

# 2001 survey on primary medical care in Singapore

S C Emmanuel, H P Phua, P Y Cheong

## ABSTRACT

**Introduction:** The 2001 survey on primary medical care was undertaken to compare updated primary healthcare practices such as workload and working hours in the public and private sectors; determine private and public sector market shares in primary medical care provision; and gather the biographical profile and morbidity profile of patients seeking primary medical care from both sectors in Singapore. This is the third survey in its series, the earlier two having been carried out in 1988 and 1993, respectively.

**Methods:** The survey questionnaire was sent out to all the 1480 family doctors in private primary health outpatient practice, the 89 community-based paediatricians in the private sector who were registered with the Singapore Medical Council and also to all 152 family doctors working in the public sector primary medical care clinics. The latter comprised the polyclinics under the two health clusters in Singapore, namely the Singapore Health Services and National Healthcare Group, and to a very much smaller extent, the School Health Service's (SHS) outpatient clinics. The survey was conducted on 21 August 2001, and repeated on 25 September 2001 to enable those who had not responded to the original survey date to participate. Subjects consisted of all outpatients who sought treatment at the private family practice clinics (including the clinics of the community-based paediatricians), and the public sector primary medical care clinics, on the survey day.

**Results:** The response rate from the family doctors in private practice was 36 percent. Owing to the structured administrative organisation of the polyclinics and SHS outpatient clinics, all returns were completed and submitted to the respective headquarters. Response from the community-based paediatricians was poor, so their findings were omitted in the survey analysis. The survey showed that the average daily patient-load of a family doctor

in private practice was 33 patients per day, which was lower than the 40 patients a day recorded in 1993. The average working hours of each of these private practitioners was 7.6 hours per day. Family doctors in public sector primary medical care clinics were responsible for 16.6 percent of the patient-load for primary medical care in Singapore while the remaining 83.4 percent was provided by family doctors in private practice. Singaporeans made approximately 4.4 visits to a family doctor in 2001, which was lower than the 5.0 visits ascertained in 1993. Chronic medical conditions seen by family doctors as a whole, increased from 29.2 percent in 1993 to 34.3 percent in 2001. Upper respiratory tract infections and hypertension were the two leading disease conditions seen at both private and public sector primary medical care clinics in 2001. The load of hypertension managed at primary medical care clinics had notably increased.

**Conclusion:** The public sector share of outpatient load at 17 percent in 2001 is well within the 25 percent level set in the Government's 1993 White Paper on Affordable Healthcare. The private sector remains the main provider of primary medical care in Singapore, serving 83 percent of the population. The average workload for each family doctor in private practice had dropped from 40 to 33 patients a day between 1993 and 2001. There had been a notable growth in family doctors working in the private sector over this period. Both sectors saw an increase in the chronic disease load that they managed.

**Keywords:** family doctors, primary medical care, private primary medical practice, public primary medical practice

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## INTRODUCTION

Primary healthcare services are designed to serve as the front-line and mainstay of health services to meet the continuum of healthcare needs of a community. Primary medical care is delivered by primary care

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### Appendix I. Advisory group for survey on primary medical care in Singapore 2001.

1. S C Emmanuel	Chief Executive Officer (NHG Polyclinics)/ Chief Investigator 2001 survey
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physicians in public sector primary care outpatient clinics [henceforth referred to as family doctors (FDs) in public practice], as well primary care physicians in private sector primary care outpatient clinics [henceforth referred to as family doctors (FDs) in private practice]. Information on the practices in both sectors, such as working hours, patient-load and the morbidity profile of outpatients, is essential for the effective planning of primary medical care provision to the community, the effective use of resources at primary care level, and for health services and epidemiological research for improved patient care. Such information will help maximise the roles of the public and private sectors, and prevent wasteful duplication in resources and facilities. This information is also valuable for the training of current and future family physicians in order to increase their professionalism and enhance and maximise their roles.

The first survey to capture information on practices and profiles in primary care was a national survey on outpatient morbidity carried out by the Ministry of Health (MOH) of Singapore in conjunction with the College of Family Physicians of Singapore in 1988<sup>(1)</sup>. A second survey was conducted in 1993<sup>(2)</sup>. The third comparative survey on primary medical care in Singapore was carried out on 21 August 2001, and aimed at obtaining up-to-date information on the current primary medical care provision and the morbidity profile and treatment-seeking patterns of outpatients at primary care level in Singapore, in both the public and the private sectors.

The 2001 survey was once again conducted under the aegis of the College of Family Physicians, in collaboration with the Singapore Medical Association and the Ministry of Health. The chief executive officer of National Healthcare Group (NHG) Polyclinics was the chief investigator of this survey. An advisory group comprising experts in family healthcare and epidemiological research in Singapore was also set up to provide combined inputs for the planning of the survey, its conduct and the interpretation of key findings. The members of the advisory group are listed in Appendix I.

### METHODS

To enable comparisons to be made with the 1993 survey, a similar survey methodology was adopted for the 2001 Survey. The 2001 Survey was however extended to cover community-based paediatricians. This is because with smaller families, there has been a shift in parents seeking primary medical care for their children from paediatricians instead of from family physicians as was the case in the past.

The survey was carried out on one day, 21 August 2001. The survey questionnaire together with a letter signed by the President of the Singapore Medical Association, the President of the College of Family Physicians and the Director of Medical Services, seeking support for the survey, were sent to all 1,480 FDs in private practice and 89 community-based paediatricians working in the private sector, who were registered with the Singapore Medical Council in August 2001. Information on their practice profile, and the biographical profile of all patients seen by them on the survey day, including the diagnosis of the disease condition for which medical attention was being sought on that day. The survey questionnaire was also distributed to all doctors in the public sector primary medical care clinics, through the chief executive officers of the Singapore Health Services (SingHealth) Polyclinics and the National Healthcare Group (NHG) Polyclinics, and the Director of the School Health Service (SHS). A sample of the survey form used for the paediatricians and the FDs in private and public practice is shown in Appendix II.

Anonymity of the returns from the FDs and paediatricians in private practice was ensured to encourage their participation in the survey. The survey was repeated on the 25 September 2001 to enable those who had not responded on the original survey day to participate. The planning and coordination of the survey fieldwork, as well as the processing and analysis of the survey data, were jointly carried out by the Health Information Management Branch and the Biostatistics and Research Branch of MOH, under the direction of the survey's chief investigator and the expert advisory group to the survey. All disease diagnoses were coded, based on the 4-digit International Classification of Diseases (ICD) ninth edition<sup>(3)</sup> codes. Data processing and analysis were carried out using SAS application software version 8.0<sup>(4)</sup>.

Goodness-of-fit<sup>(5)</sup> test was used to compare the distribution of the locations of the private sector FDs who responded to the survey against the overall geographical distribution of family practices clinics in Singapore. Two-sample t test<sup>(6)</sup> (equal variances not assumed) was applied to assess the differences between the mean daily patient-load of each private

**Appendix IIa**

**Survey form on work practice to FDs in private practice.**

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**RETURNS FOR THE 2001 SURVEY OF PRIMARY MEDICAL CARE IN SINGAPORE, 21 AUGUST 2001 (TUESDAY)**

Section A

**Information to be provided by the primary health physician on his/her practice :**

- (a) No. of hours worked on survey day :
- (b) Average no. of hours worked per week :
- (c) Average proportions of acute minor ailments versus chronic continuing care cases seen in your practice :  
  % of acute minor ailments Versus   % of chronic continuing care

Section B

**Survey forms to be completed for all outpatients seen by the primary health physician on the day of the survey. Please see attached forms.**

**Survey form on work practice to paediatricians.**

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- (d) Average proportion of patients who are inpatients :
- (e) Average proportion of outpatients treated for general paediatrics conditions i.e. common minor ailments :

Section B

**Survey forms to be completed for all outpatients seen by the primary health physician on the day of the survey. Please see attached forms.**

Appendix IIb

Survey form on the workload of primary health physicians, patients' biographical and morbidity profile.

2001 Survey of Primary Medical Care in Singapore, 21 August 2001 (Tuesday)

Clinic Postal Sector

S/N	Age (yrs) Please enter "<1" for infant	Sex*		Race*			House Type*			Residential Status*		Currently Working*	Principal Diagnosis : Main diagnosis for this consultation : (Indicate Presenting Complaint if no diagnosis is arrived at)	ICD Codes (for official use)
		M	F	Chinese	Malay	Indian	Others	HDB 1-3 rms	HDB 4 rms & above including HUDC	Pte Apt or Landed Properties	Others			
1														
2														
3														
4														
5														
6														
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9														
10														
11														
12														
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14														
15														
16														
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18														
19														
20														

\* Please tick the appropriate column

**Table I. Definitions and formulae of key indicators.**

Indicators	Formula
Average working hours of FDs in private practice per day	Total number of hours worked by PDs in private practice in survey day divided by total number of respondents from FDs in private practice.
Average number of patients seen per day per FD in private practice	Total number of outpatients seen by FDs in private practice on survey day divided by total number of respondents from FDs in private practice.
2001 annual outpatient attendances seen at private family practice clinics	Average number of patients seen per day per FD in private practice multiplied by 1480 <sup>a</sup> multiplied by 307.5 <sup>b</sup> workdays.
2001 annual outpatient attendances seen at public sector primary medical care clinics	Attendances seen at public sector polyclinics and SHS outpatient clinics on survey day multiplied by 275 <sup>c</sup> workdays.
2001 annual primary medical care patient attendances	2001 annual outpatient attendances seen at private family practice clinics + 2001 annual outpatient attendances seen at public sector primary medical care clinics.

<sup>a</sup> Total number of FDs in private practice registered with the Singapore Medical Council (SMC) on 15 August 2001.

<sup>b</sup> Based on the assumption that private FDs work about six days per week throughout the year including half the number of public holidays i.e. 365 days – 52 days – 5.5 public holidays.

<sup>c</sup> Public sector primary medical care clinics operate 5.5 days per week, and are closed on public holidays and sundays.

sector's FDs estimated in the 1993 and 2001 surveys. Where applicable, standard deviation (SD) and 95% confidence interval (CI) for mean estimates were calculated to provide an indication of measurement errors of the figures derived. The definitions and formulae of the key indicators presented in this paper are given in Table I.

## RESULTS

The findings obtained from the 2001 survey which are presented in this paper will be compared with those of the 1993 morbidity survey of out-patients.

### Response rate

A total of 524 FDs in private practice and 24 community-based paediatricians responded to the survey. This gave a response rate of 36% among the FDs in private practice which was higher than the 31% achieved in 1993. Owing to the structured administrative organisation of the polyclinics and SHS outpatient clinics, survey forms were distributed to all FDs working in these clinics. All returns were then completed and submitted to their respective administrative headquarters.

The distribution of the practices of the private sector FDs who participated in the 2001 survey did not differ significantly from the general distribution of family practice clinics in the private sector in that year ( $p > 0.90$ ). The response rate among the community-based paediatricians in the 2001 survey was much lower, comprising only 27% ( $n = 24$  returns) of the 89 community-based paediatricians. In view of the poor response from the paediatricians, data analysis on this group was not carried out, since the findings would not be representative.

### Patient-load and working hours of FDs in private practice

The survey showed that, on average, each FD in private practice worked about 7.6 hours per day [SD=1.9, CI=(7.4, 7.7)] and 43 hours per week [SD=11.2, CI=(42.0, 43.9)] in 2001. The majority (70%) of the FDs in private practice saw between 20 to 60 patients per day. The average daily patient-load of a private sector FD in 2001 was 33 patients [SD=17, CI=(31, 34)]. This was significantly lower than the daily average of 40 patients seen per day [SD=21, CI=(42, 44)] ascertained from the 1993 survey ( $p < 0.01$ ). It was also much lower than the average of 45 patients seen, estimated from a 1996 survey commissioned by the Singapore Medical Association Guideline of Fees Committee<sup>(6)</sup>.

It must be noted that FDs in private practice increased from 1,103 to 1,480, equivalent to a growth of 34%, between 1993 and 2001. In 2001, therefore, there was one private sector FD serving 2,800 persons in the population compared with one private sector FD serving 3,000 persons in 1993. It must also be noted that an economic downturn was being experienced in 2001. The profile of primary healthcare practice in the private sector, obtained from the 1993 and 2001 surveys, are shown in Table II.

### Provision of primary medical care by private and public sectors

The estimated annual patient-load of FDs in 2001 was 18.01 million attendances, an 8.6% increase over the 16.58 million attendances recorded in 1993. During this period, however, the Singapore population experienced a higher growth from 3.3 million in 1993 to 4.1 million in 2001, equivalent to a 25% increase.

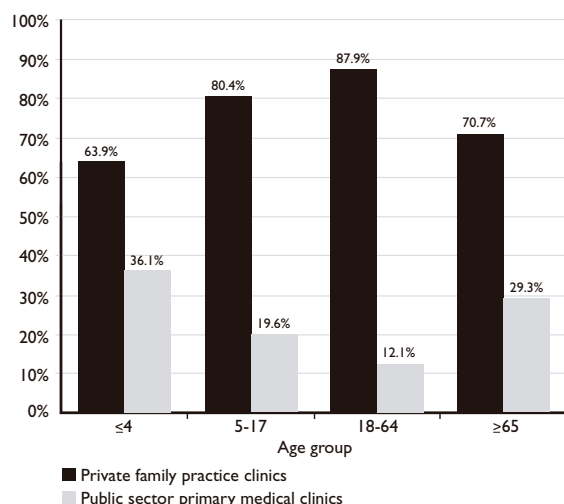
**Table II. Profile of primary healthcare practice in the private sector.**

Description	1993	2001
Number of FDs in private practice registered with SMC during survey period	1,103	1,480
Number of FDs in private practice who responded to the survey	345	524
Response rate (%)	31	36
Number of patients seen daily		
• Median	36	30
• Mean (standard deviation)	40 (21)	33 (17)
95% CI	(42-44)	(31-34)
Number of hours worked per day		
• Median	NA	8.0
• Mean (standard deviation)	NA	7.6 (1.9)
95% CI	NA	(7.4-7.7)
Number of hours worked per week		
• Median	NA	44
• Mean (standard deviation)	NA	43 (11.2)
95% CI	NA	(42.0 - 43.9)

Note: NA: not available.

**Table III. Estimated annual primary medical care patient-load – comparison between 1993 and 2001.**

	1993		2001		% change 2001/1993
	Number (in millions)	Percent	Number (in millions)	Percent	
All primary medical care clinics	16.58	100.0%	18.01	100.0%	+8.6%
Private family practice clinics	13.62	82.1%	15.02	83.4%	+10.3%
Public sector primary medical care clinics	2.96	17.9%	2.99	16.6%	+1.0%

**Fig. 1** Distribution of attendances in the private and public sectors by age, 2001.

The estimated 18 million attendances for 2001 comprised 15 million or 83.4% of the outpatients seen by FDs in private practice, with the remaining 3 million or 16.6% seen by FDs in the public sector. In 1993, the market share for primary medical care patients was 82.1% for FDs in private practice and 17.9% by FDs in the public sector. Private sector FDs, as the main providers of primary medical care in the country, had experienced a 10.3% increase in total

patient-load between 1993 and 2001, whereas the public sector only saw a marginal 1% increase in attendances during the same period (Table III).

Annual trend analysis of the public sector polyclinics' patient-load from the Ministry of Health's routine management information system showed that attendances at polyclinics started to pick up from 2001, after having recorded a constant decline in attendances since 1993. Attendances fell from 2.9 million in 1993 to 2.7 million in 2000. There was an economic downturn in Singapore in 2001. The distribution of patient-load between the private family practice clinics and the public sector clinics varied in different age groups (Fig. 1). The proportions of outpatients served by public sector medical care clinics were much higher for children under five years of age (36%) and the elderly (65 years and above) (29%) compared with adults (12%). The polyclinics administer the Government's free National childhood immunisation programme which is provided free to the young children. Children (0 to 18 years) and the elderly (above 65 years) receive highly subsidised (75% subsidy) care in the polyclinics. The biographical profile of attendances in 2001 by sector and diagnoses category are shown in Appendix III.

**Appendix III. Biographical characteristics of patients who seek primary medical care by sector, 2001.**

Selected characteristics	Private family practice clinics			Public sector primary medical care clinics			All primary medical care clinics		
	Sick attendances	Well attendances	Total attendances	Sick attendances	Well attendances	Total attendances	Sick attendances	Well attendances	Total attendances
<b>Total (in millions)</b>	<b>13.73</b>	<b>1.29</b>	<b>15.02</b>	<b>2.36</b>	<b>0.63</b>	<b>2.99</b>	<b>16.09</b>	<b>1.92</b>	<b>18.01</b>
<b>Sex</b>									
Male	6.47	0.49	<b>6.96</b>	1.15	0.29	<b>1.44</b>	7.62	0.77	<b>8.39</b>
Female	7.26	0.80	<b>8.06</b>	1.21	0.34	<b>1.55</b>	8.47	1.15	<b>9.61</b>
<b>Race</b>									
Chinese	10.23	0.74	<b>10.97</b>	1.62	0.41	<b>2.03</b>	11.85	1.15	<b>13.00</b>
Malays	1.92	0.17	<b>2.09</b>	0.41	0.15	<b>0.56</b>	2.34	0.32	<b>2.65</b>
Indians	0.98	0.11	<b>1.09</b>	0.25	0.05	<b>0.30</b>	1.23	0.16	<b>1.39</b>
Others	0.60	0.27	<b>0.87</b>	0.08	0.02	<b>0.09</b>	0.68	0.29	<b>0.97</b>
<b>Age</b>									
0-4 years	0.89	0.05	<b>0.94</b>	0.20	0.34	<b>0.54</b>	1.09	0.39	<b>1.48</b>
5-17 years	1.72	0.04	<b>1.76</b>	0.39	0.04	<b>0.43</b>	2.11	0.07	<b>2.19</b>
18-64 years	10.00	1.13	<b>11.14</b>	1.30	0.22	<b>1.53</b>	11.31	1.36	<b>12.67</b>
65 years and above	1.11	0.07	<b>1.18</b>	0.46	0.03	<b>0.49</b>	1.58	0.10	<b>1.67</b>

**Table IV. Selected characteristics of outpatients by sector – comparison between 1993 and 2001.**

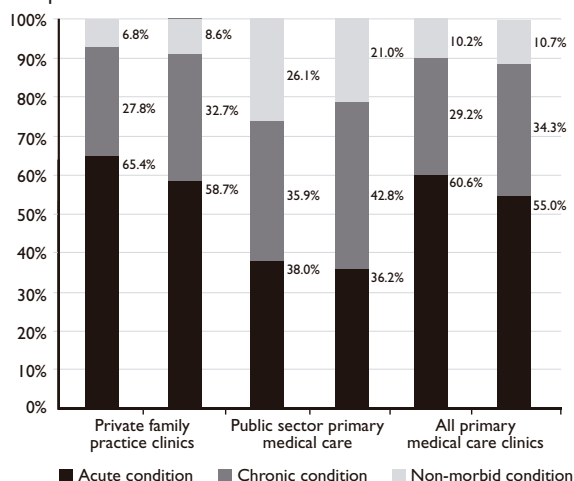
Selected characteristics	Private family practice clinics		Public sector primary medical care clinics		All primary medical care clinics	
	1993	2001	1993	2001	1993	2001
<b>Total attendances (in millions)</b>	<b>13.62</b>	<b>15.02</b>	<b>2.96</b>	<b>2.99</b>	<b>16.58</b>	<b>18.01</b>
<b>Sex</b>						
Male	46.3%	46.4%	47.7%	48.2%	46.6%	46.7%
Female	53.7%	53.6%	52.3%	51.8%	53.4%	53.3%
<b>Race</b>						
Chinese	76.5%	73.0%	66.6%	68.0%	74.8%	72.3%
Malays	13.1%	13.9%	20.8%	18.7%	14.4%	14.7%
Indians	6.5%	7.2%	10.3%	10.1%	7.2%	7.7%
Others	3.9%	5.8%	2.3%	3.2%	3.6%	5.4%
<b>Age</b>						
0-4 years	9.9%	6.3%	20.5%	18.1%	11.8%	8.2%
5-17 years	14.1%	11.7%	13.2%	14.3%	14.0%	12.1%
18-64 years	70.1%	74.2%	54.5%	51.2%	67.3%	70.4%
65 years and above	5.9%	7.9%	11.8%	16.4%	6.9%	9.3%
<b>House-type</b>						
HDB 1 - 3 room	36.5%	25.1%	46.1%	29.8%	38.2%	25.9%
HDB 4 - 5 room/executive/HUDC	46.9%	56.0%	44.0%	59.2%	46.4%	56.4%
Private apartment/house	13.2%	14.2%	7.4%	7.1%	12.2%	13.1%
Others	3.4%	4.8%	2.5%	3.9%	3.2%	4.7%
<b>Working status</b>						
Working	67.7%	60.2%	37.0%	33.1%	62.2%	55.8%
Not working	32.3%	39.8%	63.0%	66.9%	37.8%	44.2%
<b>Residential status</b>						
Singaporeans/permanent residents	90.9%	85.8%	96.3%	93.1%	91.9%	87.0%
Foreigners (Working in Singapore)	8.0%	13.3%	3.4%	6.5%	7.2%	12.2%
Foreigners (Not working in Singapore)	1.1%	0.9%	0.3%	0.4%	1.0%	0.8%

Note: Percentages may not add up to 100% due to rounding-off errors.

**Utilisation rates of primary medical care services**

The average number of visits that a Singaporean made to his/her FD overall was 4.4 visits in 2001. This was lower than the 5.0 visits recorded in 1993.

In terms of age groups, the utilisation rate of primary medical care was highest among children under five years and the elderly, the respective rates being 6.6 visits and 6.2 visits in 2001.

**Fig. 2** Distribution of attendances by sector and disease type – comparison between 2001 and 1993.

### Selected characteristics of patients seeking primary medical care

The profile of outpatients seeking primary medical care in Singapore by sector are shown in Table IV.

#### Gender

The 2001 survey showed that females accounted for a higher proportion of outpatient attendances (53.3%) as compared with males (46.7%). This trend was observed in both public sector practices and in private family practice clinics. These findings were consistent with those found from the 1993 survey.

#### Ethnic group

There was a slightly higher proportion of Malays seeking primary medical care compared to their distribution in the general population (14.7% vs 13.9%).

#### Age

There was a decline in outpatient attendances among children under five years of age, from 11.8% in 1993 to 8.2% in 2001. Elderly attendances, on the other hand, rose from 6.9% in 1993 to 9.3% in 2001. The Singapore's elderly population rose from 5.8% in 1993 to 6.5% in 2001 during this period. Compared with private family practice clinics, the polyclinics provided care to a higher proportion of elderly patients. The increase in elderly attendances was more in the polyclinics than the private family practice clinics (+4.6% vs. +2.0%).

#### House type

The distribution of attendances by their house type conformed closely to the housing distribution of the general population in 2001, with the majority of the population living in Housing Development Board (HDB) apartments that had three rooms or more. FDs in private practice served proportionately more patients who lived in private dwellings, as compared to FDs in public practice (14.2% vs. 7.1%). This was also noted in the 1993 survey.

#### Working status

The overall proportion of outpatients who were not working in 2001 was 44.2%, up from the 37.8% seen in 1993. The proportion of patients who were working and who attended private family practice clinics was almost twice that of those attending public sector family practice clinics (60.2% vs. 33.1%). This trend was also seen in the 1993 survey. Private family practice clinics are located all over the island, making

**Table V. Leading conditions seen at primary medical care clinics – comparison between 1993 and 2001.**

Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 14.88</b>		<b>Total attendances (in millions) = 16.09</b>	
1	Upper respiratory tract infections	31.6%	Upper respiratory tract infections	29.5%
2	Hypertension	6.3%	Hypertension	9.6%
3	Arthritic conditions and rheumatism	5.7%	Dermatological disorders	5.8%
4	Dermatological disorders	5.3%	Diarrhoeal diseases	5.7%
5	Diarrhoeal diseases	4.7%	Arthritic conditions and rheumatism	4.8%
6	Asthma and bronchitis	4.0%	Diabetes mellitus	3.9%
7	Diabetes mellitus	3.0%	Asthma and bronchitis	2.8%
8	Gastritis	2.4%	Gastritis	2.5%
9	Conditions of the female genital tract	2.1%	Disorders of the back	1.6%
10	Conjunctivitis	1.5%	Sprains	1.4%
	Ill-defined conditions	6.6%	Ill-defined conditions	7.3%
	Other disease conditions	26.8%	Other disease conditions	25.0%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.



them very accessible in terms of their geographical distribution. The majority are also open “after office hours”, unlike public sector family practice clinics.

#### Residential status

Singaporeans and permanent residents comprised 87.0% of the overall attendances at primary medical care clinics while the rest were foreigners. FDs as a whole saw a higher proportion of foreign patients in 2001, compared with 1993 (13.0% vs 8.2%). The proportions of foreign patients seen at the public sector primary medical care clinics and private family practice clinics were 6.9% and 14.2%, respectively, in 2001, up from the 3.7% and 9.1% seen in 1993. The foreign population in Singapore almost doubled during this period, from 408,900 to 812,100.

#### Morbidity profile of patients seeking primary medical care

##### Diagnosis category (Fig. 2)

The majority (89.3%) of visits to the primary medical care clinics were for “sickness” consultations, for which treatment was being sought. The disease-load managed in primary medical care clinics in 2001 comprised 55.0% for acute conditions, 34.3% for chronic conditions and 10.7% for non-morbid conditions. The respective proportions seen in 1993 were 60.6%, 29.2% and 10.2%, showing an increase in chronic disease consultations over the eight-year period.

Although both sectors experienced an increase in chronic disease load between 1993 and 2001, public sector polyclinics managed a proportionately higher load of patients with chronic medical conditions,

**Table VI. Leading disease conditions for all “sick” visits by gender – comparison between 1993 and 2001.**

Males				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 7.02</b>		<b>Total attendances (in millions) = 7.62</b>	
1	Upper respiratory tract infections	37.0%	Upper respiratory tract infections	31.1%
2	Hypertension	5.9%	Hypertension	9.6%
3	Diarrhoeal diseases	5.8%	Diarrhoeal diseases	6.6%
4	Arthritic conditions and rheumatism	5.5%	Dermatological disorders	5.5%
5	Dermatological disorders	5.1%	Arthritic conditions and rheumatism	5.1%
6	Asthma and bronchitis	4.2%	Diabetes mellitus	3.7%
7	Diabetes mellitus	3.0%	Asthma and bronchitis	3.3%
8	Gastritis	2.2%	Gastritis	2.1%
9	Conjunctivitis	1.4%	Disorders of the back	1.8%
10	Sprains	1.0%	Sprains	1.7%
	Ill-defined conditions	8.2%	Ill-defined conditions	6.8%
	Other disease conditions	20.7%	Other disease conditions	22.8%
Females				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 7.87</b>		<b>Total attendances (in millions) = 8.47</b>	
1	Upper respiratory tract infections	35.6%	Upper respiratory tract infections	28.1%
2	Hypertension	5.9%	Hypertension	9.6%
3	Dermatological disorders	5.6%	Dermatological disorders	6.1%
4	Arthritic conditions and rheumatism	5.4%	Arthritic conditions and rheumatism	5.7%
5	Diarrhoeal diseases	4.9%	Diarrhoeal diseases	5.0%
6	Conditions of the female genital tract	3.5%	Diabetes mellitus	4.0%
7	Diabetes mellitus	3.3%	Conditions of the female genital tract	2.8%
8	Asthma and bronchitis	3.0%	Gastritis	2.8%
9	Gastritis	2.4%	Asthma and bronchitis	2.4%
10	Conjunctivitis	1.3%	Disorders of the back	1.4%
	Ill-defined conditions	8.1%	Ill-defined conditions	7.8%
	Other disease conditions	21.0%	Other disease conditions	24.2%

Note: Figures exclude all “well visits” e.g. health assessments, preventive care.

as compared with private family practice clinics. The proportions of chronic medical conditions seen in 2001 at the public and private family practice clinics were 42.8% and 32.7%, respectively, an increase from the 35.9% and 27.8% seen in 1993.

*Leading disease conditions seen at primary medical care clinics (Table V)*

Upper respiratory tract infections (URTI) (29.5%), hypertension (9.6%), dermatological disorders (5.8%), diarrhoeal diseases (5.7%), and arthritic conditions and rheumatism (4.8%) were the five leading conditions for which treatment was sought in primary medical care clinics in Singapore in 2001. These were also the leading conditions seen in 1993. Comparisons between 1993 and 2001 showed that the proportion of hypertension managed rose from 6.3% to 9.6%, while the proportion of URTI treated fell from 31.6% to 29.5%.

*Leading disease conditions seen at all primary medical care clinics by gender, ethnic group and age*  
*Gender (Table VI)*

The five leading disease conditions seen among males and females were generally similar in 2001. These were also the leading conditions treated in 1993.

*Ethnic group (Table VII)*

URTI and hypertension were the most common disease conditions seen among the Chinese and Malays while among the Indians, URTI and arthritic conditions and rheumatism were the top two disease conditions seen in 2001. The most significant change in the ethnic-specific disease prevalence was the increase in attendances for hypertension in 2001. Hypertension prevalence among Malays during this period doubled, rising from the sixth position (4.1%) in 1993 to become the second most common condition (8.2%) in 2001. The prevalence of hypertension among Chinese outpatients also rose from 6.6% in 1993 to 10.9% in 2001.

*Age (Table VIII)*

The top five most common conditions seen in primary medical care clinics varied among the different age groups. URTI was the most common disease condition seen among outpatients below 65 years, while hypertension was the leading condition seen among those above 65 years of age. There were also relatively more consultations among the elderly for hypertension in 2001 (27.7%), compared with 1993 (21.6%). This was also noted among outpatients aged 18 to 64 years, where hypertension attendances increased from 6.5% in 1993 to 9.8% in 2001 in this age group.

More details on the principal disease conditions seen at the public sector primary medical care clinics and private family practice clinics in 2001 by selected characteristics are presented in Appendices IV to VII.

## DISCUSSION

The 2001 survey has shown that the private sector continues to be the main provider of primary medical care in Singapore, servicing 83% of all primary healthcare patients in Singapore. The public sector share of 16.6% of the total outpatient load remains well within the 25% level set in the 1993 White Paper on Affordable Healthcare<sup>(7)</sup>. The private sector market share in 1993 was 82%, while the public sector provided the remaining 18%. Family doctors (FDs) in private practice experienced a decline in their daily workload, down from a daily average of 40 patients per day in 1993 to 33 patients per day in 2001. This was the period when there was a larger pool of FDs in private practice compared to what it was in 1993. In addition, the country experienced an economic recession during this period. Chronic disease load at primary healthcare clinics also increased notably since 1993. There were 2.2 million consultations for diabetes mellitus and hypertension in 2001, compared with 1.4 million consultations for these two disease conditions in 1993. The increase in the hypertension load managed at primary health care clinics is especially noticeable.

This survey has updated the leading conditions for which primary medical care is sought, in Singapore. This will provide valuable inputs for the strategic planning for primary healthcare services in Singapore. The teaching of medical undergraduates and FDs should focus on the investigation and good management of these leading diseases if we are to prevent complications and reduce hospitalisations. This survey also highlights those areas where FDs should focus on providing improved resources and facilities, in order to support better management and care for the leading conditions seen. The 2001 survey has especially highlighted the need to better manage hypertension by FDs since the attendances for this disease has increased, especially among Chinese and Malays.

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**Table VII. Leading disease conditions for all "sick" visits by race – comparison between 1993 and 2001.**

<b>Chinese</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 11.25</b>		<b>Total attendances (in millions) = 11.85</b>	
1	Upper respiratory tract infections	37.2%	Upper respiratory tract infections	29.4%
2	Hypertension	6.6%	Hypertension	10.9%
3	Dermatological disorders	5.4%	Dermatological disorders	5.9%
4	Diarrhoeal diseases	5.2%	Diarrhoeal diseases	5.8%
5	Arthritic conditions and rheumatism	4.9%	Diabetes mellitus	3.6%
6	Asthma and bronchitis	3.2%	Arthritic conditions and rheumatism	3.3%
7	Diabetes mellitus	3.1%	Gastritis	2.6%
8	Gastritis	2.4%	Asthma and bronchitis	2.4%
9	Conditions of the female genital tract	1.7%	Conditions of the female genital tract	1.5%
10	Conjunctivitis	1.4%	Disorders of the back	1.3%
	Ill-defined conditions	8.0%	Ill-defined conditions	7.3%
	Other disease conditions	20.9%	Other disease conditions	26.0%
<b>Malays</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 2.08</b>		<b>Total attendances (in millions) = 2.34</b>	
1	Upper respiratory tract infections	34.9%	Upper respiratory tract infections	30.3%
2	Arthritic conditions and rheumatism	6.9%	Hypertension	8.2%
3	Diarrhoeal diseases	5.9%	Arthritic conditions and rheumatism	5.9%
4	Asthma and bronchitis	5.1%	Diarrhoeal diseases	5.2%
5	Dermatological disorders	4.8%	Diabetes mellitus	5.1%
6	Hypertension	4.1%	Dermatological disorders	4.9%
7	Diabetes mellitus	3.3%	Asthma and bronchitis	4.6%
8	Conditions of the female genital tract	2.2%	Sprains	1.9%
9	Gastritis	1.6%	Disorders of the back	1.8%
10	Conjunctivitis	1.4%	Gastritis	1.8%
	Ill-defined conditions	8.5%	Ill-defined conditions	7.9%
	Other disease conditions	21.3%	Other disease conditions	22.4%
<b>Indians</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.07</b>		<b>Total attendances (in millions) = 1.23</b>	
1	Upper respiratory tract infections	31.1%	Upper respiratory tract infections	29.7%
2	Arthritic conditions and rheumatism	8.5%	Arthritic conditions and rheumatism	8.0%
3	Diarrhoeal diseases	6.2%	Diarrhoeal diseases	6.0%
4	Dermatological disorders	5.1%	Diabetes mellitus	5.6%
5	Asthma and bronchitis	4.8%	Dermatological disorders	5.2%
6	Diabetes mellitus	4.6%	Hypertension	3.9%
7	Hypertension	3.2%	Disorders of the back	3.4%
8	Conditions of the female genital tract	2.7%	Asthma and bronchitis	3.2%
9	Gastritis	2.2%	Sprains	2.7%
10	Conjunctivitis	0.7%	Gastritis	2.5%
	Ill-defined conditions	9.3%	Ill-defined conditions	6.4%
	Other disease conditions	21.6%	Other disease conditions	23.4%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.

**Table VIII. Leading disease conditions for all “sick” visits by age – comparison between 1993 and 2001.**

<b>0-4 years</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.49</b>		<b>Total attendances (in millions) = 1.09</b>	
1	Upper respiratory tract infections	53.0%	Upper respiratory tract infections	51.7%
2	Asthma and bronchitis	7.6%	Asthma and bronchitis	5.6%
3	Diarrhoeal diseases	6.5%	Diarrhoeal diseases	5.3%
4	Dermatological disorders	4.9%	Dermatological disorders	4.8%
5	Perinatal conditions	1.8%	Perinatal conditions	4.7%
<b>5-17 years</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 2.21</b>		<b>Total attendances (in millions) = 2.11</b>	
1	Upper respiratory tract infections	53.0%	Upper respiratory tract infections	47.9%
2	Asthma and bronchitis	7.6%	Diarrhoeal diseases	6.4%
3	Diarrhoeal diseases	6.5%	Asthma and bronchitis	5.8%
4	Dermatological disorders	4.9%	Dermatological disorders	5.1%
5	Chickenpox	1.8%	Gastritis	1.7%
<b>18-64 years</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 10.09</b>		<b>Total attendances (in millions) = 11.31</b>	
1	Upper respiratory tract infections	32.6%	Upper respiratory tract infections	26.9%
2	Arthritic conditions and rheumatism	6.5%	Hypertension	9.8%
3	Hypertension	6.5%	Diarrhoeal diseases	6.3%
4	Dermatological disorders	5.8%	Arthritic conditions and rheumatism	6.2%
5	Diarrhoeal diseases	5.4%	Dermatological disorders	6.1%
<b>64 years and above</b>				
Rank	1993		2001	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.09</b>		<b>Total attendances (in millions) = 1.58</b>	
1	Hypertension	21.6%	Hypertension	27.7%
2	Diabetes mellitus	13.6%	Diabetes mellitus	13.6%
3	Upper respiratory tract infections	12.9%	Arthritic conditions and rheumatism	9.4%
4	Arthritic conditions and rheumatism	11.2%	Upper respiratory tract infections	8.6%
5	Dermatological disorders	4.0%	Dermatological disorders	5.1%

Note: Figures exclude all “well visits” e.g. health assessments, preventive care.

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**Appendix IV. Leading conditions seen at primary medical care clinics by sector, 2001.**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 13.73</b>		<b>Total attendances (in millions) = 2.36</b>	
1	Upper respiratory tract infections	30.4%	Upper respiratory tract infections	24.2%
2	Hypertension	8.2%	Hypertension	18.1%
3	Dermatological disorders	6.1%	Diabetes mellitus	9.8%
4	Diarrhoeal diseases	6.0%	Arthritic conditions and rheumatism	5.0%
5	Arthritic conditions and rheumatism	5.5%	Diarrhoeal diseases	4.0%
6	Asthma and bronchitis	3.0%	Dermatological disorders	3.8%
7	Diabetes mellitus	2.9%	Perinatal jaundice	2.1%
8	Gastritis	2.7%	Disorders of lipid metabolism	1.7%
9	Disorders of the back	1.6%	Asthma and bronchitis	1.6%
10	Conditions of the female genital tract	1.5%	Sprains	1.5%
	Ill-defined causes of morbidity	7.8%	Ill-defined causes of morbidity	4.3%
	Other disease conditions	24.3%	Other disease conditions	23.9%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.

**Appendix V. Leading disease conditions for all "sick" visits by gender and sector, 2001.****Males**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 6.47</b>		<b>Total attendances (in millions) = 1.15</b>	
1	Upper respiratory tract infections	31.9%	Upper respiratory tract infections	26.2%
2	Hypertension	8.4%	Hypertension	16.6%
3	Diarrhoeal diseases	6.9%	Diabetes mellitus	8.9%
4	Dermatological disorders	5.8%	Diarrhoeal diseases	4.8%
5	Arthritic conditions and rheumatism	5.2%	Arthritic conditions and rheumatism	4.6%
6	Asthma and bronchitis	3.6%	Dermatological disorders	3.7%
7	Diabetes mellitus	2.8%	Perinatal jaundice	2.1%
8	Gastritis	2.2%	Sprains	2.0%
9	Disorders of the back	1.9%	Asthma and bronchitis	1.7%
10	Sprains	1.7%	Disorders of the back	1.6%
	Ill-defined causes of morbidity	7.2%	Ill-defined causes of morbidity	4.4%
	Other disease conditions	22.4%	Other disease conditions	23.4%

**Females**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 7.26</b>		<b>Total attendances (in millions) = 1.21</b>	
1	Upper respiratory tract infections	29.1%	Upper respiratory tract infections	22.4%
2	Hypertension	8.0%	Hypertension	19.5%
3	Dermatological disorders	6.4%	Diabetes mellitus	10.7%
4	Arthritic conditions and rheumatism	5.8%	Arthritic conditions and rheumatism	5.4%
5	Diarrhoeal diseases	5.3%	Dermatological disorders	4.0%
6	Gastritis	3.1%	Diarrhoeal diseases	3.1%
7	Diabetes mellitus	2.9%	Disorders of lipid metabolism	2.2%
8	Conditions of the female genital tract	2.9%	Perinatal jaundice	2.0%
9	Asthma and bronchitis	2.6%	Disorders of the thyroid gland	1.5%
10	Disorders of the back	1.4%	Asthma and bronchitis	1.5%
	Ill-defined causes of morbidity	8.4%	Ill-defined causes of morbidity	4.2%
	Other disease conditions	24.1%	Other disease conditions	23.5%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.

## Appendix VI. Leading disease conditions for all "sick" visits by race and sector, 2001.

## Chinese

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 10.23</b>		<b>Total attendances (in millions) = 1.62</b>	
1	Upper respiratory tract infections	30.7%	Hypertension	22.5%
2	Hypertension	9.0%	Upper respiratory tract infections	20.9%
3	Dermatological disorders	6.3%	Diabetes mellitus	10.1%
4	Diarrhoeal diseases	6.1%	Diarrhoeal diseases	3.6%
5	Arthritic conditions and rheumatism	5.1%	Disorders of lipid metabolism	2.3%
6	Gastritis	2.8%	Dermatological disorders	3.8%
7	Asthma and bronchitis	2.7%	Arthritic conditions and rheumatism	4.8%
8	Diabetes mellitus	2.6%	Perinatal jaundice	1.6%
9	Conditions of the female genital tract	1.6%	Disorders of the thyroid gland	1.3%
10	Disorders of the back	1.4%	Ischaemic heart disease	1.1%
	Ill-defined causes of morbidity	7.7%	Ill-defined causes of morbidity	4.6%
	Other disease conditions	24.0%	Other disease conditions	23.4%

## Malays

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.92</b>		<b>Total attendances (in millions) = 0.41</b>	
1	Upper respiratory tract infections	29.5%	Upper respiratory tract infections	34.3%
2	Hypertension	8.1%	Hypertension	8.9%
3	Arthritic conditions and rheumatism	6.2%	Diabetes mellitus	7.8%
4	Diarrhoeal diseases	5.4%	Perinatal jaundice	4.7%
5	Dermatological disorders	5.1%	Diarrhoeal diseases	4.3%
6	Asthma and bronchitis	4.9%	Asthma and bronchitis	2.9%
7	Diabetes mellitus	4.5%	Sprains	2.3%
8	Gastritis	2.0%	Arthritic conditions and rheumatism	4.2%
9	Disorders of the back	2.0%	Dermatological disorders	3.7%
10	Sprains	1.8%	Obesity	1.3%
	Ill-defined causes of morbidity	8.8%	Ill-defined causes of morbidity	3.8%
	Other disease conditions	21.7%	Other disease conditions	21.8%

## Indians

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 0.98</b>		<b>Total attendances (in millions) = 0.25</b>	
1	Upper respiratory tract infections	30.2%	Upper respiratory tract infections	27.9%
2	Arthritic conditions and rheumatism	8.4%	Diabetes mellitus	13.4%
3	Diarrhoeal diseases	6.2%	Hypertension	8.2%
4	Dermatological disorders	6.1%	Diarrhoeal diseases	5.4%
5	Disorders of the back	3.8%	Asthma and bronchitis	3.5%
6	Diabetes mellitus	3.7%	Sprains	2.8%
7	Asthma and bronchitis	3.1%	Arthritic conditions and rheumatism	3.9%
8	Gastritis	2.8%	Dermatological disorders	4.1%
9	Hypertension	2.8%	Open wounds	1.8%
10	Sprains	2.7%	Gastritis	1.2%
	Ill-defined causes of morbidity	7.3%	Ill-defined causes of morbidity	3.3%
	Other disease conditions	22.9%	Other disease conditions	24.5%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.

**Appendix VII. Leading disease conditions for all "sick" visits by age and sector, 2001.****0-4 years**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 0.89</b>		<b>Total attendances (in millions) = 0.20</b>	
1	Upper respiratory tract infections	48.9%	Upper respiratory tract infections	47.5%
2	Asthma and bronchitis	6.4%	Perinatal jaundice	7.8%
3	Diarrhoeal disorders	6.3%	Diarrhoeal diseases	5.9%
4	Dermatological disorders	5.5%	Dermatological disorders	3.8%
5	Gastritis	1.5%	Refractive disorders	3.4%

**5-17 years**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.72</b>		<b>Total attendances (in millions) = 0.39</b>	
1	Upper respiratory tract infections	47.9%	Upper respiratory tract infections	48.1%
2	Asthma and bronchitis	6.7%	Diarrhoeal disorders	6.9%
3	Diarrhoeal disorders	6.3%	Dermatological disorders	3.7%
4	Dermatological disorders	5.4%	Obesity	2.9%
5	Gastritis	1.8%	Arthritic conditions and rheumatism	2.5%

**18-64 years**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 10.00</b>		<b>Total attendances (in millions) = 1.30</b>	
1	Upper respiratory tract infections	27.8%	Upper respiratory tract infections	19.8%
2	Hypertension	8.7%	Hypertension	18.5%
3	Diarrhoeal disorders	6.5%	Diabetes mellitus	9.7%
4	Dermatological disorders	6.3%	Arthritic conditions and rheumatism	7.0%
5	Arthritic conditions and rheumatism	6.1%	Diarrhoeal disorders	4.5%

**64 years and above**

Rank	Private family practice clinics		Public sector primary medical care clinics	
	Disease condition	% of total attendances	Disease condition	% of total attendances
	<b>Total attendances (in millions) = 1.11</b>		<b>Total attendances (in millions) = 0.46</b>	
1	Hypertension	22.6%	Hypertension	40.1%
2	Arthritic conditions and rheumatism	11.8%	Diabetes mellitus	22.7%
3	Diabetes mellitus	9.9%	Upper respiratory tract infections	6.5%
4	Upper respiratory tract infections	9.4%	Arthritic conditions and rheumatism	3.7%
5	Dermatological disorders	6.2%	Ischaemic heart disease	3.4%

Note: Figures exclude all "well visits" e.g. health assessments, preventive care.