ORIGINAL RESEARCH

General practitioner-type patients in emergency departments in metro North Brisbane, Queensland: A multisite study

Ghasem (Sam) TOLOO 1,2, Nimisha BAHL,2 David LIM,3 Gerry FITZGERALD,2 Darren WRAITH,1 Kevin CHU,4 Frances B KINNEAR,5 Peter AITKEN6 and Douglas MOREL7

1Institute of Health and Biomedical Innovation, Queensland University of Technology, Brisbane, Queensland, Australia, 2School of Public Health and Social Work, Queensland University of Technology, Brisbane, Queensland, Australia, 3School of Science and Health, Western Sydney University, Sydney, New South Wales, Australia, 4Department of Emergency Medicine, Royal Brisbane and Women’s Hospital, Brisbane, Queensland, Australia, 5Emergency and Children’s Services, The Prince Charles Hospital, Brisbane, Queensland, Australia, 6Health Disaster Management Unit, Queensland Health, Brisbane, Queensland, Australia, and 7Emergency Department, Redcliffe Hospital, Redcliffe, Queensland, Australia

Abstract

Objective: To estimate the proportion of ED patients in urban Queensland who are potentially suitable for general practitioner (GP) care.

Methods: A retrospective analysis was conducted using ED Information System data from Metro North Hospital and Health Service in Brisbane, Australia for three consecutive financial years (2014–2015 to 2016–2017). The hospitals included two Principal Referral and two Public Acute hospitals. GP-type patients were calculated using the Australian Institute of Health and Welfare (AIHW), Australasian College for Emergency Medicine (ACEM) and the validated Sprivilus methods.

Results: Of the 822,841 ED presentations, 219,567 (27%) were potentially GP-type patients by AIHW, 49,307 (6%) by ACEM and 61,836 (8%) by Sprivilus methods. The higher proportion of GP-type presentations were during 08.00 to 17.00 hours by AIHW and ACEM methods. Of the lower-acuity triage categories of 4 (286,154 presentations) and 5 (5638 presentations), AIHW estimated that 62% and 80% of the patients were GP-type patients, as compared to 9% and 22% by ACEM, and 9% and 0.3% by Sprivilus method. The mean costs of adult GP-type patients is $345 by the AIHW and $406 by the ACEM method, lower than non-GP type patients ($706 and $622, respectively).

Conclusions: There is considerable variation in what is considered GP-type ED presentations based on the three methods employed and this variation may have fuelled the debate surrounding what is ‘avoidable’ ED utilisation. Regardless, the study findings provide an interesting addition to defining and addressing appropriate utilisation of ED services.

Key words: avoidable ED utilisation, emergency departments, general practice, healthcare costs, health services needs and demand.

Key findings

- Principal Referral hospital EDs had higher proportions of GP-type patients than Public Acute EDs in Brisbane’s Metro North.
- The percentage of GP-type patients remained fairly stable across the study period and all the three methods of estimates.
- Considering the current evidence, we argue that providing care for these patients in an ED with a minimal marginal cost may be the most effective option.

Introduction

EDs provide unscheduled and accessible care for many with acute illnesses and injuries and are an important part of the healthcare system.1 As in other developed countries, the demand for ED care in Australia is increasing,2 leading to longer waiting times, increased costs and overcrowding which potentially compromises acute healthcare.3,4 ED overcrowding is also associated with efficiency and safety problems, patient dissatisfaction and stress among healthcare professionals.5

Patients attend EDs for various reasons. Many attend because of the perceived urgency and severity of their condition.6–8 Some are referred by
health professionals (e.g. general practitioner [GP], paramedic or telephone triage), and some attend because of limited social support. Furthermore, the ED is an attractive source of medical care because of perceived convenience and access to specialised care and ancillary investigations (pathology and radiology). Strategies to reduce demand may include primary and secondary prevention, pre-hospital diversion and telephone advice. Reducing ED presentations may reduce hospital costs.

It has been suggested that a number of patients presenting to EDs could be safely and suitably managed in primary care settings, and this could result in shorter ED waiting times, improved patient satisfaction and continuity of care. A recent Western Australian study used GP-researchers to assess the suitability of ED presentations for management in a primary care setting. It showed that between 20% and 40% of all ED presentations could have been managed in primary care, with potentially better health outcomes and economic benefits.

There is little agreement though, on how best to define and identify GP-type patients in the ED. Various methods have been devised and the results vary considerably from 10% to 70% of ED presentations. The three main methods in Australia are the Australian Institute of Health and Welfare (AIHW), the Australasian College for Emergency Medicine (ACEM) and the Sprivilus methods.

A retrospective analysis was conducted using the ED Information System (EDIS) data from the Metro North Hospital and Health Service in Brisbane, Australia. The Metro North Hospital and Health Service includes four major public hospitals; two Principal Referral and two Public Acute (groups A and B) hospitals which provide emergency care to around 900 000 people. One of the Principal Referral EDs receives only adult patients, and the other has co-located EDs for adults and children. The other two EDs treat patients of all ages.

Data on ED attendances for the fiscal years 2014–2015 to 2016–2017 were obtained from Queensland Health. The dataset contained de-identified records of patients including Australasian Triage Scale (ATS) triage category, age, gender, dates and times of arrival and departure, arrival mode, referral status, departure status, and diagnosis code (ICD 10-AM).

Costing information was obtained from the Independent Hospital Pricing Authority (IHPA)’s website. IHPA was established to provide independent benchmarking of the efficient cost of public hospital services. IHPA determines a National Efficient Price (NEP) and price weights for disease groups in public hospital EDs. We have used the 2016–2017 NEP to provide an estimated cost for GP-type patients presenting to EDs for 2016–2017. The 2016–2017 NEP was $4883 per national weighted activity unit; which included an adjustment for the impact of age on the cost of ED services.

Descriptive statistics and univariate analysis was used to report the data. R-squared ($R^2$) values were calculated based on Pearson’ R. Statistical analyses were performed using srs Statis-
tics for Windows (version 25; IBM Corp, Armonk, NY, USA) licensed to Queensland University of Technology.

To quantify GP-type presentations, we applied three definitions previously used by Australian researchers.

1. The AIHW method defines a GP-type patient as one who had a triage category 4 or 5, did not arrive by ambulance/police/correctional vehicle, was not admitted, was not referred to another hospital and did not die.

2. The ACEM method defines a GP-type patient as one who is self-referred, did not arrive by ambulance and had a medical consultation time of less than 1 h. Patients with an invalid consultation time or who did not wait were excluded from the analysis.

3. The Sprivilus method is based on the difference between the discharge rate of self-referred patients and that of GP-referred patients, for ATS categories 3 to 5, were not admitted, and arrived by self, family or friends.

To calculate costs, the NEP for 2016–2017 ($4883) was multiplied by the price weights for GP-type and non-GP-type patients defined by the AIHW and ACEM methods. Since the Sprivilus method uses aggregate results, we were unable to estimate cost for this method.

Ethics approvals were obtained from the Human Research Ethics Committees of The Prince Charles Hospital (approval number HREC/17/QPCH/170) and Queensland University of Technology (1500000438). ED data were provided under the Public Health Act 2005 (Queensland) approved by the EDIS Data Custodian and Director of Health Innovation, Investment and Research Office at Queensland Health (Ref. RD007029).

Results

The dataset contains 822 841 patient records (Table 1). There were 13 378 more ED presentations in 2016–2017 than 2014–2015; a 1.7% annual...
### TABLE 1. Descriptive characteristics of the study population compared with Queensland state-wide data

| Variables                          | Number of patients | Percentage for study (%) | State-wide |
|------------------------------------|--------------------|---------------------------|------------|
| **Type of hospital**               |                    |                           |            |
| Principal referral ($n = 2$)       | 477 366            | 58.0                      | —          |
| Public acute ($n = 2$)             | 345 275            | 42.0                      | —          |
| **Year**                           |                    |                           |            |
| 2014–2015                          | 266 029            | —                         | 1 378 883† |
| 2015–2016                          | 277 405            | —                         | 1 439 143† |
| 2016–2017                          | 279 407            | —                         | 1 457 083† |
| **Day of the week and arrival time**|                    |                           |            |
| Monday–Friday: 08.00–16.59 hours   | 298 775            | 36.3                      | —          |
| Monday–Friday: 17.00–23.59 hours   | 198 852            | 24.2                      | —          |
| Monday–Friday: 00.00–07.59 hours   | 84 001             | 10.2                      | —          |
| Saturday–Sunday: 08.00–16.59 hours| 122 071            | 14.8                      | —          |
| Saturday–Sunday: 17.00–23.59 hours| 79 355             | 9.6                       | —          |
| Saturday–Sunday: 00.00–07.59 hours| 39 787             | 4.8                       | —          |
| **Gender**                         |                    |                           |            |
| Female                             | 417 425            | 50.7                      | 49.7%‡     |
| Male                               | 405 274            | 49.3                      | 50.3%‡     |
| Missing/not reported               | 142                | <0.1                      |            |
| **Age group (years)**              |                    |                           |            |
| Less than 15                       | 150 311            | 18.3                      | 22.1%‡     |
| 15–29                              | 192 230            | 23.4                      | 67.7%‡     |
| 30–44                              | 158 668            | 19.3                      |            |
| 45–59                              | 124 459            | 15.1                      |            |
| 60–74                              | 102 291            | 12.4                      |            |
| More than 75                       | 94 882             | 11.5                      | 10.2%‡     |
| **Triage category**                |                    |                           |            |
| 1 (Resuscitation, to be seen immediately) | 4405             | 0.5                       | 0.8%‡     |
| 2 (Emergency, to be seen within 10 min) | 112 844           | 13.7                      | 14.0%‡     |
| 3 (Urgent, to be seen within 30 min) | 367 780           | 44.7                      | 44.0%‡     |
| 4 (Semi-urgent, to be seen within 60 min) | 286 154         | 34.8                      | 36.4%‡     |
| 5 (Non-urgent, to be seen within 120 min) | 51 658         | 6.3                       | 4.8%‡     |
| **Departure status**               |                    |                           |            |
| Admitted                           | 304 124            | 37.0                      | 35.2%‡     |
| Discharged                         | 477 527            | 58.0                      | 59.4%‡     |
| Left/did not wait                  | 40 808             | 4.9                       | 5.3%‡     |
| Died/dead on arrival               | 380                | <0.1                      | 0.1%‡     |
| Missing/not reported               | 2                  | <0.1                      |            |
| **Referred by**                    |                    |                           |            |
| General practitioner               | 17 152             | 2.1                       | 4.7%§      |
| Self/family/friends                | 778 841            | 94.7                      | 90.1%§     |
| Other                              | 26 848             | 3.2                       | 5.2%§     |
| **Mode of arrival**                |                    |                           |            |
| Walk in/self-transport             | 531 183            | 64.6                      | 72.6%§     |
| Ambulance                          | 280 342            | 34.1                      | 27.3%§     |
| Other                              | 11 116             | 1.4                       | 0.2%§     |

†Data for comparison were sourced from AIHW ED Care.‡ Data for comparison were sourced from AIHW ED Care 2015–2016.§ Data for comparison were sourced from Emergency Health Study – QLD 2010–2011.
increase which is consistent with the increase in Queensland for the same period (1.2%). Some 63.7% of patients presented at ED outside of the conventional Australia working week (Monday to Friday, 08.00 to 17.00 hours), and 15% were between 00.00 and 08.00 hours (seven days). Approximately half of the patients were female (50.7%) and two-thirds (63.6%) were under 30 or over 60 years. Over 85% were in triage categories 3 to 5, and 58% were not admitted. Approximately 95% were referred by self, family or friends; and 2.1% referred by a GP. Most two-thirds (64.6%) used their own transport or walked in compared to approximately one-third (34.1%) who arrived by ambulance.

**GP-type presentations**

Table 2 shows the proportion of GP-type patients presenting to the various EDs in accordance with the different methods detailed above. Overall, GP-type patients were estimated at 26.7% (95% confidence interval [CI] 26.6–26.8%) by the AIHW method, 6% (95% CI 5.9–6.0%) by the ACEM method and 7.5% (95% CI 7.4–7.6%) by the Sprivulis method.

All methods reported a decreasing trend in the proportion of GP-type patients during the study period; AIHW: from 27.5% (2014–2015) to 25.6% (2016–2017), $R^2 = 0.93$; ACEM: from 6.5% to 5.3%, $R^2 = 0.92$; and Sprivulis: from 7.6% to 7.1%, $R^2 = 0.48$.

The highest proportion of GP-type presentations were during business hours (08.00 to 17.00 hours weekdays and weekends), and this reduced during the evening and overnight based on all methods. The proportion of GP-type presentations between 08.00 and 17.00 hours on weekends was higher than similar

| TABLE 2. Percentage of GP-type patients by general and demographic characteristics according to the AIHW, ACEM and Sprivulis methods |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| **Method characteristics** | **AIHW (n)** | **% of presentations (95% CI)** | **ACEM (n)** | **% of presentations (95% CI)** | **Sprivulis (n)** | **% of presentations (95% CI)** |
| **Hospital** | | | | | | |
| Principal referral | 138 024 | 28.9 (28.8–29.0) | 30 640 | 6.4 (6.3–6.5) | 39 727 | 8.3 (8.2–8.4) |
| Public acute | 81 543 | 23.6 (23.5–23.8) | 18 667 | 5.4 (5.3–5.5) | 22 732 | 6.6 (6.5–6.7) |
| All combined | 219 567 | 26.7 (26.6–26.8) | 49 307 | 6.0 (5.9–6.0) | 61 836 | 7.5 (7.4–7.6) |
| **Year** | | | | | | |
| 2014–2015 | 73 108 | 27.5 (27.3–27.7) | 17 243 | 6.5 (6.4–6.6) | 20 129 | 7.6 (7.5–7.7) |
| 2015–2016 | 74 918 | 27.0 (26.9–27.2) | 17 116 | 6.2 (6.1–6.3) | 21 556 | 7.8 (7.7–7.9) |
| 2016–2017 | 71 541 | 25.6 (25.4–25.8) | 14 948 | 5.3 (5.2–5.4) | 19 810 | 7.1 (7.0–7.2) |
| **Arrival day and time** | | | | | | |
| Mon–Fri: 08.00–16.59 hours | 81 602 | 27.3 (27.2–27.5) | 20 339 | 6.8 (6.7–6.9) | 23 033 | 7.7 (7.6–7.8) |
| Mon–Fri: 17.00–23.59 hours | 51 439 | 25.9 (25.7–26.1) | 9749 | 4.9 (4.8–5.0) | 13 791 | 6.9 (6.8–7.1) |
| Mon–Fri: 00.00–07.59 hours | 16 819 | 20.0 (19.8–20.3) | 3598 | 4.3 (4.2–4.4) | 3366 | 4.0 (3.9–4.2) |
| Sat–Sun: 08.00–16.59 hours | 40 570 | 33.2 (33.0–33.5) | 9911 | 8.1 (8.0–8.3) | 9328 | 7.6 (7.5–7.8) |
| Sat–Sun: 17.00–23.59 hours | 21 536 | 27.1 (26.8–27.5) | 4289 | 5.4 (5.2–5.6) | 4116 | 5.2 (5.0–5.4) |
| Sat–Sun: 00.00–07.59 hours | 7601 | 19.1 (18.7–19.5) | 1421 | 3.6 (3.4–3.8) | 1194 | 3.0 (2.8–3.2) |
| **Gender** | | | | | | |
| Female | 103 472 | 24.8 (24.7–24.9) | 21 879 | 5.2 (5.2–5.3) | 31 913 | 7.6 (7.5–7.7) |
| Male | 116 067 | 28.6 (28.5–28.8) | 27 419 | 6.8 (6.7–6.9) | 29 165 | 7.2 (7.1–7.3) |
| **Age group (years)** | | | | | | |
| Less than 15 | 67 430 | 44.9 (44.6–45.1) | 18 724 | 12.5 (12.3–12.6) | 6394 | 4.3 (4.2–4.4) |
| 15–29 | 58 951 | 30.7 (30.5–30.9) | 12 310 | 6.4 (6.3–6.5) | 16 480 | 8.6 (8.5–8.7) |
| 30–44 | 43 313 | 27.3 (27.1–27.5) | 9323 | 5.9 (5.8–6.0) | 10 561 | 6.7 (6.5–6.8) |
| 45–59 | 28 305 | 22.7 (22.5–23.0) | 5553 | 4.5 (4.4–4.6) | 6398 | 5.1 (5.0–5.3) |
| 60–74 | 15 423 | 15.1 (14.9–15.3) | 2566 | 2.5 (2.4–2.6) | 4158 | 4.1 (3.9–4.2) |
| More than 75 | 6145 | 6.5 (6.3–6.6) | 831 | 0.9 (0.8–0.9) | 2565 | 2.7 (2.6–2.8) |

CI, confidence interval.
periods on weekdays according to AIHW (33.2% vs 27.3% of patients) and ACEM (8.1% vs 6.8% of patients), while for Sprivulis the proportions were similar (7.6% vs 7.7% on weekends and weekdays, respectively). Of all GP-type presentations, 44.4% occurred after hours on both weekdays and weekends (AIHW method), 38.6% (ACEM) and 41% (Sprivulis).

Males had a marginally higher level of GP-type presentations than females for the AIHW (28.6% vs 27.8%) and ACEM methods (6.8% vs 5.2%), while the Sprivulis method showed the opposite (7.2% vs 7.6%).

The AIHW (44.9%) and ACEM (12.5%) methods showed a linear trend with the highest proportion of GP-type presentations among children (<15 years) and decreasing proportions as age increased ($R^2 = 0.96$ and 0.89, respectively). The Sprivulis method however showed a non-linear trend with the highest proportion among the 15–29 years age group (8.6%, 95% CI 8.5–8.7%), but decreasing afterwards ($R^2 = 0.34$).

As Table 3 shows, the AIHW method suggested that 62% of ATS 4 and 80% of ATS 5 patients were identified as GP-type. This compares with 9% (ATS 4) and 22% (ATS 5) by the ACEM method. The ACEM method also identifies a small number of patients in higher acuity triage categories as suitable for GP care, ranging 0.9–2.7% in ATS categories 1–3. The Sprivulis method produced different results with only 0.3% of the patients in ATS 5 identified as GP-type, and 6.8–9.1% in ATS 3–4.

The AIHW method suggests that there is little difference in the rate of GP-type patients whether self-referred (27.4%) or GP-referred (26.8%). As Table 4 shows, GP-type patients had a significantly shorter length of stay in EDs by both AIHW and ACEM methods than other patients (not GP-type). However, the AIHW’s mean length of stay (131.1 min, 95% CI 130.7–131.5) was three times longer than the ACEM method (41.3 min, 95% CI 41.2–41.4). This difference most likely reflects the ACEM criteria which limits length of stay to less than 1 hour.

**Price estimates**

Table 5 shows the average price paid for GP-type and non-GP-type presentations in 2016–2017. There was a lower mean cost for GP-type patients using the AIHW method compared with the ACEM method (adult: $345 vs $406; child: $343 vs $412). However, for non-GP-type presentation,
AIHW’s estimates were higher than ACEM’s for adults (mean: $706 vs $622) and children (mean: $635 vs $511).

**Discussion**

Our study of four metropolitan hospitals in Queensland adds to the discussion about GP-type patients in ED, and provides comparative costs. We found considerable variation in the estimates using the three different methods, with the AIHW method reporting a much higher proportion (27%) than the ACEM (6%) or Sprivulis methods (8%). This is consistent with previous studies.16,20

The AIHW method has been widely questioned and discredited as a suitable method for estimating GP-type presentations. It is based mainly on triage category, which is an urgency scale and does not represent the complexity or severity of the condition/s. Furthermore, it includes patients who are referred by GPs, leading to an overestimation of GP-type attendances.19,20,26

By comparison, the Sprivulis method is more reflective of local GP’s capability to manage low acuity presentations, and may vary over time and between locations.21 Other diagnosis-based attempts to quantify GP-type presentations have been developed,22 but are limited by the subjective assessment of urgency and do not take into account patient and (alternate) provider (e.g. GP) preferences or the suitability of services available.

All three methods rely on post-hoc evaluation. They calculate GP-type patients based variably on the mode of arrival, triage category, diagnosis and outcome. None of these are predictable by the patient deciding where to seek medical care in an emergency. Thus, while they may be useful for policy evaluation, they do not help the patient with their decision making.

In line with previous studies,20,21 we estimated 40% of GP-type patients visited ED between the 08.00 and 17.00 hours weekdays, when GPs are available. In addition to the medical deputising services, many GP clinics in the study area provide extended hours services, both weekdays and weekends. The study area is served by approximately 1200 GPs (personal communication with GP Liaison Officer, Brisbane North PHN), providing bulk-billing and mixed billing systems. Thus, the lack of GPs may not be the sole or principal factor in GP-type patients presenting to EDs. Decision to use GP services for urgent care is a complicated issue for patients built around affordability, suitability, physical and timely access. These matters would require additional research which focusses on the decision making of individuals.

Many low acuity patients attend EDs because they consider their condition requires urgent treatment.7 However, other factors influence ED demand, including out-of-pocket fees for GP services, availability and access to preferred GPs, convenience and the perception that EDs offer ‘total care’ with available diagnostic services and multidisciplinary specialists.9

Consistent with the literature,21 the highest proportion of GP-type presentations was in children (<15 years) in both AIHW and ACEM methods, but not Sprivulis. This may reflect parents’ decision-making processes and perceptions of urgency. Also, one of the hospitals has a separate paediatric ED, which may have affected the results. In contrast, the elderly have the lowest level of GP-type presentation using all three methods.

The AIHW’s 2017–2018 data show over 8 million presentations to public hospital EDs,25 an increase of 3.4% over the previous year. This growth is much higher than preceding years and population growth.28 To attenuate the growth in ED demand, mitigation strategies are required. These may include the diversion of low acuity and/or GP-type patients from public EDs to primary care, where safe and suitable. Our findings provide some insight into potential policy changes.

Our findings of the long ED length of stay (by both AIHW and ACEM methods) indicate that these patients may not be simply suitable for a GP care with a standard consultation time of about 15 min. Consistent with previous studies,20,21 our results show that the largest proportion (40%) of GP-type patients attended EDs during business hours. The (relatively inflated) AIHW method shows a total of 140 000 GP-type patients attended outside of normal working hours compared with 29 000 (ACEM) and 32 000 (Sprivulis) methods. These findings further point to the inadequacies of pumping resources into after-hours

---

| Price | AIHW: GP-type ($) | AIHW: non-GP ($) | ACEM: GP-type ($) | ACEM: non-GP ($) |
|-------|------------------|-----------------|------------------|-----------------|
| Adults |                  |                 |                  |                 |
| Mean (95% CI) | 345.0 (344.7–345.3) | 706.3 (705.5–707.1) | 406.3 (404.2–408.3) | 622.3 (621.6–623.0) |
| Median (IQR) | 360.8 (306.6–376.9) | 621.6 (550.3–960.0) | 360.8 (262.7–484.4) | 570.8 (377.0–891.1) |
| Children |                  |                 |                  |                 |
| Mean (95% CI) | 342.8 (342.4–343.2) | 635.2 (633.4–637.0) | 411.9 (409.3–414.5) | 510.5 (509.2–511.8) |
| Median (IQR) | 360.8 (342.8–360.8) | 550.3 (485.8–767.6) | 360.80 (306.6–424.3) | 476.1 (360.8–576.7) |

CI, confidence interval; IQR, interquartile range.
care, and question whether such policies will translate into actual reduced demand for EDs.

On the other hand, offering after-hours care by GPs is often limited by financial viability. The economic question is whether the relatively small number of patients would provide a sufficient client base for viable GP out of hour’s models of care. The lower average (marginal) cost of these patients to the ED, which includes all ancillary costs such as pathology, radiology and consumables, is such that management of these patients in the ED may be the most cost effective approach. However, in the absence of a comparable cost analysis for treatment in a GP setting, we are unable to estimate the relative cost benefit if these patients were diverted to the primary care. Further research is required to investigate the cost benefits of diverting patients to primary care.

Limitations
All these methods use retrospective analysis to identify low acuity or non-urgent conditions that might be suitable for GP care. They fail to consider the patient perspective and the need for investigations or management processes that might not be possible at a smaller healthcare facility. The present study has also not been able to identify the primary care perspectives of the relative costs.

Conclusion
The increase in ED demand is well-known and improved access to primary care has been touted as a possible solution. However, it is likely that increased access to primary care may only attract a small proportion of the ED patients. Estimating the proportion of patients for whom GP care may be appropriate is challenging as it is confounded by the nature and scope for primary care and by the decision-making processes of patients. Intervention studies on diverting GP-type presentations to primary care are needed to establish the real impact of such mitigations on ED utilisation.

While it may be possible to encourage or direct more patients to primary care, primary care needs to be appropriate to the needs of the patient in terms of timeliness and scope of care. It is necessary to further explore the patient’s perspective of the decision-making process and to define the nature and scope of primary care that would be required. A better understanding of the factors affecting patient’s decisions and how this may affect demand is important to develop evidence-based policies and management strategies.

Acknowledgements
The grant for conducting this research was awarded by the Emergency Medicine Foundation. The authors would also like to thank the EDIS data custodian and Department of Health, Queensland for the provision of the data.

Competing interests
KC, FBK, PA and DM are all employees of Queensland Health. KC and PA are members of the Emergency Medicine Australasia’s Editorial Board.

References
1. Toloo S, Rego J, FitzGerald G et al. Emergency Health Services: Demand and Service Delivery Models. Monograph 2: Queensland EHS User’s Profile. Research Monograph. Brisbane, QLD: Queensland University of Technology, 2012.
2. Berchet C. Emergency care services: trends, drivers and interventions to manage the demand. OECD Health Working Papers, No. 93. Paris: OECD Publishing, 2015.
3. Lowthian JA, Curtis AJ, Jolley DJ, Stoelwinder JU, McNeil JJ, Cameron PA. Demand at the emergency department front door: 10-year trends in presentations. Med. J. Aust. 2012; 196: 128–32.
4. Hoot NR, Aronsky D. Systematic review of emergency department crowding: causes, effects, and solutions. Ann. Emerg. Med. 2008; 52: 126–36.
5. Van den Heede K, Van de Voorde C. Interventions to reduce emergency department utilisation: a review of reviews. Health Policy 2016; 120: 1337–49.
6. Kraaijvanger N, Ripsma D, van Leeuwen H, Edwards M. Self-referrals in the emergency department: reasons why patients attend the emergency department without consulting a general practitioner first—a questionnaire study. Int. J. Emerg. Med. 2015; 8: 46–51.
7. Rego J, FitzGerald G, Toloo S, Vallmuur K. Why do Queenslanders seek care in emergency departments? A population study. Emerg. Med. Australas. 2015; 27: 516–21.
8. Scherer M, Lühmann D, Kazek A, Hansen H, Schäfer I. Patients attending emergency departments: a cross-sectional study of subjectively perceived treatment urgency and motivation for attending. Dtsch. Arztebl. Int. 2017; 114: 645–52.
9. Tsai JC-H, Liang Y-W, Pearson WS. Utilization of emergency department in patients with non-urgent medical problems: patient preference and emergency department convenience. J. Formos. Med. Assoc. 2010; 109: 533–42.
10. Villarreal M, Leach J, Ngiangabakwin K, Dale J. Can a partnership between general practitioners and ambulance services reduce conveyance to emergency care? Emerg. Med. J. 2017; 34: 459–65.
11. Soril LJJ, Leggert LE, Lorenzetti DL, Noseworthy TW, Clement FM. Reducing frequent visits to the emergency department: a systematic review of interventions. PLoS One 2015; 10: e0123660.
12. Lim D, Geelhoed E. General practice coordinated chronic disease management to reduce avoidable hospital admission. Aust. Med. J. 2015; 8: 249–50.
13. Ismail SA, Gibbons DC, Gnani S. Reducing inappropriate accident and emergency department attendances: a systematic review of primary care service interventions. Br. J. Gen. Pract. 2013; 63: e813–20.
14. Jones D, Carroll L, Frank L. After-hours care in suburban Canada: influencing emergency department utilization. J. Prim. Care Community Health 2011; 2: 250–4.

© 2019 Australasian College for Emergency Medicine
15. Harris P, Whitty JA, Kendall E et al. The Australian public’s preferences for emergency care alternatives and the influence of the presenting context: a discrete choice experiment. BMJ Open 2015; 5: e006820.

16. Sprivilis P. Estimation of the general practice workload of a metropolitan teaching hospital emergency department. Emerg. Med. 2003; 23: 131–7.

17. Northington WE, Brice JH, Zou B. Use of an emergency department by nonurgent patients. Am. J. Emerg. Med. 2005; 23: 131–7.

18. Whyatt D, Tuson M, Haynes E, Mountain D, Nagree Y, Vickery AW. Burden of primary care-type emergency department presentations using clinical assessment by general practitioners: a cross-sectional study. Emerg. Med. Australas. 2019; 31: 780–6.

19. Allen P, Cheek C, Foster S, Ruigrok M, Wilson D, Shires L. Low acuity and general practice-type presentations to emergency departments: a rural perspective. Emerg. Med. Australas. 2015; 27: 113–8.

20. Nagree Y, Camarda VJ, Fatovich DM et al. Quantifying the proportion of general practice and low acuity patients in the emergency department. Med. J. Aust. 2013; 198: 612–5.

21. Stephens AS, Broome RA. Patterns of low acuity patient presentations to emergency departments in New South Wales, Australia. Emerg. Med. Australas. 2017; 29: 283–90.

22. Independent Hospital Pricing Authority. National Efficient Price Determination 2016–17. [Cited 28 Jun 2017] Available from URL: https://www.ihpa.gov.au/publications/national-efficient-price-determination-2016-17

23. Borland M, Skarin D, Nagree Y. Comparison of methods used to quantify general practice-type patients in the emergency department: a tertiary paediatric perspective. Emerg. Med. Australas. 2017; 29: 77–82.

24. Australian Institute of Health and Welfare. Australian Hospital Statistics 2012–13: Emergency Department Care. Canberra: Australian Institute of Health and Welfare, 2013.

25. Australian Institute of Health and Welfare. Australian Hospital Statistics 2017–18: Emergency Department Care. Canberra: Australian Institute of Health and Welfare, 2018.

26. FitzGerald G, Toloo GS. General practice patients in the emergency department. Med. J. Aust. 2013; 198: 573–4.

27. Schütze H, Rees R, Asha S, Eagar K. Development and evaluation of a code frame to identify potential primary care presentations in the hospital emergency department. Emerg. Med. Australas. 2019; 31: 982–8.

28. Australian Bureau of Statistics. 3101.0 - Australian Demographic Statistics, Dec 2018, 2019. [Cited 10 Sep 2019] Available from URL: https://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0

29. FitzGerald G, Toloo S, Rego J, Ting J, Aitken P, Tippett V. Demand for public hospital emergency department services in Australia: 2000–2001 to 2009–2010. Emerg. Med. Australas. 2012; 24: 72–8.

30. Gonçalves-Bradley D, Flodgren G, Perera R, Rowe BH, Shepperd S, Khangura JK. Primary care professionals providing non-urgent care in hospital emergency departments. Cochrane Database Syst. Rev. 2018; 13: CD002097.

31. Zager K, Taylor YJ. Discharge to medical home: a new care delivery model to treat non-urgent cases in a rural emergency department. Healthc. Ala. 2019; 7: 7–12.

32. Morphet J, Griffiths DL, Crawford K et al. Using transprofessional care in the emergency department to reduce patient admissions: a retrospective audit of medical histories. J. Interprof. Care 2016; 30: 226–31.

33. Australian Institute of Health and Welfare. Australian Hospital Statistics 2015–16: Emergency Department Care. Canberra: Australian Institute of Health and Welfare, 2016.