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Informing diversion strategy: A comparison of parent and general practitioner-referred paediatric patients presenting to a metropolitan hospital

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Informing diversion strategy: A comparison of parent and GP-referred paediatric patients presenting to a metropolitan hospital.

Abstract

Objective: To determine whether the characteristics and outcomes of parent-referred children differ substantially from GP-referred children attending a metropolitan Emergency Department.

Methods: Prospective cross-sectional observational study **of consecutive patients aged less than 16 years of age attending** a mixed adult & paediatric metropolitan teaching hospital ED in Melbourne. Data collected included patient characteristics (age, sex, arrival mode, triage category), and outcomes (admission, specialty consultation, treatment time > 1 hour, IV/NG therapy, procedural sedation, procedures, imaging studies, pathology collection).

Results: **The outcome data of 4580 patients was analysed.** Patients brought by parents directly to the ED did not differ from patients referred by their GP in **age, sex, or triage category**, but were more likely to arrive by ambulance (13% v 2%, $p < 0.01$). Low-urgency GP-referred children were more likely to require a procedure (22% v 15%, risk difference 0.07, 95% CI 0.02 - 0.13), and pathology tests (13% v 8%, risk difference 0.05, 95% CI 0.01 - 0.1) than parent referred children, but were similar for other outcomes. The proportion of low-urgency children who had no ED-specific care interventions was not significantly different between the groups (27% v 32%, risk difference -0.06, 95% CI -0.11 - 0).

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Conclusions: Children brought to ED directly by their parents or carers did not differ substantially from GP-referred children in their characteristics or outcomes. The use of referral source and triage categories to determine patient suitability for diversion to general practice **may need to be reconsidered**.

Keywords: child, emergency, hospital, parent, triage

Key findings

- Children brought to ED directly by their parents had few **significant** differences in demographics and outcomes from the cohort referred by GPs.
- The use of referral source and triage categories to determine suitability for diversion to general practice **may need to be reconsidered**.
- EDs should be resourced to provide the paediatric care requested by both GPs and parents.

Introduction

Presentations to Australian Emergency Departments (EDs) have been increasing at a greater rate than population growth for many years.¹ In Victoria a 52% increase was demonstrated in total ED presentations over an 11 year period (2002/3 to 2012/13).² This issue is especially evident in paediatric age groups³, with the 0-4 year-old age bracket consistently representing the largest age cohort of ED presentations.²

The overcrowding of EDs has been shown to contribute to additional mortality overall,⁴ while in paediatric services (which generally have a very low mortality) it has been shown to increase the rate of hospital admission, and representations within the following week.⁵

One of the many strategies that has been proposed to counter this phenomenon is the diversion of low-urgency patients to general practice, despite the evidence that these patients use very few ED resources⁶ and the real cause of overcrowding is actually insufficient numbers of inpatient beds.⁷ A recent systematic review found no evidence for success of these diversion strategies.⁸ While there are no Australian studies of cost benefits, **a US study also found that** the cost savings of diversion are questionable.⁹

Previous work on this topic has included surveys of parents, general practitioners (GPs) and Emergency Physicians, to determine their opinions and motivations as to which children are appropriate to be seen in the ED rather than general practice. Cheek et al found that Emergency clinicians were more willing to agree that a GP referral was appropriate

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compared to a parent-initiated presentation.¹⁰ **However, Freed et al found that 94% of parents of low-urgency patients reported that the seriousness of their child's condition justified ED presentation.**¹¹ **The aim of this study** was to obtain data to objectively compare the children presenting directly to an ED with those referred by their GP. It was hypothesized that if parent or carer-referred (PCR) children with non-urgent conditions were truly more appropriate to be seen by a GP, that they would be less likely than GP-referred (GPR) patients to have interventions that a **GP is unable to provide.**

Methods

A prospective cross-sectional observational study was conducted in the Paediatric Emergency Department of a metropolitan mixed adult and paediatric teaching hospital in Melbourne, Australia. Consecutive paediatric patients (less than 16 years of age) over a 4-month period (February to May 2019) were triaged by nursing staff on arrival at the ED and had their referral source independently determined by clerical staff. Their care and subsequent disposition were then determined by medical staff according to usual practice. All medical records were then audited for demographics and outcomes.

The outcomes audited we named "ED-care interventions" (EDCIs), and were **determined prior to data collection as those frequently requested in GP referrals** and difficult or impossible to deliver in general practice:

- admission to hospital ward or short-stay unit, or transferred to another hospital

- consultation with a specialty unit, e.g. orthopaedics
- medical treatment & observation time greater than 1 hour (excluding waiting time)
- intravenous or nasogastric fluid therapy
- procedural sedation, e.g. nitrous oxide or parenteral drugs
- performance of a procedure, e.g. fracture reduction, suturing, lumbar puncture
- imaging studies
- pathology collection, e.g. blood or urine collection in young children

Data was collected in a spreadsheet (Microsoft Excel), and demographic differences were compared for significance using Chi squared analysis. Significance of EDCI data was determined by calculating the risk difference (RD) between the two referral sources, with a RD of zero signifying no difference between groups.

Ethics approval was granted by the Austin Health Human Research Ethics Committee.

Results

5086 patients less than 16 years of age attended the ED during the 4-month study period. Patients referred by other sources (not GPR or PCR, e.g. medical specialist) were excluded (n= 192). **During the study period there were some instances of medical records without outcome data due to computer software failure (n=59) and also patients who did not wait (DNW) for care after being triaged (n = 255), and these patients were excluded from**

analysis. Therefore, the analysed cohort included 4580 presentations aged 0-15 years old who were either GPR or PCR and had recorded outcome data.

Patient Characteristics

Of all presentations, 497 (11%) patients were GPR while 4083 (89%) were PCR. Patients aged 0-4 were the largest age cohort to present (n=2252), regardless of referral source (GPR 51%, PCR 49%). Males were more prevalent than females in both GPR (57%) and PCR groups (56%). For both referral sources, the majority of the patients referred were assigned an Australasian Triage Score (ATS) category 4 or 5 (GPR 52%, PCR 56%, p=0.26). A significantly higher proportion of PCR patients arrived by ambulance compared to GPR (PCR 13%, GPR 2%, p<0.001). There were no other significant differences between the age or sex of GPR and PCR patients (Table 1). **There was only one death during the data collection period.**

Emergency Department Care Interventions

Patients may have received none of the EDCIs, one, or multiple depending on their presentation. Analysis of patients in all ATS categories revealed GPR patients were more likely to require admission or transfer (21% v 16%, RD = 0.05, 95% CI 0.01 – 0.09), require pathology tests (16% v 12%, RD = 0.05, 95% CI 0.02 – 0.08), or have a consultation time greater than 1 hour (53% v 48%, RD = 0.05, 95% CI 0.01 – 0.1). 34% of GPR patients had no EDCIs, as did 31% of PCR patients, although this difference was not statistically significant (Table 2).

Focusing specifically on the patients given the less urgent ATS categories 4 and 5 (n=2548), GPR patients were more likely to require pathology tests (13% v 8%, RD = 0.05, 95% CI 0.01 – 0.1) and undergo a procedure (22% v 15%, RD = 0.07, 95% CI 0.02 – 0.13). No other significant differences were seen. 27% of ATS category 4 and 5 GPR patients received no EDCIs, as did 32% of the PCR patients, with no statistically significant difference demonstrated between these two referral sources (Table 3, Figure 1).

Discussion

Emergency Departments in Australian public hospitals provide specialist-supervised care to all attendees, and at no cost to citizens and permanent residents. They provide a model of care in which both GPs and parents place their confidence to detect serious illness and provide safe and timely treatment of a wide range of adult and paediatric conditions. The rising demand for ED services has caused concern regarding patient safety due to long waiting times for patients, overburdened staff, as well as the cost of resourcing these services. It has been tempting to find simple ways to identify patients **who can be diverted** to other health services, with one example being children with non-urgent triage categories.¹²

In addressing the indicators of the National Healthcare Agreement, the Australian Institute of Health and Welfare (AIHW) has reported that some patients attending EDs are “General-Practice appropriate” according to its definition: Australasian Triage Scale (ATS) category 4 or 5, not admitted, and not brought in by ambulance (BIBA) or correctional vehicle.¹³ While simple to audit this definition **is thought to be** misleading. The Australasian College for Emergency Medicine (ACEM) proposed a different definition: self-referred, not BIBA and with a medical consultation time of less than 1 hour.¹⁴ A comparison of these definitions using real patient cohorts by Nagree and colleagues found that the AIHW definition consistently overestimated the proportion of GP-type patients due to its inappropriate utilisation of the Australasian Triage Scale (ATS).¹⁵

The ATS is used on arrival of a patient at an ED to determine urgency. The 5 categories of the ATS are used to determine which patients should receive temporal priority when receiving medical care. The ATS categories were never designed to be measures of complexity, severity, or appropriateness for ED attendance. What may also not be appreciated is that the ATS as applied to paediatric patients is not very reliable when compared to other triage systems internationally,¹⁶ and its accuracy and interrater reliability for children has been demonstrated to be poor.¹⁷ Despite this, the AIHW still uses semi-urgent and non-urgent ATS categories to judge whether an ED visit is an “avoidable GP-type presentation”.^{12, 18} Other bodies such as Primary Healthcare Networks (PHNs) have used this data to build cases for diversion strategies, on the assumption that patients with low-urgency ATS categories most properly **should be cared for** in general practice.

Previous research has used surveys which collated self-reported opinions by parents¹¹, GPs and Emergency Physicians¹⁰ to reach the conclusion that a cohort of paediatric patients would be more appropriately cared for in general practice. The implication is that the decision to attend the ED was inappropriate, and that GPs would be able to avoid ED referral. However, parents have been shown to attend EDs as they genuinely believe their child is sick and needs more care than a GP can provide. Freed et al found that 94% of parents presented to the ED due to their concern about the seriousness of their child’s condition.¹¹ Siminski has concluded that these decisions to attend ED are “premised on

reasonable decision-making processes and as such may not be amenable to commonly promoted education programs focussed on clarifying service roles".³

The objective data gained from our study demonstrates that the children referred by GPs and those brought directly by their parents or carers differ very little, either in demographics or outcome. We found an increased likelihood of low-urgency patients referred by GPs requiring pathology tests or a procedure, however the incidence of other EDCIs, and indeed the incidence of not requiring any EDCIs at all, were no different between the groups. Cheek et al found that GPs reported the need for a second opinion as a common reason for their referrals,¹⁰ and so **the absence of provision of a EDCIs to a patient should not be interpreted as demonstrating that they are appropriate for GP care but perhaps just that they require more specialised advice.**

Parents appear to be making decisions which are closely aligned to the capacity of general practices. Parents have previously been found to prefer to attend ED rather than their GP for low-urgency injuries,¹⁹ and unfortunately there is also some evidence that many parents lack trust in GPs for the care of their children.²⁰ It is possible that this may be influenced by either individual experience or shared community knowledge of what conditions GP will treat, and which they refer to EDs. **Criticism of parental decisions would appear to be unwarranted as our results suggest that the desire for advice and decision-making by doctors more familiar with paediatric care is similar for both GPs and parents.**

Limitations

Our study was conducted in a single metropolitan hospital in which the Emergency Department cares for both adults and children, similar to where many children receive ED care. Differences in casemix and referral patterns are likely in regional hospitals and tertiary paediatric centres. Our data was also collected over a four-month period during summer and autumn. Seasonal variation may affect presentation numbers and the conditions treated, but it is unlikely that this would affect referral patterns. **Approximately 5% of patients presenting for care did not wait after triage, and we do not have data on where this cohort received any further care. Referral from GPs was sometimes obvious from the presence of a referral letter, but determination of referral source otherwise relied upon the reporting of the parent or carer. Patients' geographical region of residence, and social or health status may be confounders that were not analysed in this study. Broader studies to account for these limitations are recommended.**

Conclusions

Based on our objective outcome data, children presented directly to an ED by their parents did not differ substantially to the children referred by GPs, even if their condition was triaged as less urgent. Similar proportions of patients in both groups did not require any interventions that specifically required an ED attendance, and many of these are likely to be cases where specialised clinical advice was required. Rather than efforts to divert these

patients to general practice, health care systems may be better focussed on properly resourcing EDs to safely & efficiently manage these patients. Government departments and agencies should also reconsider the reporting of ATS category 4 & 5 patients as “GP-appropriate”, as this unsupported judgement **may drive** poor health policy.

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Table 1: Patient characteristics with regard to referral source

Demographic	GP-Referred N (%)	Parent-Referred N (%)	p-value
Total number	497	4083	
Age			
0-4	251 (51)	2001 (49)	0.65
5-9	114 (23)	894 (22)	0.64
10-15	132 (27)	1188 (29)	0.32
Sex			
Male	285 (57)	2285 (56)	0.70
Triage Category			
1, 2 or 3	238 (48)	1792 (44)	0.21
4 or 5	259 (52)	2291 (56)	0.26
Arrival Transport			
Ambulance	8 (2)	530 (13)	<0.01

Table 2: EDCIs of GPR and PCR patients of all ATS categories (1-5)

Outcomes (EDCIs)	GP-Referred N (%)	Parent-Referred N (%)	RD (95% CI)*
Total number	497	4083	
Admission or Transfer	105 (21)	668 (16)	0.05 (0.01 - 0.09)
Specialty consultation	89 (18)	647 (16)	0.02 (-0.02 - 0.06)
Treatment >1 hour	265 (53)	1961 (48)	0.05 (0.01 - 0.1)
IV or NG Therapy	32 (6)	176 (4)	0.02 (0.00 - 0.04)
Procedural sedation	20 (4)	132 (3)	0.01 (-0.01 - 0.03)
Procedure	68 (14)	485 (12)	0.02 (-0.01 - 0.05)
Imaging	109 (22)	948 (23)	-0.01 (-0.05 - 0.02)
Pathology	82 (16)	470 (12)	0.05 (0.02 - 0.08)
No EDCIs required	171 (34)	1281 (31)	0.03 (-0.01 - 0.07)

*RD = risk difference, 0 = no difference

Table 3: EDCIs of GPR and PCR patients of ATS categories 4 and 5 only

Outcomes	GP-Referred N (%)	Parent-Referred N (%)	RD (95% CI)*
Total number	258	2290	
Admission or Transfer	26 (10)	169 (7)	0.03 (-0.01 - 0.07)
Specialty consultation	36 (14)	226 (10)	0.04 (-0.02 - 0.07)
Treatment >1 hour	125 (48)	992(43)	0.05 (-0.01 - 0.12)
IV or NG Therapy	10 (4)	53 (2)	0.02 (-0.01 - 0.04)
Procedural sedation	14 (5)	51 (2)	0.03 (0.00 - 0.06)

Procedure	57 (22)	333 (15)	0.07 (0.02 - 0.13)
Imaging	65 (25)	610 (27)	-0.02 (-0.07 - 0.04)
Pathology	34 (13)	177 (8)	0.05 (0.01 - 0.10)
No EDCIs required	69 (27)	744 (32)	-0.06 (-0.11 - 0.00)

*RD = risk difference, 0 = no difference

Admission or Transfer
Consultation
Treatment >1 hour
IV or NG Therapy
Procedural sedation
Procedure
Imaging
Pathology
No EDCIs required

