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# Utilisation of accident and emergency services by patients who could be managed by general practitioners

## Key Messages

1. The reasons for high utilisation rates of accident and emergency (A&E) department services are complex and reflect problems of service delivery by general practitioners (GPs).
2. A network of GPs providing out-of-hours services would reduce the unnecessary use of A&E services.
3. Better interfacing between primary and secondary care and between the public and private sectors would facilitate patients being referred back to and effectively cared for by GPs.

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## Introduction

The accident and emergency (A&E) department is intended for patients with life-threatening or critical conditions that need immediate hospital services. Nonetheless, A&E departments are becoming popular venues for primary care. This rise in inappropriate A&E attendance is considered a serious threat to the health care system because it utilises resources needed to provide true emergency cases with quality care. Some studies have found that up to two thirds of patients who attend the A&E department have problems that could be managed appropriately by general practitioners (GPs).

Traditionally, studies of emergency department visits have relied on surveys of patients at one or two hospitals to determine who used these facilities and why. A comprehensive picture of A&E patients from the whole community was not easily obtained because only a limited number of hospitals were sampled. Moreover, data were usually collected during the day and seldom across midnight. Time is considered an important variable when determining morbidity patterns and reasons for utilisation.

Although there is evidence that referral to primary care providers can be acceptable to patients, in Hong Kong, direct triaging of patients from emergency departments to primary care is currently considered inappropriate and impracticable. Nurse triage is done to ensure that patients receive appropriate attention. It is used to prioritise care and increase efficiency in A&E departments and to increase the overall efficiency of the A&E process. It is not a screening procedure used to identify primary care cases.

Patient self-triage can be as accurate as the classification of urgency made by attending nurses and physicians.<sup>1</sup> Consequently, the question of primary concern is one of screening non-urgent cases with high degrees of sensitivity, specificity, and positive predictive value.

## Objectives

The objectives of this study were to determine the level of inappropriate use, the nature of the morbidity pattern, the validity of the nursing triage system and patient self-classification, and to understand the reasons why alternate and appropriate primary care services are not being accessed. This should enable a more proactive policy on utilisation of A&E services in Hong Kong to be developed.

## Methods

This study was conducted from April 1997 to February 1999. The study population was a cross-section of patients attending four hospitals in Hong Kong. The accessible population comprised patients attending the A&E departments located in three geographical regions in Hong Kong: Hong Kong Island with a population of 1.3 million, Kowloon with a population of 1.9 million, and the New Territories with a population of 2.9 million. The hospitals were Pamela Youde Nethersole Eastern Hospital serving the population in the eastern side of

**Table. Relationship between age and utilisation of accident and emergency (A&E) services for general practitioner (GP) cases and genuine A&E cases**

| Types of cases | Age (years)<br>No. (%) |          |          |          |          | Total<br>No. (%) |
|----------------|------------------------|----------|----------|----------|----------|------------------|
|                | 0-9                    | 10-19    | 20-44    | 45-64    | ≥65      |                  |
| A&E            | 176 (31)               | 81 (31)  | 318 (37) | 206 (52) | 255 (75) | 1036 (43)        |
| GP             | 384 (69)               | 177 (69) | 540 (63) | 188 (48) | 85 (25)  | 1374 (57)        |
| Total          | 560                    | 258      | 858      | 394      | 340      | 2410             |

\* P&lt;0.01

Hong Kong Island, the United Christian Hospital serving the east Kowloon region, Tuen Mun Hospital and Yan Chai Hospital serving the population in the New Territories.

Patients were selected randomly from these four A&E departments in Hong Kong. The gold standard used for true urgent status was a retrospective record review conducted independently and blindly by a panel of emergency physicians.

A sample size of 2410 patients was needed to establish the level of acceptance error (e) at  $\pm 0.02$  in the total sample [ $N=(z/e)^2(p)(1-p)=(1.96/0.02)^2 p=0.05$ , using the unit normal deviate (z) of 1.96 corresponding to a 95% confidence level and the most conservative rate (p) at 0.50]. Therefore, 240 hours of data collection were required involving 10 patients per hour.

The number of attendees varied hourly across the days; to avoid sampling bias it was important to obtain a representative sample with all the attendee variations included. The averages for low, medium, and high utilisation periods were estimated as 12, 25, and 40 visits per hour respectively. On average, there are about 600 attendees per day in the four study hospitals. In order to obtain a representative sample, the study proportionally sampled the number of hours selected within each utilisation period. Therefore, 39, 75, and 127 hours from low, medium, and high utilisation periods respectively were selected. This yielded a sample size of 390, 750, and 1270 subjects from the low, medium, and high utilisation periods, which were determined by the z score of the individual hour. The utilisation patterns of the four different hospitals were tabulated hourly for each day of the week for the most recent month. To determine the grand mean of the tabulated hour for each day, the most recent available 1-year record of A&E utilisation was tabulated hourly for the year. Using the grand mean and standard deviation per hospital for each week, the z score for a 1-hour block within the week was calculated. The four z scores for the same day and hour in each week were averaged across the 4 weeks.

Written informed consent was obtained from each patient and further permission given for a follow-up telephone interview after 2 to 4 weeks. During the telephone interview, the reasons for utilising the A&E services

instead of private GPs or public general out-patient clinics (GOPC) were discussed, and questions on biographic and demographic characteristics, such as age, sex, education level, occupation, insurance cover, having a family doctor or not, location of residence, were asked.

Of the 2410 patients studied, 1378 (57%) were classified as GP cases. In order to establish statistically significant factors distinguishing non-urgent A&E patients from patients with similar morbidities who choose to visit out-patient facilities, the study required at least 700 patients from each group, assuming a small effect size of 15% when a statistical power of 0.80 is desired (using a 0.05, 2-tailed level of significance).

A total of 726 patients attending the GOPC were matched for morbidity patterns with patients attending the A&E during the study period. The diseases were coded according to the International Classification of Primary care. Of the 1322 GP cases that met the criteria for telephone contact by researchers, 726 were randomly selected in proportion to the 14 system categories. For example, if 30% of the 1322 non-urgent patients had problems related to the respiratory system, 30% of the 726 patients selected also had respiratory problems.

The research staff carried out telephone interviews with both the A&E GP cases and the matched GOPC groups. The same questionnaire was given to both groups of patients, except that the GOPC-matched cases were asked why they did not utilise A&E services. This enabled analysis of the difference in the reasons for utilisation of services and also of the difference in biographic and demographic characteristics between the two groups.

## Results

### *Levels of utilisation of the accident and emergency department by non-urgent cases*

According to the study protocol, 2410 patients were recruited from the four study hospitals across the different utilisation periods. Most of the 2892 patients approached by research assistants at the four A&E departments consented for an interview and telephone follow-up if required, agreed with a non-response rate of just above 10%. The reasons for refusal were no time, not wanting to be disturbed, and personal reasons. The patients sampled for the study

were very similar in sex and age distribution to 1997 A&E attendees in Hong Kong.

Most (57%) were found to be GP cases, with a significantly higher proportion of such cases in the younger age-group (Table). The disagreement rate between the two emergency physicians was less than 5%.

Of GP patients utilising the A&E, a significantly higher proportion were aged 20-44 across all four different time periods. Patients aged 45 or above were more likely to visit the A&E in the morning and early afternoon. This trend was reversed for children aged 0-9, who were more likely to use the facility in the evening up to midnight, a result that was statistically significant ( $P < 0.01$ ).

### ***Morbidity patterns in general practice cases using accident and emergency services***

Among A&E attendees with respiratory and digestive problems, a higher proportion (statistically significant) of cases were found to be non-urgent. Conversely, more of those with circulatory and neurological problems were found to be true A&E cases. The top 10 diagnoses seen in non-urgent cases were very similar to the Hong Kong general practice morbidity pattern for self-limiting conditions. The utilisation of the A&E for acute self-limiting conditions was more marked in the late evening, particularly in children and younger adult age-groups.

### ***Factors associated with non-urgent utilisation of accident and emergency services***

The educational backgrounds and employment status of patients attending the A&E with non-urgent conditions were recorded and it was found that patients from lower socio-economic classes utilise the A&E more frequently for primary care (GP) purposes.

A higher proportion of more highly educated patients (75% vs 51%;  $P < 0.01$ ) utilised the A&E services for GP purposes than the GOPC. A higher proportion of patients with skilled jobs utilised the A&E for GP purposes than the GOPC (35% vs 15%;  $P < 0.01$ ). The majority (88%) of patients expressed a wish to be referred back to their own doctors once their condition had been stabilised.

Of patients who attended the A&E with conditions that could be treated by GPs (726 selected patients compared with 726 GOPC patients), the main reasons for utilising the A&E service were: perceived emergency status of their disease; feeling sick on public holidays or at night; living in close proximity to the hospitals; availability of efficient diagnosis and of service at the time of day it was needed ( $P < 0.05$ ).

Multiple logistic regressions were performed to analyse factors independently associated with utilisation of the A&E for general practice conditions, using GOPC patients with similar morbidities as controls.

## **Discussion**

Although the four A&E departments were not randomly selected, they are located in different parts of Hong Kong and represent both urban and rural areas. The age and sex distribution of the study population was similar to that of all A&E attendees. The time blocks were randomly selected to represent proportionally the high, medium, and low utilisation periods. The response rate was over 80%. Therefore the study population was a reasonably representative sample of the target population. This sampling method is rather complex and time consuming, but provides a more comprehensive and representative picture of patients attending the A&E.

Another unique feature of this study was the use of patients attending the GOPC with similar morbidities as controls. This enabled a more valid analysis of factors associated with utilisation of the A&E for general practice purposes.

In contrast to many overseas studies, this study found that those patients who utilised A&E for management of GP problems were not from the lower socio-economic class and a higher proportion had their own family doctors when compared with GOPC patients. Results of the multivariate analysis also show that perceived urgency, closure of clinics, desperate need for help, and conditions best handled by A&E, as independent, associated factors. Nonetheless, low cost was significantly associated with lower odds of utilising A&E for general practice purposes. This implies that patients tend to choose the GOPC rather than attend A&E if they want low-cost services.

An analysis of morbidity patterns revealed that most of the GP cases were problems related to upper respiratory tract infections (URTI), gastroenteritis, and other gastrointestinal disturbances. Children and adolescents were the largest group of GP cases presenting to the A&E followed by young adults, then adults. Non-urgent utilisation by elderly people was comparatively low. Parents perceived their children's symptoms as urgent so they took their children to the A&E as alternative primary care. This explains why the utilisation by children and adolescents for GP conditions was high in the evening.

The utilisation pattern among younger age-groups further suggests that they use the A&E for primary health care for convenience. They may understand the purpose of the A&E service but cannot easily find an alternative source of health care so the A&E becomes a safe choice for them. The A&E departments seem to have become popular venues for alternative primary medical care for self-limiting conditions such as URTI and gastroenteritis.

This study has found that a substantial proportion of higher socio-economic group and young adults utilise A&E services for non-urgent purposes, compared with

those from socially disadvantaged groups. Hong Kong is a well-established financial centre with a good economy and most people are able to afford private GP services. The GOPC provides a safety net for the poor and sick. Inappropriate utilisation of the A&E is a problem of delivery of comprehensive primary health service, rather than of affordability of the services. There is a need to develop a system enabling patients to gain access to GP services after surgery hours. Extending the GOPC working hours may not solve the problem entirely, as this only helps those in the lower socio-economic classes. Those in the higher socio-economic classes will still use A&E services rather than the GOPC if their family doctors are not available.

A valid screening examination is needed to identify those patients that are truly non-urgent. If a group of patients can be selectively moved from the A&E without significant adverse outcomes, this may offer one solution to the problem of overcrowding. Further studies should focus on nurse triage as a screening examination for non-urgent patients as this study found that a triage system based on patient self-classifications was neither sensitive nor specific.

## Conclusions

The reasons for the high level of utilisation of A&E services in Hong Kong are complex and reflect GP service delivery problems. There is an urgent need for GPs to set up a network to provide out-of-hours services, and for better interfacing between primary and secondary care and between the public and private sectors, so that patients can be referred back to their GPs. Interim clinical services provided to non-urgent cases by nursing practitioners or by GPs working in the A&E can expedite discharge of patients to primary care facilities.

The results of the study have direct implications for the estimation of the potential extent of inappropriate use of the A&E, the organisation of admitting procedures within such services, and the education of patients on the purpose and appropriate use of A&E facilities. The design and measures chosen for this study will help provide A&E policy makers and planners with relevant information needed to better address practical solutions.

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