a system that was designed to capture demographic and service episode data about patients and support the operational control of the hospital ED.[26]

Population inclusion criteria

The study population consisted of all children aged 0–5 years who presented at the Cairns Hospital ED between 1 January 2010 and 31 December 2013. Tourists were excluded because postcodes could not be assigned to them to determine their SES.

Outcome measures

The main outcome measures for this study were the rate of low-acuity ED utilisation and cost of low-acuity ED presentations.

Criteria for defining low-acuity ED utilisation

For the purposes of this study, an ED visit is considered low acuity if the presentations were: categorised as Triage category 4 (semi-urgent) or 5 (non-urgent) on the Australasian Triage Scale, not admitted, self-referred (not referred by a GP or any other primary care provider) and new episodes. This is based on the definition by Bezzina *et al.* for potential 'primary care' or 'general practice' patients.[3] All other presentations were categorised as non-low acuity.

Net cost of low-acuity visit

Cost of each ED presentation was calculated based on triage score and whether or not the patient was admitted. Costs were obtained from the National Hospital Cost Data Collection, Australian Public Hospitals Cost Report.[27] It was assumed that had the low-acuity patients not presented to the ED, they would have presented to a GP. The net cost to the health system was calculated by subtracting the cost of a GP consultation from the cost of the ED presentation. The cost of GP consultation for each year was obtained from the Medicare Benefits Schedule Item 36, Level C Consultation.[28]

Exposure measure

Criteria for defining SES

The exposure of interest was SES. Residential postcode was used to calculate SES, defined using the Australia Bureau of Statistics Socio-Economic Indexes for Areas (SEIFA), specifically the Index of Relative Socio-economic Advantage and Disadvantage.[29,30] For the purposes of these analyses, the Index of Relative Socio-economic Advantage and Disadvantage was categorised into very low (Deciles 1–2), low (Deciles 3–4), medium (Deciles 5–6), high (Deciles 7–8) and very high SES (Deciles 9–10). The identification of low and high SES is arbitrary, and there are no agreed means of defining it.

Other potential covariates were: age (0, 1–2, 3–5 years), gender, day of week (weekday vs. weekend), access time (Monday–Friday 8 am–5 pm vs. after hours) and discharge diagnosis (this was based on ICD-10-AM and was recoded into the following groups for the purposes of analyses: infectious and parasitic diseases; diseases of the eye and adnexa; diseases of the ear and mastoid process; diseases of the respiratory system; diseases of the digestive system; diseases of the skin and subcutaneous tissue; genitourinary system disorders; perinatal period conditions and congenital deformations; symptoms and signs not elsewhere classified; injury/poisoning; factors

Table 3 Low and non-low acuity emergency department presentations in children aged 0–5 years by socio-economic status (SES) and year

SES	Acuity	2010	2011	2012	2013	*P* value
Very low, *n* (%)	Non-low acuity	353 (80.0)	371(77.5)	373 (78.9)	343 (81.5)	0.518
	Low acuity	88 (20.0)	108 (25.5)	100 (21.1)	78 (18.9)	
Total, *n*		441	479	473	421	
Low, *n* (%)	Non-low acuity	1016 (62.8)	1247 (66.6)	1489 (70.3)	1480 (69.0)	<0.001
	Low acuity	602 (37.2)	624 (33.4)	629 (29.7)	665 (31.0)	
Total, *n*		1618	1871	2118	2145	
Medium, *n* (%)	Non-low acuity	1484 (62.5)	1694 (64.2)	1973 (68.9)	2120 (67.8)	<0.001
	Low acuity	889 (37.5)	943 (35.8)	891 (31.1)	1005 (32.2)	
Total, *n*		2373	2637	2864	3125	
High, *n* (%)	Non-low acuity	307 (65.9)	331 (62.3)	396 (68.3)	425 (67.5)	0.164
	Low acuity	159 (34.1)	200 (37.7)	184 (31.7)	205 (32.5)	
Total, *n*		466	531	580	630	
Very high, *n* (%)	Non-low acuity	39 (56.5)	41(58.6)	64 (67.4)	53 (66.3)	0.127
	Low acuity	30 (43.5)	29 (31.4)	31(32.6)	27 (33.8)	
Total, *n*		69	70	95	80	

Table 4 Association between different socio-economic status (SES) and low-acuity emergency department (ED) visits after adjusting for potential confounders

Characteristics	Odds ratio	95% CI	Wald	df	*P* value
SES					
Very low	Reference				
Low	1.80	1.58–2.04	79.82	1	<0.001
Medium	1.87	1.65–2.12	95.99	1	<0.001
High	1.90	1.63–2.20	69.44	1	<0.001
Very high	2.17	1.66–2.85	31.95	1	<0.001
Age, years					
0	Reference				
1–2	1.27	1.18–1.37	36.82	1	<0.001
3–5	1.37	1.27–1.49	59.67	1	<0.001
Gender					
Male	Reference				
Female	1.07	1.01–1.14	5.79	1	0.016
Day of presentation					
Weekday	Reference				
Weekend	1.10	1.03–1.17	8.81	1	0.004
Diagnoses (ICD-10-AM)					
Factors influencing health status and contact with health services†	Reference				
Infectious and parasitic diseases	0.29	0.26–0.33	435.12	1	<0.001
Diseases of the eye and adnexa	0.44	0.32–0.63	21.46	1	<0.001
Diseases of the ear and mastoid process	0.57	0.47–0.69	31.39	1	<0.001
Diseases of the respiratory system	0.14	0.13–0.16	1105.04	1	<0.001
Diseases of the digestive system	0.42	0.34–0.51	74.31	1	<0.001
Diseases of the skin and subcutaneous tissue	0.36	0.31–0.42	167.31	1	<0.001
Genitourinary system disorders	0.17	0.13–0.21	247.36	1	<0.001
Perinatal period conditions and congenital deformations	0.17	0.13–0.23	143.76	1	<0.001
Symptoms and signs not elsewhere classified	0.18	0.16–0.21	630.56	1	<0.001
Injury and poisoning plus external causes of morbidity	0.47	0.42–0.52	195.56	1	<0.001
Other‡	0.08	0.05–0.11	278.89	1	<0.001

†Factors influencing health status and contact with health services: did not wait, reviews, scheduled ED follow-up and dressing change. ‡For the purposes of analyses, the category 'other' comprised International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) diagnoses of: Neoplasms, diseases of the blood and blood-forming organs; endocrine, nutritional and metabolic disorders; mental and behavioural disorders; diseases of the nervous system; diseases of the circulatory system; musculoskeletal and connective tissue disorders. CI, confidence interval; df, degree of freedom.

influencing health status and contact with health services (did not wait, reviews, scheduled ED follow-up and dressing change) and other (diagnosis of: neoplasms, diseases of the blood and blood-forming organs; endocrine, nutritional and metabolic disorders; mental and behavioural disorders; diseases of the nervous system; diseases of the circulatory system; musculoskeletal and connective tissue disorders).

Statistical analysis

All variables were categorical, so frequency distributions were used to summarise the demographic characteristics of the study sample. Chi-squared analyses were conducted to determine whether there were any differences between low-acuity and non-low-acuity ED presentations. A χ^2 test for trend was completed to determine whether there was any change over time in the proportion of low-acuity ED, which was then also stratified by SES. In order to determine the association between SES and low-acuity presentation, Chi-squared analysis was first conducted to identify which variables (including covariates) were significantly associated with low-acuity presentations. All variables significantly associated with low-acuity ED presentations in crude analyses were then included in a multivariate logistic regression model. Non-significant variables were removed one at a time, and the impact on the remaining variables was assessed; if the odds ratios (ORs) changed more than 10%, the variable was retained in the model. Analyses were conducted using Statistical Package for the Social Sciences, version 23 (IBM SPSS, New York, NY, USA).

Ethical approval

This study was approved by the Far North Queensland Human Research Ethics Committee (HREC Approval Number: HREC/14/QCH/28-901 LR).

Table 5 Total net cost of low-acuity presentation by socio-economic status (SES) and year

Year	SES	Total net cost, A$
2010	Very low	44 558.8
	Low	304 822.7
	Medium	450 145.15
	High	80 509.65
	Very high	15 190.5
	Total	895 226.8
2011	Very low	55 512
	Low	320 736
	Medium	484 702
	High	102 800
	Very high	14 906
	Total	978 656
2012	Very low	56 270
	Low	353 938.3
	Medium	501 365.7
	High	103 536.8
	Very high	17 443.7
	Total	1 032 554.5
2013	Very low	43 734.6
	Low	372 865.5
	Medium	563 503.5
	High	114 943.5
	Very high	15 138.9
	Total	1 110 186

A$, Australian dollar.

Results

A total of 23 340 paediatric patients aged 0–5 years attended the Cairns Hospital ED during the 4-year study period; 254 children were tourists and so were excluded, yielding a final sample of 23 086. Of the 23 086 paediatric patients, 56.7% were male; the mean age of participants was 1.85 ± 1.63 years.

The total proportion of low-acuity visits was 32.4% (n = 7487). Table 1 shows the general characteristics of the study population by type of ED presentation. Low-acuity presentations were more frequent in children from families of medium SES to very high SES (49.8 vs. 46.6%; 10.0 vs. 9.4%; 1.6 vs. 1.3%; χ^2 = 131.79; df = 4, P < 0.001), children aged 3–5 years (37.3 vs. 30.8%; χ^2 = 190.77; df = 2, P < 0.001), in female children (44.7 vs. 42.6; χ^2 = 8.80; df = 1, P = 0.003) and in weekend presentations (32.6 vs. 29.8%; χ^2 = 19.26; df = 1, P < 0.001). Access time did not vary according to acuity of presentation (P > 0.05). Acuity of presentation varied significantly with diagnoses (ICD-10-AM; χ^2 = 1939.74; df = 11, P < 0.001). Low-acuity presentations were more frequent in children diagnosed with injuries (34.4 vs. 21.5%), ear diseases (15.4 vs. 5.0%) and factors influencing health status (15.8 vs. 5.0%).

Overall, there was a significant increase in the acuity of paediatric visits over the 4-year period (Table 2; P < 0.001); ED utilisation for low-acuity visits was higher in 2010 than in any other year (35.6%). This relationship was modified by SES. The proportion of low-acuity ED visits in the very low, high and very high SES groups did not change over the study period, but the proportion of non-low-acuity ED presentations significantly increased in the low and medium SES groups (Table 3). In general, there was a higher proportion of low-acuity ED presentations in children from families with very high SES compared to low SES across all study years (χ^2 = 40.70; df = 3; P < 0.001).

The association between SES and low-acuity ED visits was then assessed via a multivariate logistic regression model (Table 4). Low-acuity ED presentations were approximately twice as common in children from families with low, medium, high and very high SES than very low SES even after adjusting for all relevant confounders (OR_{Adj} and 95% confidence intervals (CIs) are: 1.80 (1.58–2.04); 1.87 (1.65–2.12); 1.90 (1.63–2.20); and 2.17 (1.66–2.85), respectively). Other significant factors associated with low-acuity presentations were: age (3–5 years; OR = 1.38, 95% CI: 1.27–1.49), being female (OR = 1.07, 95% CI: 1.01–1.14), weekend presentation (OR = 1.10, 95% CI: 1.03–1.17) and diagnoses. Specifically, compared with a diagnosis of 'factors influencing health status', all other diagnostic categories were inversely associated with low-acuity presentations.

The net cost of low-acuity ED presentations (Table 5) increased from approximately A$896 000 to A$1 110 000 between 2010 and 2013. Across all years, children in the low, medium and high SES groups contributed approximately 94% of the total net cost compared to children from the very low SES group.

Discussion

These results indicate that there is a high proportion of low-acuity ED visits among children aged 0–5 years. About 23 086 ED visits occurred between 2010 and 2013, and 32.4% of these visits were low acuity, resulting in costs to the health-care system in excess of A$895 000–A$1 110 000 per year over the 4-year study period. ED use for low-acuity visits among paediatric patients is an international concern, with the proportions reported in various studies ranging from 15 to 90%.[13–16] The costs estimated in this study are the costs that could have been saved if the children had presented at a GP clinic or other primary care centres. This finding corroborates findings from previous research that the marginal cost of a low-acuity ED visit was high and is associated with increased health-care expenditure.[8,11] The unavailability of other primary care services may have overestimated the cost stated in our study. In addition, children from the low, medium and high SES groups contributed to over 94% of the cost. As visits to the ED increase so does health-care expenditure.[8] According to the Australian Government Productivity Commission, 'the Government's health-care spending is expected to increase from 4.2% of gross domestic product in 2014–2015 to 5.7% in 2054–2055'.[31] However, for the health-care system to be efficient, there has to be an improvement in the quality of care, cost reduction and improved access.[31]

In this study, the frequency of ED visits for low-acuity illnesses increased progressively with SES. Low-acuity ED presentations were more common in children from families with very high SES over the study period. This effect remained after adjusting for relevant confounders, such as age, gender, the day of presentation and reason for attendance. This is in contrast with findings of previous research, which demonstrated that people from disadvantaged areas attended the ED more frequently for low-acuity and high-acuity conditions compared to those from affluent

areas.[32] The increased utilisation of the ED for low-acuity presentation by children from the very high SES in this study may be attributed to residing in a geographical location close to the ED. According to previous studies, residing close to the ED has been associated with increased rates of low-acuity presentation.[13,33] In addition, the universal health-care structure of Australia may be a potential driver for the increased rates of low-acuity visits.[22] The universal public health insurance scheme (Medicare) is funded by the Australian Government, and the scheme provides free treatment for public patients in public hospitals and payments of benefits or rebates for professional health services.[22] Another possible reason is the availability (or perceived availability) of other adequate health-care services.[34]

Other factors such as age, gender, presentations during the weekend and reason for the visit were associated with low-acuity presentation. In this study, older children (1–2 years, 3–5 years) were more likely to visit the ED for low-acuity presentations than infants aged <1 year. It is difficult to compare the findings of this study to other studies because the age groups in our study were more specific than previous studies. However, previous studies suggest that children aged 0–5 years, in comparison to older children and adults, were more likely to present for low-acuity conditions.[15,35] This may be due to the parental perception of the severity of illness in younger children compared to older children.[19] In our study, female children had higher odds of visiting the ED for low-acuity illnesses, which is supported by some previous research[35] but not all. Brousseau *et al*. found no association between gender and low-acuity ED presentations.[36] In addition, paediatric patients were more likely to present to the ED during the weekends for low-acuity visits. This finding is consistent with previous research[35] and is intuitive – parents are more likely to present with their children at the ED for low-acuity illness when there is limited availability of health care provided by their regular GP/primary care provider.[34] Furthermore, type of diagnoses was associated with increased low-acuity ED visits in the study. Children with a diagnostic category of 'Factors influencing health status and contact with health services' (which includes 'did not wait' for medical examination/treatment after triage; and medical review or wound dressing change) were more likely to be low acuity compared to all other diagnostic conditions.

However, whether these patients constitute 'low-acuity' or 'primary care type presentation' is likely to remain controversial given the complexity of presentations and potential drivers such as the availability of primary care providers, costs and perceived severity of the illness.[34] The lack of an agreed criterion for defining patients as low acuity or primary care type also makes it difficult to classify these patients.[6] Further research is required to develop a consistent criterion for defining low acuity and to identify reasons for seeking health care at the ED for low-acuity cases.

Strengths and limitations

To our knowledge, this is the first time a cost analysis of low-acuity paediatric ED visits has been conducted. There were limitations to the study. First, we used postcode to estimate SEIFA and then SEIFA codes to classify participants into SES groups. This is a relative index at an area level and does not reflect individual SES level. This may have either overestimated or underestimated the magnitude of the association between SES and low-acuity ED visits. In addition, some participants were from overseas countries, and the SEIFA index could not be calculated. Another limitation of the study is the use of the EDIS data, which may contain coding errors. Although we controlled for some confounders in the study, the ability to control for confounding was limited by the availability of data in the EDIS data set, so other potential covariates such as parental educational level and parental employment status were not included in the analyses. Another potential limitation is the definition of 'low acuity' that was used for this study. Our definition did not take into consideration low-acuity illnesses that are complex. The triage scale determines urgency, not complexity. Thus, we may have misclassified these presentations as low acuity. In addition, we did not take into account the time of day or day of the week. Consequently, one criticism of this work could be that it is inappropriate to identify presentations as 'low acuity' if there are no other medical services available at the time of presentation (e.g. on weekends or overnight). Another criticism of this work may be that the demonstrated increase in lower acuity presentations may be more reflective of proximity and postcodes rather than SES. We acknowledge these limitations. Finally, the results of this study may not be generalisable to other countries that have a different health-care system.

Implications for policy and future research

From a policy perspective, improving access to primary care could potentially reduce low-acuity ED visits. Findings from this study suggest that policies resulting in alternative sources of care, such as after-hours GP/primary care provider services and co-location of GP clinics in the ED, could potentially reduce the cost and burden of a low-acuity ED visit. This coupled with ongoing education for parents about alternative services, such as about primary care services and providers, to access at the time of bringing their children to the ED for low-acuity illnesses may change attendance patterns over time. Further research is also required to investigate parents' decision-making process prior to bringing their children to the ED for low-acuity presentations. Identifying factors that influence this process could lead to interventions that result in care givers having a higher degree of confidence in accessing more appropriate, low-cost primary care services.

Conclusions

The findings of this study demonstrate that approximately one-third of paediatric patients present to this regional hospital ED for low-acuity illnesses, incurring an additional cost of A$895 000–A $1 110 000 per year. Paediatric patients in the very high SES group were more likely to visit the ED for low-acuity conditions. Further research is required to investigate care givers' rationale and potentially other reasons underlying these low-acuity ED presentations with the aim of reducing the overall cost to the Australian health-care system.

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