

Hospital Service for the Elderly in Hong Kong — Present and Future

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Summary

In a study of the utilization pattern of hospital beds for elderly patients admitted into the geriatric and medical units of Princess Margaret Hospital in 1989, the projected percentage increases in bed-days required for the 75+ age group in the next 5 years are 59% for male and 35% for female. If an age-related 75+ admission policy was adopted in the N.T. West region, the 1989 non-surgical acute and rehabilitation bed requirement for male and female would be 81 and 156 beds respectively (female/male bed ratio = 1.93), and the 1995 bed requirement would be at least 128 for male and 211 for female (female/male bed ratio = 1.64).

Introduction

There is an increasing awareness of the ageing population in Hong Kong, but there has been little study on how this will affect the hospital service for the elderly in quantitative terms. The projected demographic changes from 1986 to 2000 for the elderly population in Hong Kong are shown in table 1^{1,2,3}. However, such demographic data alone are insufficient for planning hospital utilization, one must also know the age and sex distribution of the

hospital population^{4,5}. The aim of the present study is two-fold; firstly, to collect and analyze such hospital data, and see how these will affect future planning for geriatric care; secondly, to review the present resources and practice and to estimate the number of beds required for an age-related admission policy for the elderly.

Methods

The study consisted of two parts. The first part was a study on all patients admitted into the geriatric wards of Princess Margaret Hospital (PMH) from January to September 1989 (the most recent data available at the time of study). The patient data had previously been entered into a database program. The following data were retrieved for each patient: identity number, sex, age, admission date, discharge date and outcome. These data were then analyzed with the help of a spreadsheet program, and the following information were obtained for different age groups and sexes: average length of stay, bed-days used and occupancy. (see appendix)

The second part of the study was to obtain information on the number of admissions into the medical and geriatric units of PMH for different age groups and sexes. This information was retrieved

Table 1. Population estimate (1986) and projected population changes 1989-2000 by age and sex^{1, 2, 3}. (population in thousands, %changes as of 1989 figures)

	1986	1989	1990	1995	2000
HONG KONG					
Male					
65-69	79.7	90.3	93.9 (+4%)	109.8 (+22%)	122.1 (+35%)
70-74	55.7	62.7	65.0 (+4%)	80.4 (+28%)	94.8 (+51%)
75-79	26.8	37.3	40.5 (+9%)	51.0 (+37%)	64 (+72%)
80-84	11.7	14.6	16.1 (+10%)	27.8 (+90%)	35.8 (+145%)
>=85	4.9	6.7	7.4 (+10%)	11.8 (+76%)	20.7 (+209%)
Total	178.8	211.6	222.9 (+5%)	280.8 (+33%)	337.4 (+59%)
Female					
65-69	86.1	95.6	98.9 (+3%)	109.3 (+14%)	113.3 (+19%)
70-74	68.8	74.3	76.1 (+2%)	90.8 (+22%)	101.0 (+36%)
75-79	43.6	53.6	56.8 (+6%)	66.4 (+24%)	79.9 (+49%)
80-84	28.4	30.8	32.1 (+4%)	45.1 (+45%)	53.3 (+73%)
>=85	18.6	23.4	25.0 (+7%)	32.7 (+40%)	45.7 (+95%)
Total	245.5	277.7	288.9 (+4%)	344.3 (+24%)	393.2 (+42%)
All>=65	424.3	489.3	511.8 (+5%)	625.1 (+28%)	730.6 (+49%)
%Total	7.7	8.6	8.9	10.3	11.6
NEW TERRITORIES WEST					
All>=65	66.2	86.0	91.8 (+7%)	114.1 (+34%)	
%Total	5.8	6.6	6.8	7.9	

from the patient database of our record office, and at the time of study, was available for the period January to March 1989.

Results and analysis

As a result of the first study, information on 1922 patients (1068 male, 854 female) admitted into the geriatric wards of PMH from January to September 1989 were obtained (Tables 2 & 3). The second study revealed 7769 admissions (4271 male, 3498 female) into geriatric and medical wards of PMH from January to March 1989; their distribution by sex and age (less than 65, at or above 65, at or above 75) were shown in table 4. Based on this admission rate in the first quarter of 1989, if all the elderly patients, at two different age cutoffs 65 and 75, were admitted into geriatric wards, the bed-days required and the expected occupancy for the year 1989 with the current practice (i.e. same length of stay as shown in table 3) were calculated and shown in table 5.

It can be seen from table 2 that the age structure of patients in PMH geriatric wards, as a proportion of those 65 years and over, did not follow their distribution in the general population. Males over 70 years, only 58% of male population aged 65 and over, accounted for 75% of geriatric male admissions. Females over 75 years, only 38% of female population aged 65 and over, accounted for 63% of geriatric female admissions. The bed-days occupied by different age groups were not uniform either; for male, the 70-74 age group utilized most of the hospital days

Table 2. Relationship of age and sex with hospital admission and stay for geriatric wards PMH 1989 Jan.-Sept.

(p=% of elderly population in community, a=% of geriatric admissions, s=% of hospital days occupied)

	Male (n=1068)			Female (n=854)			Total (n=1922)		
	p	a	s	p	a	s	p	a	s
65-69	42	25	25	35	16	18	38	21	21
70-74	30	30	27	27	21	19	28	26	23
75-79	18	24	25	19	24	27	19	24	26
80-84	7	13	13	11	21	19	9	17	16
>=85	3	8	10	8	18	17	6	12	14

Table 3. Average stay (days), bed-days used, and occupancy for geriatric wards PMH 1989 Jan.-Sept.

	Male			Female		
	Stay	Bed-days	Occ.	Stay	Bed-days	Occ.
>=65	10.70	11407	114%	13.97	11887	118%
>=75	11.27	5457		14.12	7526	

Table 5. Estimated medical bed-days used by the elderly for 1989 PMH and the occupancy if all were admitted into geriatric wards

	Male			Female			F/M bed ratio
	Stay	Bed-days	Occ.	Stay	Bed-days	Occ.	
>=65	10.70	63344	469%	13.97	95108	704%	1.50
>=75	11.27	29482	218%	14.12	56988	422%	1.93

(27%), whereas for female, it is the 75-79 age group (27%). Thus, in calculating the percentage increase in bed-days required by the elderly for the next 10 years, the demographic increases (table 1) have to be weighted with the differential bed-day utilization of the different age groups (table 2, columns 's'); the results are shown in table 7. The projected female to male bed ratio were obtained by taking the ratio of the projected bed-days required by the two sexes, and this was shown in table 8.

Discussion

The Present situation

The geriatric unit of PMH serves the N.T. West region with a population of 86,000 aged over 65 in 1989. The three main components of a geriatric service are acute care (A), rehabilitation (R), and long-stay care (L). There are three main styles of geriatric practice at present: combined acute and rehabilitation with separate long-stay wards (AR/L); separate acute, rehabilitation and long-stay wards (A/R/L); and combined acute, rehabilitation and long-stay wards (ARL)⁶. The unit operates on an AR/L style, with 85 beds in PMH serving the A and R components and 39 long-stay beds in Fanling and St. John Hospital. The present study is mainly restricted to the geriatric wards in PMH, in particular, the 37 male and 37 female beds which receive direct admissions. The unit admits any patients over 65 from our catchment area presenting with non-surgical problems as long as beds are available. Reference to table 3 showed that both the male and female wards were fully occupied. In fact, an extra of 4 male and 4 female beds have been added in the past year to ease the congestion. When the occupancies are calculated with these extra beds, the occupancies are 103% and 107% for male and female respectively. Thus many elderly patients are admitted into medical units. The demand for medical service for the elderly is best seen in table 4 which showed that females over 65 accounted for half of all non-surgical female admissions into PMH, whereas males over 65 accounted for over one-third.

Table 4. Admissions into geriatric and medical units of PMH for 1989 Jan. to March

	Male (n=4271)		Female (n=3498)		Total (n=7769)	
	%	n	%	n	%	n
<65	65	2791	51	1796	59	4587
>=65	35	1480	49	1702	41	3182
>=75	15	654	29	1009	21	1663

Although the geriatrician's specialist skills amply justify the existence of geriatric medicine as a needs-related clinical specialty, there seems to be substantial support for the idea that departments of geriatric medicine should operate an age-related admission policy.⁷ Had we adopted an age-related admission policy for the year 1989, the estimated bed-days required and the resultant occupancies would be as shown in table 5 for two different age cutoffs (65 and 75); occupancy levels that could not easily be solved by putting in more camp beds, especially for females, who require 1.5 times (for cut-off at 65) to 2 times (for cut-off at 75) as more beds as males. In the absence of further bed provision, the alternative would be to shorten the length of stay. The mean duration of stay (table 3) of our patients is short when compared with the United Kingdom geriatric practice; their median durations of stay for acute and rehabilitation wards are 14 and 29 days respectively.⁵ Suppose the duration of stay is further shortened to the average hospital figure of 8 days, the occupancy level would still be high, namely 320% for males over 65, and 413% for females over 65. The practical implication is that the present geriatric wards cannot accommodate all 65+ admissions. If all 75+ were admitted into geriatric wards for the year 1989, and the length of stay remains the same, the occupancies for male and female would be 218% and 422% respectively, meaning that their respective bed requirements would be 81 and 156, so that 44 more male and 119 more female beds have to be provided.

Geriatric Medicine has been practised in the United Kingdom for over 40 years, allowing useful review of their experience. Professor Brocklehurst and Dr. Andrews have done a survey on 272 geriatric departments all over the United Kingdom in the 1980s⁵. They found out that the discharge rate is maximal when the beds/1,000 elderly(>65) and consultants/1,000 elderly are 8.30 and 0.08 respectively (table 6); resources above or below these levels

Table 6. Relationship of performance to resources⁵. (popn.=1,000 elderly population aged 65 or over)

	U. K.	OPTIMAL	PMH Geri
RESOURCES			
Beds/popn.	7.74 - 13.28	8.30	1.44
Consultants/popn.	0.05 - 0.11	0.08	0.01
Physio./popn.	0.08 - 0.19		0.03
Occup./popn.	0.07 - 0.16		0.03
Social workers/popn.	0.07 - 0.10		0.01
Beds/nurse			
am	4.0		4.1
(for AR units) pm	3.1		4.3
night	8.6		18.5
PERFORMANCE			
Discharges/bed/year	2.7 - 5.6	5.6	22.62
Discharges/popn./year	15.4 - 45.7	45.7	32.6

would have sub-optimal discharge rates. Despite the low level of resources available in our unit, our discharge/bed/year is 4 times their maximum value (table 6). It should be noted that 'discharge' here refer to genuine discharge and not transferal to convalescent beds, and 'bed' is the total of acute, rehabilitation and long-stay beds. Compared with the United Kingdom geriatric practice, we have a lower level of long-stay beds (31% vs. 55%) and a heavier acute component with rapid turn-over, accounting for the high rate of discharge/bed/year. When the discharge rate is expressed as per thousand elderly population, the figure is not as high because many elderlies are admitted into the medical units due to bed-shortage.

The number of discharges per bed per year has widely been used as a performance indicator, because the data are readily available. However, this has considerable limitations in geriatric medicine. Though a high admission rate with a short stay might result from good and efficient management, it might equally reflect inadequate assessment and premature discharge with unsolved problems^{5,8,9}. Studies from the United States have shown that repeated admissions for the same condition is more costly than a single admission^{10,11}. It has been suggested that readmission rates should be included in the performance indicators. However, a low readmission rate might just reflect an overcautious discharge policy. "In addition, the responsibility of a geriatric service is not only to maintain a high discharge rate but to provide good quality long-term care and to ensure that aged people do not suffer by being discharged from hospital when they are not fit to live in the community"⁵. Alternative methods to assess the efficacy of geriatric practice have been discussed elsewhere^{8,12}.

The Future

What about the future? Reference to table 1 shows that for the next 5 years, there will be an

Table 7. Projected %increase in bed-days required for elderly from 1989 to 2000 in Hong Kong

	1990	1995	2000
Male			
>=65	7	42	80
>=75	9	59	120
Female			
>=65	4	29	54
>=75	6	35	69

Table 8. Projected female/male bed ratio required for elderly from 1989 to 2000

	1989	1990	1995	2000
>=65	1.50	1.24	1.36	1.28
>=75	1.93	1.63	1.64	1.48

overall increase in 28% of those aged over 65, but especially for those over 75 (up to 90% for the male 80-84 group, 46% for the female 80-84 group). It is those older elders that are more likely to be admitted into the hospital and occupy more bed-days (tables 2 and 3). As shown in table 7, the projected increases in bed-days required will pose even a greater problem for those over 75, more than one would expect by looking at table 1. Thus, for the next 5 years, though there would be 33% increase in males over 65, the bed-days required would increase by 42% (59% for those over 75); whereas for females over 65, the corresponding figures are 24% and 29%, (35% for those over 75). The N.T. West region has a relatively young population; 6.6% of the population is over 65 as compared with 8.6% for Hong Kong overall, but this does not mean that the need for geriatric service is less urgent. Many old elders are migrating into the increasing number of homes for the elderly in the N.T. West region. As shown in table 1, the growth of the elderly population in N. T. West is even more rapid (+34% from 1989 to 1995) than Hong Kong overall (+28%). Thus the projected percentage increase in bed-days required for the elderly in the N.T. West region would be even higher than those shown in table 7, which are based on the overall Hong Kong figures.

There have been much controversy regarding geriatric medicine as an age-related versus need-related speciality^{5,7,9}, but there is little argument that future planning for medical service for the elderly should be based on the 75+ age^{4,5,13}. Most of those with chronic, complex disability are aged over 75; and the present study also shows that the age 75+ consumed most of the bed-days in our wards (table 2), though when compared with the United Kingdom figures⁵, our male patients tend to be 5 years younger. As the 75+ consume more bed-days than the 65+, Prof. Brocklehurst and Dr. Andrews⁵ have suggested that a norm of 22 beds and 0.21 consultants for a unit of 1000 population aged 75 and over as equivalent to 8.3 beds and 0.08 consultants for the 65+. Such recommendations might be difficult to achieve in Hong Kong. Given the rapidly expanding 75+ population, the 1995 bed requirement would be at least 128 for male and 211 for female in the NTW region (tables 1, 5, 7). At present, females are provided with the same number of beds as the males. Reference to table 5 showed that for the 75+, females actually require twice as many beds as males. For the next 5 to 10 years, the elderly males are increasing much more rapidly than the females (table 1), so that the female/male bed ratio would drop from 1.93 to 1.64 to 1.48 (table 8).

Conclusion

1. It is important to know the differential require-

ments of the age-sex distribution of the elderly population for different periods for future planning.

2. The current bed provision and resources in PMH geriatric unit is inadequate for a 75+ admission policy.

3. The rapidly expanding 75+ population will pose a heavy demand for more hospital beds in the next 5 to 10 years.

4. Mixed sex wards would provide flexibility in view of the changing female/male ratio for the 75+ in the next 5 to 10 years.

5. These problems of demographic changes are applicable not only to the geriatric specialty, which has a high transfer rate from other specialties. Blockage at any point in hospital inevitably results in pressure on other specialties.

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Appendix on calculation of occupancy

Consider a ward with B beds, suppose there are A admissions over a period of D days and the total number of bed-days used is N, then the average stay S of those A patients = N/A , and the occupancy P is defined as the % of bed-days used over the % of bed-days provided. Thus $P=N/BD=AS/BD$. This definition of occupancy is different from the concept of point occupancy commonly employed by administrators. Point occupancy is the proportion of beds occupied at a certain time of the day, and obviously depends on the admission pattern of the ward and the sampling time used. The definition used here can be regarded as an "interval" occupancy so that the ward is regarded as 100% occupied whenever for every day, each bed is or has been occupied by one patient. For the most 'efficient' practice whereby a bed is immediately filled after a patient has been discharged from it, the occupancy can be above 100% without the provision of extra beds. However, there is a limit to this, depending on the proportion of beds discharged per day; thus, in an efficient ward which discharges one-quarter of its bed every day, the occupancy can be 125% without putting in extra beds (i.e. one-quarter of its beds are occupied by 2 patients for the same bed on the same day).

References

1. Hong Kong 1986 By-Census
2. Hong Kong population - A 20 year projection. Census and Statistics Department 1987; 14-6.

3. Population forecast of NTW by District Board by age group, WGPD Papers No. 13/88, 14/88, 15/88.
4. Andrews K, Brocklehurst JC. The implications of demographic changes on resource allocation. *J R Coll Physicians Lond* 1985; 19:109-11.
5. Andrews K, Brocklehurst JC. *British Geriatric Medicine in the 1980s*. King Edward's Hospital Fund for London 1987.
6. Brocklehurst JC, Andrews K. Geriatric medicine - the style of practice. *Age and ageing* 1985;14:1-7.
7. Horrocks P. The case for geriatric medicine as an age-related speciality. In: Issacs B, ed. *Recent advances in geriatric medicine*, vol 2. Edinburgh: Churchill Livingstone. 1982:259-77
8. McInnes EG, Joshi DM, O'Brien TD. Failed discharges: setting standards for improvement. *Geriatric Medicine* April 1988;35-42.
9. Young A. There is no such thing as geriatric medicine, and it's here to stay. *Lancet* 1989;II:263-5.
10. Anderson GF, Steinberg EP. Hospital readmissions in the Medicare population. *NEJM* 1984; 311: 1349-1353.
11. Zook CJ, Moore FD. High cost users of medical care. *NEJM* 1980; 302: 996-1002.
12. Woodhouse KW. Called to account - a geriatrician. *Lancet* 1989; I: 546.
13. Andrews K. Demographic changes and resources for the elderly. *BMJ* 1985; 288:1023-24.