CHAPTER 1

PROVISION OF ACUTE CORONARY CARE SERVICES IN MALAYSIA

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In 2006, there were a total of 31186 admissions to the 73 coronary care units (CCU) in Malaysia, of which 12534 admissions were due to Acute Coronary Syndrome (ACS) (Table 1). The incidence of ACS admission was therefore 47.1 per 100,000 population in 2006. Assuming half of all coronary heart disease (CHD) first presented with ACS and only half were admitted to CCU with a third who died before being admitted into hospital, a rough estimate of the incidence of CHD in Malaysia is 141 per 100,000 population.

The 37 CCUs in MOH hospitals took care of the majority (60%) of ACS admissions, the 3 university hospitals' CCUs cared for another 10% while the private sector accounted for 27% of admissions. As expected, the economically developed states like Penang, Perak, Selangor/Wilayah Persekutuan have disproportionately large numbers of ACS admissions, while the less developed states (Kedah/Perlis, Terengganu, Sabah and Sarawak) were under-resourced, the surprising exception being Kelantan. Thus, the pattern parallels the availability of acute coronary care services in these states.

The 73 CCUs in the country provided 414 CCU beds. Table 1.2 shows the utilization of these resources. The MOH sector is clearly under-resourced relative to the demands it faces, resulting in over 4000 ACS being denied admission into its CCU in 2006. It has a 30% shortfall in CCU beds, and even if non-acute cardiac admissions are excluded, it is still short of 10% of its required bed strength.

Table 1.3 shows the cardiac care ACS patients received after being admitted into CCU. A remarkable 59% of patients in IJN had thrombolytic. Patients in private hospitals, including IJN, are more likely to receive invasive coronary interventions (emergency angiogram, PCI and coronary artery bypass graft [CABG]).

Figure 1.1 and 1.2 shows that the likelihood of ACS patients receiving emergency angiogram, PCI and CABG are driven by availability of cardiologist and on-site invasive cardiac catheterization laboratory (cath lab) facility.

Similarly, the likelihood of receiving emergency coronary artery bypass graft (CABG) correlates with availability of cardiac surgical services (Figure 1.3). What is the optimum level for the provision of these services however remains to be determined, and whether availability of such emergency services translated into better health outcomes are addressed in another chapter in this report.

Summary Points:

- The incidence of ACS admission to CCU was 47 per 100,000 populations in 2006.
- MOH Hospitals received 60% of ACS while Private Hospitals account for only 27%. However the MOH sector is clearly under-resourced in terms of CCU beds, on-site Cardiologists, Catheterization Laboratory and Cardiac Surgical Facilities.
- The likelihood of ACS patients receiving intervention (PCI or CABG) is driven by the availability of these resources.

Table 1.1 Acute Coronary/ Cardiac Care Services and Admissions in Malaysia 2006

	Population no in 000,000	CCU No	CCU (%)	Total beds No	Total beds (%)	CCU beds No	CCU beds (%)	CCU nurses No	CCU nurses (%)	Cardiologist No	Cardiologist (%)	Cardiologist PMP*	Cath lab No	Cath lab (%)	Cath lab PMP*	Cardiac surgical service No	Cardiac surgical service (%)	Cardiac surgical service PMP*	CCU admission No	CCU admission (%)	All acute admission No	All acute admission (%)	All acute admission PMP*	ACS admission No	ACS admission (%)	ACS admission PMP*
Malaysia	26.6	73	100	30191	100	414	100	559	100	163	100	6	36	100	1	27	100	1	31186	100	20144	100	756	12534	100	471
By sector																										
Private		32	44	6357	21	214	52	176	31	81	50		28	78		20	74		13820	44	6286	31		3398	27	
MOH		37	51	21118	70	169	41	305	55	37	23		4	11		4	15		14257	46	11809	59		7580	60	
IJN		1	1	211	1	12	3	13	2	27	17		1	3		1	4		1307	4	465	2		335	3	
University		3	4	2505	8	19	5	65	12	17	10		3	8		2	7		1802	6	1583	8		1221	10	
States																										
P.Pinang	1.5	9	12	3206	11	54	13	63	11	24	15	16	6	17	4	5	19	3	6124	20	2242	11	1502	1140	9	764
Melaka	0.7	4	5	1485	5	31	7	15	3	11	7	15	3	8	4	3	11	4	1961	6	1243	6	1714	745	6	1027
Johor	3.2	5	7	2293	8	30	7	34	6	9	6	3	2	6	1	2	7	1	2846	9	1938	10	611	1243	10	392
Perak	2.3	7	10	2829	9	25	6	58	10	4	2	2	1	3	0	1	4	0	2635	8	2253	11	987	1772	14	776
Selangor & Kuala Lumpur	6.4	22	30	10,118	34	148	36	220	39	86	53	13	15	42	2	12	44	2	9211	30	5634	28	876	3683	29	573
Negeri Sembilan	1.0	4	5	1260	4	17	4	20	4	1	1	1	1	3	1	0	0	0	780	3	621	3	645	374	3	389
Kedah & Perlis	2.1	5	7	2093	7	21	5	33	6	1	1	0	1	3	0	0	0	0	2190	7	1878	9	890	623	5	295
Terengganu	1.0	1	1	821	3	4	1	2	0	0	0	0	0	0	0	0	0	0	362	1	276	1	265	181	1	173
Pahang	1.5	4	5	1317	4	18	4	28	5	4	2	3	1	3	1	0	0	0	841	3	753	4	518	526	4	362
Kelantan	1.5	3	4	1778	6	17	4	36	6	6	4	4	2	6	1	1	4	1	2380	8	1956	10	1278	1438	11	939
Sarawak	2.4	5	7	1785	6	15	4	22	4	13	8	6	3	8	1	2	7	1	690	2	585	3	248	314	3	133
Sabah	3.0	4	5	1206	4	34	8	28	5	3	2	1	1	3	0	1	4	1	1166	4	766	4	255	496	4	166

*PMP = Per Million Population
Note: Percentage is to the nearest decimal point

Table 1.2 Utilization of Acute Coronary/Cardiac Services in Malaysia 2006

	Pop in 000,000	Current bed %	Bed occup. rate %	Use for all acute %	Use for ACS %	Use for non cardiac %	ACS denied No	ACS denied % of all ACS	Required bed strengths (RBS) No	Required bed strengths (% shortfall)	RBS if non cardiac excluded No	RBS if non cardiac excluded (% shortfall)
Malaysia	26.6	414	89	65	40	35	6703	53	515	80	375	110
Sector												
Private		214	83	51	27	49	1635	48	238	90	162	132
MOH		169	93	77	49	23	4722	62	242	70	190	89
IJN		12	83	36	26	64	177	53	13	92	7	171
University		19	104	76	58	24	168	14	21	90	16	119
States												
P.Pinang	1.5	54	148	42	21	58	917	80	71	76	28	193
Melaka	0.7	31	59	55	33	45	460	62	35	89	28	111
Johor	3.2	30	136	75	48	25	700	56	40	75	29	103
Perak	2.3	25	145	74	58	26	1116	63	61	41	41	61
Selangor & Kuala Lumpur	6.4	148	75	65	43	35	1463	40	164	90	128	116
Negeri Sembilan	1.0	17	47	69	42	31	472	126	21	81	18	94
Kedah & Perlis	2.1	21	93	83	28	17	182	29	22	95	18	117
Terengganu	1.0	4	59	66	43	34	96	53	5	86	4	100
Pahang	1.5	18	41	78	54	22	187	36	19	95	18	100
Kelantan	1.5	17	114	72	53	28	723	50	24	71	17	100
Sarawak	2.4	15	24	76	41	24	46	15	15	100	14	107
Sabah	3.0	34	64	57	37	43	340	69	38	89	32	106

Note: Percentage is to the nearest decimal point.

Table 1.3 Cardiac Care provided for ACS in Malaysia 2006

	Population	ACS admits		PMP*	Trombolytic		PMP*	Angiogram		PMP*	PCI		PMP*	CABG		PMP*
	no in 000,000	No	%		No	%		No	%		No	%		No	%	
Malaysia	26.64	12534	100	471	4771	38	179	4156	33	156	2552	20	96	858	7	32
Sector																
Private		3398	27		837	25		2168	64		1478	43		534	16	
MOH		7580	60		3367	44		1403	19		801	11		264	3	
IJN		335	3		199	59		257	77		134	40		39	12	
University		1221	10		368	30		328	27		139	11		21	2	
States																
Pulau Pinang	1.49	1140	9	764	373	33	250	534	47	358	367	32	246	119	10	80
Melaka	0.73	745	6	1027	431	58	594	261	35	360	122	16	168	59	8	81
Johor	3.17	1243	10	392	337	27	106	450	36	142	307	25	97	89	7	28
Perak	2.28	1772	14	776	497	28	218	924	52	405	457	26	200	141	8	62
Selangor & Kuala Lumpur	6.43	3683	29	573	1469	40	228	1238	34	193	908	25	141	277	8	43
Negeri Sembilan	0.96	374	3	389	200	53	208	66	18	69	40	11	42	14	4	15
Kedah & Perlis	2.11	623	5	295	343	55	163	128	21	61	78	13	37	26	4	12
Terengganu	1.04	181	1	173	50	28	48	32	18	31	19	11	18	6	3	6
Pahang	1.45	526	4	362	313	59	215	93	18	64	55	10	38	19	4	13
Kelantan	1.53	1438	11	939	515	36	336	197	14	129	119	8	78	44	3	29
Sarawak	2.36	314	3	133	141	45	60	71	23	30	29	9	12	11	3	5
Sabah	3.00	496	4	166	102	21	34	162	33	54	51	10	17	53	11	18

*PMP = Per Million Population
Note: Percentage is to the nearest decimal point.

Figure 1.1 Relationship between availability of cardiologist and provision of emergency Coronary angiogram and Percutaneous Coronary Intervention (PCI) for patients admitted with ACS in 2006
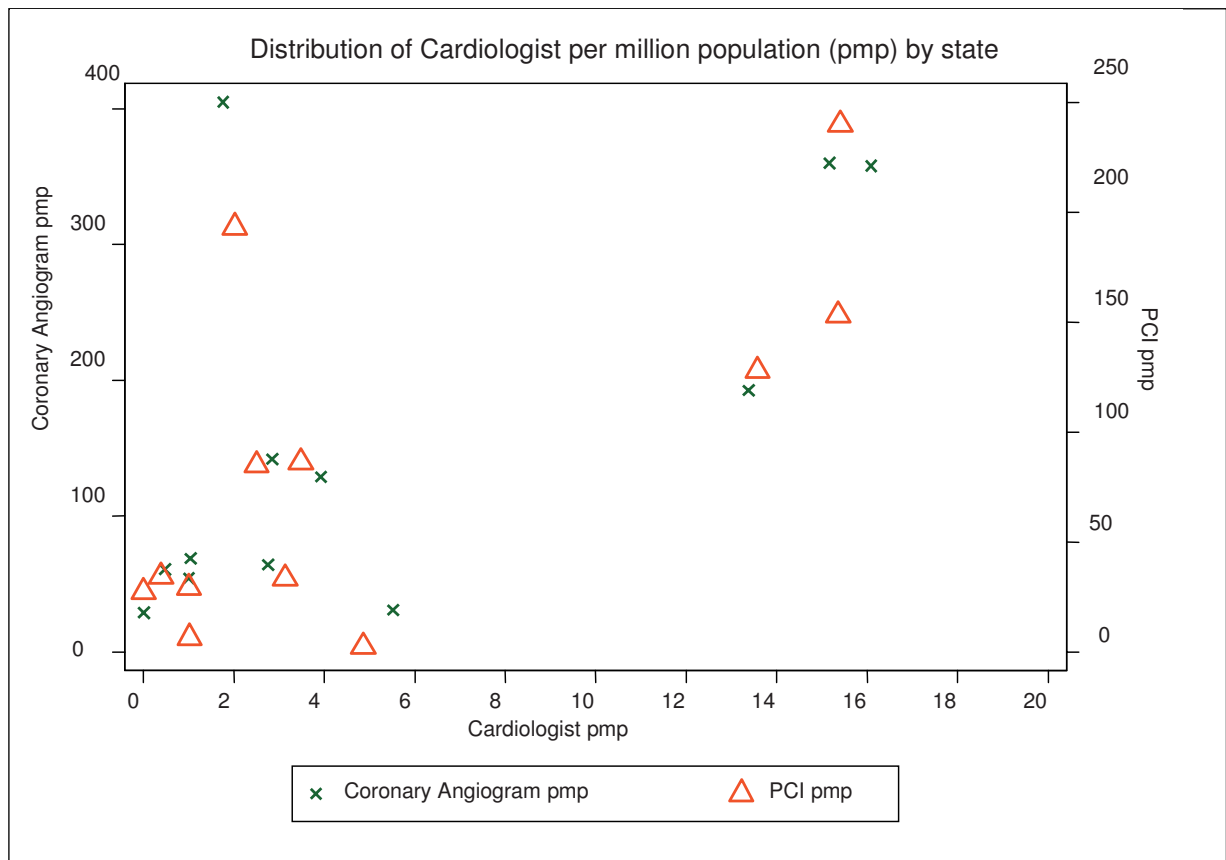
Figure 1.2 Relationship between availability of Cath Lab and provision of emergency Coronary angiogram and Percutaneous Coronary Intervention (PCI) for patients admitted with ACS in 2006
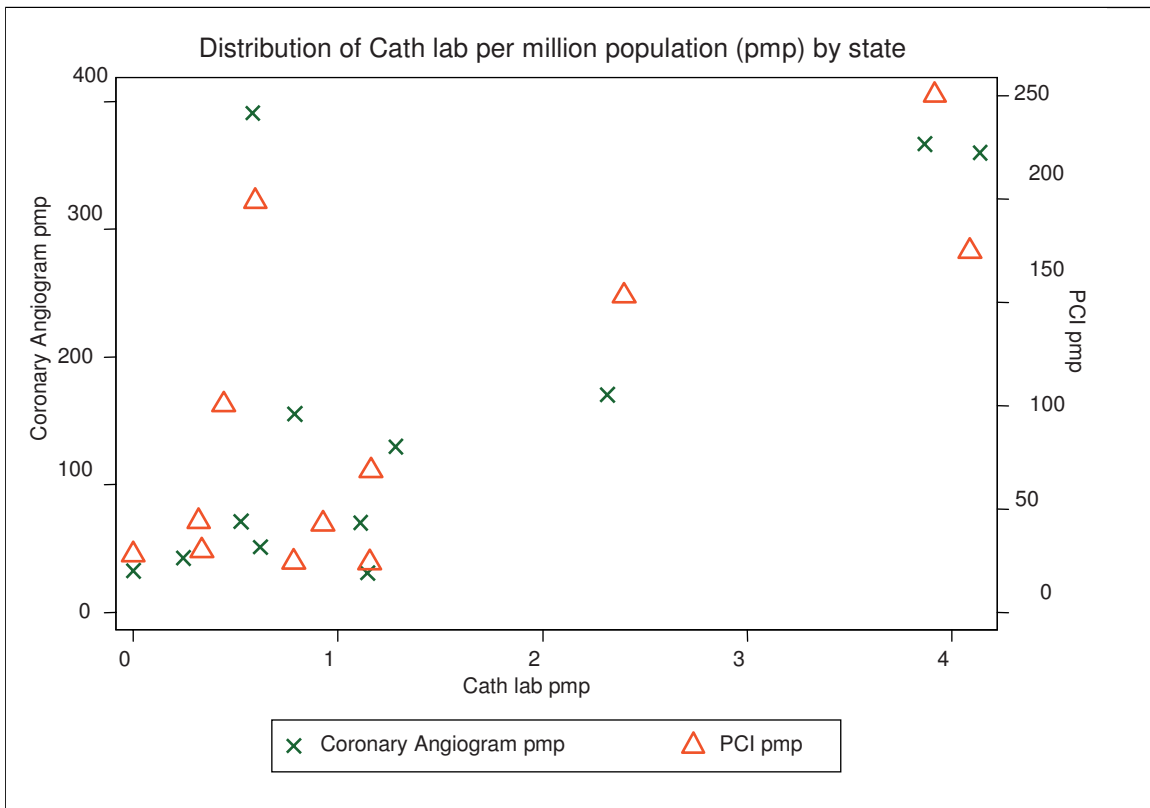

Figure 1.3 Relationship between availability of cardiac surgical services and provision of emergency CABG for patients admitted with ACS in 2006