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Acute care service utilisation and the possible impacts of a user-fee policy in Hong Kong

香港急症服務的使用及急症室收費政策的影響

Objectives. To examine the utilisation pattern of accident and emergency services and to study the possible impact of a user-fee policy on non-emergency attendances in Hong Kong.

Design. Retrospective study.

Methods. Four different scenarios are postulated to examine the impact on the number of accident and emergency attendances of a user-fee policy from 2000 to 2029. Patient volume data of accident and emergency attendances for 2000 were made available by the Hospital Authority of Hong Kong.

Results. Non-emergency use of the accident and emergency services is the main cause of over-utilisation and contributes to more than 70.0% of its use. Only 22.0% of patients attending accident and emergency departments were admitted to a ward for further treatment. By 2029, the number of accident and emergency attendances would increase by more than 47.0% if the present utilisation pattern prevails. However, if patients at triage levels 3, 4, and 5 were discouraged from using the accident and emergency services, the number of attendances would decrease by 76.4%.

Conclusion. The proposed user-fee policy would act as a deterrent by preventing unnecessary use of accident and emergency services. However, the use of out-patient services may be increased as a result and attendance should be carefully monitored. Community health education and civic education relating to abuse of accident and emergency services would be effective in reducing over-utilisation of these services.

目的：探討急症服務的使用及研究在香港實施急症室收費政策對非緊急就診者可能帶來的影響。

設計：回顧研究。

方法：根據由香港醫院管理局提供的公元2000年到急症室就診人數的數據為基礎。本文提出四種假設的情況，用以探討急症服務收費政策會對由2000到2029年間往急症室就診人數的影響。

結果：非緊急情況使用是急症服務被過量使用的主要原因；佔總使用量超過70%。急症室就診者中，僅有22%被確認為需住院再作進一步治療。如果目前的使用模式不變，到2029年往急症室求診的人數可能增加47%以上。然而，按急症室現行的五級分流制度，如果第三、四、五級的病人不使用急症室服務，就診人數將可減少76.4%。

結論：建議中的急症室收費可減低市民對急症服務的誤用。但隨之而來可能會導致門診服務使用量增加，所以應小心監控。社區衛生教育和有關誤用急症服務的公民教育可能有效減少其服務的過量使用。

Key words:

Emergency service, hospital;

Health care reform;

Social welfare

關鍵詞：

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Introduction

The accident and emergency (A&E) services provided by government-subsidised Hospital Authority (HA) hospitals are free of charge for residents of Hong Kong. Currently, there are 15 HA hospitals providing acute care treatment to patients with conditions requiring emergency medical care—four hospitals are located on Hong Kong Island, five in Kowloon, and six are in the New Territories.¹ The primary consideration of the no-fee policy is to ensure that every

patient who requires emergency medical treatment can receive immediate care equitably. However, this policy unintentionally induces non-urgent attendances at A&E departments. Subsequently, patients complain about the long waiting time for acute treatment. In view of this and the level of expenditure for these services, the Health, Welfare and Food Bureau of the Hong Kong SAR Government is proposing to revise the fee schedule and to establish a user-fee policy for all attendances at A&E departments in an attempt to reduce non-emergency attendances and to decrease the waiting time for those who need acute care.² This scheme suggests that all patients who attend for acute care services are required to pay a consultation fee. An amount of HK\$100 or HK\$150 per visit is suggested.² A safety net is also to be established to protect low-income groups, so that they may still receive acute care in Hong Kong when the situation arises.

There are two objectives for this study. Firstly, the utilisation pattern of A&E services in Hong Kong, based on patient-volume analysis, is examined. Secondly, the possible impact on A&E utilisation if a user-fee policy is adopted is evaluated. A scenario projection of A&E attendances for the period 2000 to 2029 is compiled to evaluate the impact of the proposed user-fee policy.

Methods

Accident and emergency attendance data for the year 2000 were made available by the HA.³ The current triage-based allocation system at A&E departments and hospital admission data can be used to objectively indicate the condition of patients who register for treatment and to estimate the inappropriate usage rate. The word 'triage' is a French word meaning 'to sort' or 'to choose' and is a process whereby priorities for the treatment of patients in A&E departments is determined.¹ Patients are assigned to one of five levels of triage, based on their need for emergency treatment.¹ The average waiting time for patients is classified according to the different levels of triage.¹ The primary objective of the triage assignment is to ensure that priority for treatment correlates with the severity of the subject's condition and not to the time of attendance.¹ Therefore, the lower the level of triage that the patient is assigned, the longer the waiting time for a medical consultation. The relationship between triage and average waiting time for a patient in 2000 is illustrated in Table 1. For example, a patient in a critical condition (triage level 1) will be attended to without delay, while a patient with a non-urgent condition (triage level 5) will need to wait for approximately one hour for medical treatment.

Table 1. Proportion of patients at each triage level and average waiting times in accident and emergency departments in Hospital Authority hospitals in 2000

Triage level	1	2	3	4	5
Proportion of patients* (%)	0.63	1.75	21.14	57.96	16.47
Waiting time (mins)	0	5	16	40	59
Urgency	Critical	Emergency	Urgent	Semi-urgent	Non-urgent
Severity of condition when registered	Extremely high	←—————→			Extremely low

* Two percent of patients (47 581) could not be assigned a triage level in 2000

Utilisation pattern of accident and emergency services

The relationship between A&E attendance rates for each level of triage and the age of prospective users is examined. Age is an important element in utilisation rates for acute care. According to data about the Hong Kong population made available by the Census and Statistics Department, the number of elderly people aged 65 years or older amounted to 729 300,⁴ of whom 223 918 had attended an A&E department in 2000.³ In other words, more than 30% of the elderly people in the community aged 65 years or older had attended an A&E department in 1 year. With a rapidly growing elderly population, it is inevitable that the need for acute care services will increase in the coming years.

In addition to the triage-based system, the medical condition of a patient can be evaluated using departmental admission data. The function of the A&E department is only to provide primary assistance and diagnosis and to prevent the patient's condition from deteriorating. Further medical treatment and diagnoses for patients with an acute condition will then be conducted after the patient is admitted to the hospital. If a patient does not have an acute condition, he or she will normally be discharged from the A&E department directly without being admitted to the hospital. Most of the medical needs of these patients will have been satisfied in the A&E department. Thus, hospital admission data can provide an alternative way to estimate the number of non-emergency A&E attendances.

Scenario projection of accident and emergency attendances to assess the impact of a user-fee policy

Assuming that the user-fee policy is established and this policy can effectively divert non-emergency A&E attendances to out-patient clinics, it is important to assess the possible impact on the attendance distribution for A&E departments in Hong Kong. Therefore, a scenario projection of A&E attendances for the period 2000 to 2029 has been performed. Four different scenarios with regard to future government policy and A&E attendance trends are considered:

- (1) the no-fee policy continues and A&E attendance rates for every triage level remain unchanged;
- (2) the user-fee policy is adopted and any patients in triage level 5 who do not require in-patient treatment will be diverted to public out-patient or private clinics. Thus, attendance rates for patients classified into triage level 5 are revised by multiplying the age- and sex-specific utilisation rates for that triage level with the corresponding hospital admission rates;

- (3) the user-fee policy is adopted and patients who are not admitted and are classified at triage levels 4 and 5 will be diverted to out-patient clinics. In this scenario, the attendance rates for patients classified at triage levels 4 and 5 will be revised; and
- (4) the user-fee policy is adopted and patients at triage levels 3, 4, and 5 who do not need in-patient treatment will be diverted to out-patient clinics and the utilisation rates for these triage levels will be revised.

Patients classified at triage levels 1 and 2 are assumed to genuinely require immediate medical attention. Experienced nursing staff at the registration counter in A&E departments perform the classification of patients into different triage levels. Patients with non-acute symptoms are not likely to be classified into triage levels 1 or 2 upon arrival. Therefore, it is implausible that the user-fee policy will cause any impact on the utilisation rate for these two triage groups. To obtain the number of A&E attendances in each age- and sex-group at the end of each year, the age- and sex-specific A&E attendance rates³ and the projected population size of the corresponding age- and sex-group⁵ are used. Finally, the projected number of attendances for each year is calculated by adding the number of attendances for each age- and sex-group.

Results

In year 2000, the total number of A&E attendances was 2.3 million, with 1.3 million patients attending the A&E departments at HA hospitals.³ In other words, more than 20% of the population (the population of Hong Kong in 2000 has been revised to 6.66 million based on the results of the 2001 population census⁴) attended A&E departments for acute care consultations and, on average, each patient made 1.72 attendances. The estimated cost was

approximately HK\$1.4 billion, given that the average cost for one A&E attendance is approximately HK\$600.⁶ There was no significant difference between males and females in the utilisation pattern of A&E attendances. No separate estimates for males and females were given. Figure 1 shows the age- and triage level-specific A&E attendance rates. Only 55 000 A&E attendances, or 2.4% of the total attendances, were classified as triage levels 1 and 2. On the other hand, more than 1.7 million attendances (72.4% of the total attendances) were classified as triage levels 4 and 5 (semi-urgent and non-urgent).¹ This suggests that only a small proportion of attendances at A&E departments were genuine emergencies.

Figure 1 also illustrates that A&E attendance rates for every non-emergency triage level (triage levels 3, 4, and 5) were significantly associated with the age of the patient. A quadratic curve is shown using age as the independent variable. It was found that the attendance rates for triage levels 3 to 4 follow a U-shaped curve, which is high for the age-group 0 to 4 years, but then decreases and gradually rises with age. This can be explained by a higher attendance rate for children and a greater prevalence of morbidity and disability for the elderly. Surprisingly, a downward curve with a significant negative slope coefficient is observed for the utilisation pattern of triage level 5 (P<0.05). This suggests that the non-urgent A&E attendance rate is decreasing relative to the age of patients. Elderly people are not necessarily the most prevalent group among non-urgent attendances at A&E departments. Finally, for triage levels 1 and 2, there are no significant differences among different age-groups.

Table 2 illustrates the departmental admission rates by age-group and triage level. Using analysis of variance, the departmental admission rates for non-emergency cases were

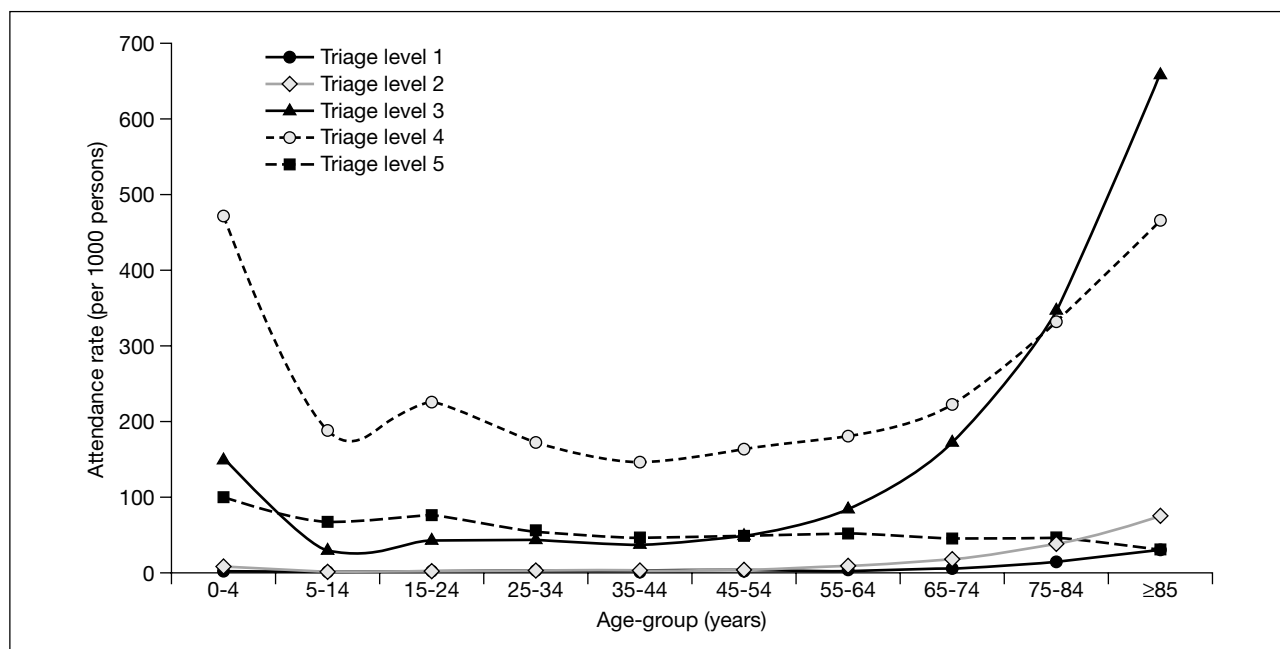


Fig 1. Accident and emergency attendance rate by age and triage level in Hong Kong, 2000

Table 2. Hospital admission rates according to age-group and triage level (per 1000 persons) in Hong Kong in 2000

Age-group (years)	Triage level*				
	1	2	3	4	5
0-4	860.27	863.27	477.17	129.88	34.66
5-14	842.47	801.20	344.25	78.72	18.56
15-24	797.53	749.52	357.80	71.42	13.97
25-34	754.43	771.70	417.28	94.26	15.72
35-44	716.54	781.34	414.76	99.88	17.76
45-54	728.36	838.64	466.00	114.59	21.31
55-64	714.19	908.28	595.79	156.78	28.53
65-74	718.73	946.55	697.96	238.54	42.02
75-84	683.19	963.51	772.45	337.48	66.45
≥85	601.76	977.67	825.61	454.81	137.21
All ages	702.15	889.59	564.30	130.95	22.46

* The admission rates for various triage levels are significantly different from each other ($P < 0.01$)

significantly lower than those for emergencies ($P < 0.01$). It seems that the triage process is satisfactory in terms of determining the severity and nature of the medical conditions, which enables patients to be classified into the appropriate triage level. It is also worth noting that the departmental admission rate for triage level 1 is lower than that for triage level 2. This can be explained by the higher fatality rate for critically ill patients classified at triage level 1. For those who die in the A&E department, no further treatment is required and the deceased is immediately taken to the mortuary. Only 22% of A&E attendances were admitted to hospital wards for further medical care and treatment, which supports our hypothesis that the problem of non-emergency attendance is serious.

Figure 2 shows the projected number of A&E attendances classified according to the four scenarios for the period 2004 to 2029. As the population ages over time (the rate of ageing is more serious in Hong Kong than in other countries because of the low birth rate [less than 0.927 live births per woman aged 15-49 years in 2001]), for scenario 1

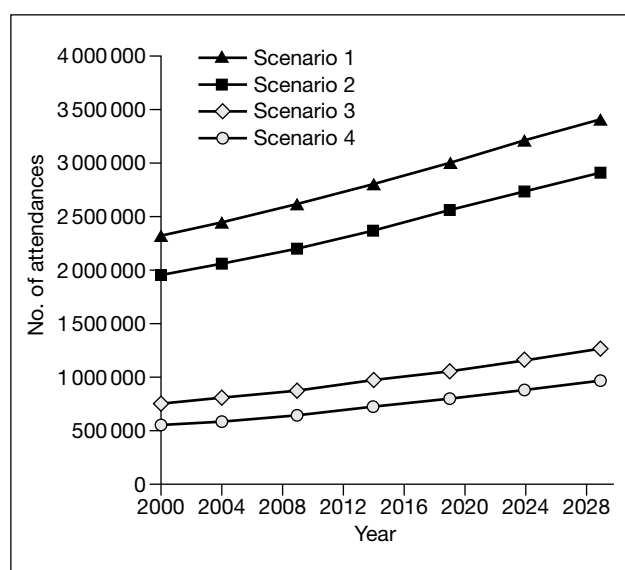


Fig 2. Projected number of accident and emergency department attendances from 2000 to 2029 according to four projected scenarios

(the no-fee policy continues), the total number of A&E attendances would increase by more than 47%, from 2.3 million in 2000 to 3.4 million in 2029, given that the growth of A&E attendances is solely due to the ageing effect and the increased elderly population. For scenario 2, the number of attendances would immediately decrease by 16.3%, given that all else is equal, and that patients classified at triage level 5 are not admitted, which, along with the implementation of a user-fee policy, would act as a deterrent. In the long term, however, the ageing effect and population growth would entirely outweigh the impact of the policy by 2013. Towards the end of the period of projection, the total number of attendances would increase to 2.9 million—an increase of 0.6 million or 25.8% above the base-year figures. Thus, the user-fee policy is probably not able to overcome the ageing effect and population growth unless the policy affected the patients at triage level 4 (the most prevalent group in the A&E data set). For scenarios 3 and 4, the number of attendances would decrease dramatically by 67.0% and 76.4%, respectively. Overall, the number of attendances in 2029 would be reduced by 1.0 million to 1.3 million (47.0%) for scenario 3, and by 1.4 million to 0.96 million (60.3%) for scenario 4. However, patients who do not attend A&E departments may seek medical treatment in government out-patient clinics, which are currently operated and financed solely by the government. It is important to note that, currently, only 21% of primary care attendances are provided by government out-patient clinics and out-patient departments of HA hospitals. The largest proportion of care is provided by private practitioners.⁷

Discussion

Non-emergency attendances in A&E departments appear to be an important problem. This could be linked to the free service and the comprehensive treatment offered. Furthermore, population ageing aggravates the severity of the problem.⁸ The growing burden on the government seems almost unmanageable if the present utilisation pattern continues. In a survey, Ma et al⁹ indicated that the respondents accepted the proposal to establish a user-fee policy for acute care services offered by HA hospitals, thereby reducing the non-emergency attendance rate and reducing the waiting time for acute care services. Tsoi and Chung¹⁰ highlighted that patients with non-emergency conditions would go to other out-patient or private clinics and not come to A&E departments for treatment if the fees were comparable to those in a district hospital.

In this study, the focus was on the impact of a user-fee policy to divert non-emergency attendances away from A&E departments. However, there is no evidence to show that the adoption of such a policy would improve the overall health of the population and reduce the burden on the government in the future. Theoretically, a user-fee policy can only work as a barrier to divert non-emergency attendances from A&E departments to the general out-patient service (GOPS) clinics, which are also currently operated

and financed by the Department of Health (DH). According to statistics provided by the Census and Statistics Department, it is evident that the workload of medical practitioners in government clinics in Hong Kong is high. In 2000, only 545 doctors were registered with the DH, and they treated 6.55 million people attending government clinics.⁴ In other words, each practitioner in the government clinics treated an average of 33 patients per day. Indeed, the severity of the manpower problem in government clinics may be understated. The mission of the DH is not only providing out-patient services to the public, but also to execute health care policies and to safeguard the health of the community through health planning, infectious disease prevention campaigns, and health education.¹¹ As a consequence, registered doctors in the DH are not all involved in GOPS clinics, so the situation in the government clinics could be worse than that reported. Data have shown that the public out-patient system is stretched and is financially unable to absorb any new attendances diverted from A&E departments. This factor should be borne in mind when evaluating the viability of a user-fee policy for A&E services in Hong Kong. Public health care policy planning is not only a matter of controlling public expenditure on health care, but is also a commitment to ensure quality of services so that everyone can receive appropriate medical treatment. Before the government determines whether they will adopt a user-fee policy in A&E departments, the provision for GOPS clinics needs to be evaluated—the number of registered medical practitioners may have to increase as a consequence.

For illustrative purposes, this study shows the impacts of population growth, ageing, and a user-fee policy, on the growth and utilisation pattern of A&E services in Hong Kong. It should be borne in mind, however, that there is no universal standard for what constitutes a 'typical' A&E attendance.¹²⁻¹⁷ Thus, it is ethically and technically difficult to identify whether each attendance was truly urgent or not.¹⁸ The use of departmental admission rates to calculate the number of non-emergency attendances is a reasonable criterion. Finally, an assumption that the problem of non-emergency attendances is only subject to the no-fee policy and the introduction of a user-fee system will solve the problem was followed. Therefore, the projections in this study only illustrate the most optimistic outcomes for the impact of the user-fee system. In reality, however, non-financial factors that affect the utilisation pattern of A&E departments exist, so the impact is likely to be smaller than shown here. In the final section of this paper, three non-financial factors that affect A&E attendances are discussed.

Opening hours of accident and emergency departments

Most of the GOPS clinics do not open for medical care services at night or on public holidays. Thus, many patients attend A&E departments if they need medical treatment during these times. To solve this problem, the HA has cooperated with the Hong Kong Medical Association and established several pilot medical centres to serve patients'

unexpected medical needs at night.^{10,19} However, these pilot clinics are not successful in absorbing patients from the A&E departments because of the fees charged. The services offered by A&E departments are free of charge, while the pilot medical centres charge patients at market rates for medical care.¹⁰ Moreover, the medical care facilities in the overnight clinics are not as sophisticated as those offered in the A&E departments.

Medical care in accident and emergency departments

There has been a remarkable improvement in the operational efficiency and the quality of public health care services offered to the public under the management of the HA.²⁰ This may partly explain why some patients who do not require immediate treatment still seek medical care at A&E departments, where the quality of the services is better than that offered by the pilot medical centres and local clinics.

Inadequate health education

Despite the initiatives discussed above, non-urgent A&E attendances will not be entirely eliminated simply because most patients do not have sufficient knowledge about their own or their dependants' health. As a consequence, the user-fee policy may not affect the preference of patients to seek medical care at A&E departments. Public health education for the community could help to prevent unnecessary attendances at A&E departments.

Conclusion

Solving the problem of inappropriate attendances for acute care services will help to make A&E services cost-effective. The saving from eliminating inappropriate attendances at A&E departments is relatively small when compared with the overall budget for the health care system. However, it is expected that a user-fee policy will divert patients with non-emergency conditions away from A&E departments and control unnecessary admissions to the hospitals. In this way, the A&E service will only be utilised for emergency situations.

References

1. Guide to accident and emergency service: service guide. Hospital Authority website <http://www.ha.org.hk>. Accessed 24 May 2002.
2. Future hospital fees and charges still being discussed. Hospital Authority Press Release 27 Sep 2000.
3. Patient volume analysis—2000 total no. of A&E first attendances in HA hospitals by triage and age-group. HKSAR: Hospital Authority; 2001.
4. Hong Kong annual digest of statistics 2001. Census and Statistics Department, HKSAR; 2001.
5. Hong Kong population projections 1999-2029, Census and Statistics Department, HKSAR; October 2000.
6. Annual report 1999/2000. HKSAR: Hospital Authority; 2000.
7. Thematic household survey report no. 3. Census and Statistics Department, HKSAR; Dec 2000.
8. Yip PS, Lee J, Chan B, Au J. A study of demographic changes under sustained below-replacement fertility in Hong Kong SAR. *Soc Sci Med* 2001;53:1003-9.

9. Ma JL, Wong CK, Wong TW, Wong TK. Public attitude towards the health care policy in Hong Kong. CUHK Press Release; Nov 2001.
10. Tsoi LC, Chung CH. The possible impact on patient attendance and expectation after imposing a fee on semi-urgent and non-urgent cases utilising the accident and emergency service. Hong Kong J Emerg Med 2001;8:3-8.
11. Mission and vision. Department of Health website <http://www.info.gov.hk/dh/mission/index.html>. Accessed 24 May 2002.
12. Sucov A, Clark J. Retrospective denial of emergency department payments is inappropriate. J Emerg Med 1999;17:23-5.
13. Gill JM. Nonurgent use of the emergency department: appropriate or not? Ann Emerg Med 1994;24:953-7.
14. Mitchell TA. Nonurgent emergency department visits—whose definition? Ann Emerg Med 1994;24:961-3.
15. Foldes SS, Fischer LR, Kaminsky K. What is an emergency? The judgments of two physicians. Ann Emerg Med 1994;23:833-40.
16. McCabe JB. What is an emergency, and who wants to know? Ann Emerg Med 1994;23:872-3.
17. O'Brien GM, Shapiro MJ, Woolard RW, O'Sullivan PS, Stein MD. "Inappropriate" emergency department use: a comparison of three methodologies for identification. Acad Emerg Med 1996;3:252-7.
18. Abbuhl SB, Lowe RA. The inappropriateness of "appropriateness". Acad Emerg Med 1996;3:189-91.
19. HA & HKMA jointly launch pilot medical centre at A&E departments. Hospital Authority Press Release; 1 Aug 2000.
20. Grant C, Yuen P. The Hong Kong health care system, ASHSA No.84, University of N.S.W, 1998.



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