

CHAPTER 5: OUTCOME

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Summary

1. The overall in-hospital and 30-day mortality rates remained constant at 7.4% and 9.2% respectively comparable to the last NCVD-ACS 2011 – 2013 report 7.6% and 9%).
2. STEMI remained the highest in-hospital (10.6%) and 30-day (12.3%) risk of mortality after an event. However, at 1-year post ACS, the risk of mortality for NSTEMI had doubled to be 23% higher than STEMI (17.9%).
3. Patients who received fibrinolytic therapy or PCI had better outcomes than those who did not. However, the rate had remained the same from the last report.
4. Hospitals with cardiac catheterisation facility registered lower in-hospital and 30-day mortality rates. Worryingly, the mortality rate for hospitals without cardiac catheterisation facility had worsened.
5. Advanced age, higher Killip classification, and TIMI risk score at presentation as well as diabetes were independent risk factors for poor prognosis.

Overall in-hospital and 30-day mortality

In the year 2014 and 2015, the all-cause in-hospital mortality rates were 7.5% and 7.2% respectively while the 30-day mortality rates were 9.4% and 9.0% respectively (Table 5.1). There was no obvious change in the trend of mortality across all stratum of ACS over these 2 years. In-hospital mortality for STEMI was the highest (10.6%), followed by NSTEMI (8%) and UA (1.6%). The 30-day mortality was also highest in STEMI (12.3%), followed by NSTEMI (10.9%) and UA (2.8%) (Table 5.9).

In contrast to the previous report, patients treated at PCI centres (cardiologist centre) had favourable outcomes for in-hospital and 30-day mortality (6.9% and 8.7%) compared to patients treated at non-PCI centres (physician centre) (10.5% and 12.7%) (Table 5.8). Young patients consistently showed lower rate of mortality for in-hospital and 30-day outcomes (Table 5.2). In terms of ethnic distribution, Indians and those categorised as Others ('Orang Asli' (aboriginal), various East Malaysian tribes, other Malaysian and foreigners) seemed to have better in-hospital and 30-day outcomes. (Table 5.3)

Females had a higher mortality rate compared to males, although there was a slight improvement from the previous report (9.2% for in-hospital and 11.8% for 30-day mortality rates) (Table 5.4).

Patients with traditional cardiovascular risk factors namely diabetes mellitus and hypertension expectedly had higher rate of mortality, which was also seen in the previous report (Tables 5.5, 5.6). Patients with dyslipidaemia had a lower mortality rate, but this could be due to these patients already being on some form of statin. On the other hand, non-dyslipidaemic patients could have been undiagnosed at presentation, hence having a higher mortality rate (Table 5.7).

Outcome at 1-year post ACS

In this latest NCVD-ACS Registry 2014 – 2015, we have included the mortality rates at 1-year post ACS. The overall rate of mortality at 1-year was 17.1%. Comparison with the earlier report was not possible because this data was not captured previously. The mortality rates at 1-year for NSTEMI and UA had increased significantly to 23% and 10.6% respectively compared to the 30-day outcome. The rate of mortality for STEMI was 17.9% at 1-year.

Elderly patients had the highest mortality rate at 24.9% compared to only 6.4% in the younger group. Patients treated at PCI centres (cardiologist centre) had more favourable mortality outcomes (16.5%) compared to those treated at non-PCI centres (physician centre) (21.4%) (Table 5.8). STEMI patients who received fibrinolytic therapy (16%) seemed to have better outcome compared to those who did not (19.3%). An even higher benefit was seen in STEMI patients who had PCI with mortality rate of 13.1% vs those without PCI (21.5%).

Prognostic factors for STEMI patients

Advanced age, higher Killip classification, and TIMI risk score at presentation as well as diabetes were independent risk factors for mortality in-hospital, at 30-day and at 1-year. On the other hand, Indian and other Malaysian patients who received fibrinolytic therapy, patients who underwent cardiac catheterisation, smokers, patients with positive family history of premature cardiovascular disease were found to have good prognosis (Table 5.12.1, 5.12.2, 5.12.3).

The bizarre phenomenon of the ‘smoker’s paradox’ could be explained as follows:

1. Smokers who present with STEMI were much younger.
2. Young STEMI patients tend to have less complex lesion and often single vessel disease.
3. The lesions in smokers were more ‘thrombotic’ vs ‘atherosclerotic’ in non-smokers.

Patients with positive family history of premature cardiovascular disease would have most likely received more aggressive treatment, hence having better survival.

Prognostic factors for NSTEMI / UA

We observed similar predictors of mortality in NSTEMI/UA in the STEMI cohort (Table 5.11.4, 5.11.5, 5.11.6). Patients with severe LV dysfunction in NSTEMI/UA had a higher hazard ratio (8.35) than the STEMI (3.37) at 1-year after an ACS. Similar ‘protective’ factors were also noted in NSTEMI/UA cohort with the addition of dyslipidaemia. As discussed earlier, dyslipidaemic patients were more likely to be on some form of treatment prior to the event unlike those who were non-dyslipidaemic (perhaps undiagnosed).

Table 5.1 Outcomes for patients with ACS by year, NCVD-ACS Registry, 2014 – 2015

	+Outcome	Overall outcome					
		Outcome at discharge		30-day*		1-year*	
		No.	%	No.	%	No.	%
2011 – 2013	Alive	13,633	92.3	13,440	91.0		
	Died	1,130	7.7	1,323	9.0		
2014	Alive	7,820	92.5	7,664	90.6	6,954	82.2
	Died	638	7.5	794	9.4	1,504	17.8
2015	Alive	8,642	92.8	8,473	91.0	7,783	83.6
	Died	671	7.2	840	9.0	1,530	16.4
2014 – 2015	Alive	16,462	92.6	16,137	90.8	14,737	82.9
	Died	1,309	7.4	1,634	9.2	3,034	17.1

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.2 Overall outcomes for patients with ACS by age group (years), NCVD-ACS Registry, 2014 – 2015

	+Outcome	In-hospital			30-day*			1-year*		
		Young	Middle-aged	Elderly	Young	Middle-aged	Elderly	Young	Middle-aged	Elderly
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	934 (97.5)	6,904 (95.2)	5,795 (88.5)	928 (96.9)	6,843 (94.3)	5,669 (86.5)			
	Died	24 (2.5)	350 (4.8)	756 (11.5)	30 (3.1)	411 (5.7)	882 (13.5)			
2014	Alive	545 (97.7)	3,872 (94.8)	3,403 (89.2)	541 (97.0)	3,826 (93.7)	3,297 (86.4)	526 (94.3)	3,585 (87.8)	2,843 (74.5)
	Died	13 (2.3)	212 (5.2)	413 (10.8)	17 (3.0)	258 (6.3)	519 (13.6)	32 (5.7)	499 (12.2)	973 (25.5)
2015	Alive	641 (96.1)	4,274 (95.4)	3,727 (89.4)	639 (95.8)	4,220 (94.2)	3,614 (86.7)	620 (93.0)	4,008 (89.5)	3,155 (75.7)
	Died	26 (3.9)	204 (4.6)	441 (10.6)	28 (4.2)	258 (5.8)	554 (13.3)	47 (7.0)	470 (10.5)	1,013 (24.3)
2014 – 2015	Alive	1,186 (96.8)	8,146 (95.1)	7,130 (89.3)	1,180 (96.3)	8,046 (94.0)	6,911 (86.6)	1,146 (93.6)	7,593 (88.7)	5,998 (75.1)
	Died	39 (3.2)	416 (4.9)	854 (10.7)	45 (3.7)	516 (6.0)	1,073 (13.4)	79 (6.4)	969 (11.3)	1,986 (24.9)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Note: Young is defined as age 20 to less than 40 years, middle-aged is defined as age 40 to less than 60 years and elderly is defined as 60 years and above

Table 5.3 Overall outcomes for patients with ACS by ethnicity, NCVD-ACS Registry, 2014 – 2015

Year	*Outcome	In-hospital					30-day*					1-year*						
		Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	Malay	Chinese	Indian	Others	
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 - 2013	Alive	3,837 (91.6)	1,612 (91.2)	1,491 (94.4)	880 (95.5)	3,754 (89.6)	1,570 (88.9)	1,473 (93.2)	867 (94.1)	3,360 (80.2)	1,421 (80.4)	1,344 (85.1)	829 (90.0)					
	Died	353 (8.4)	155 (8.8)	89 (5.6)	41 (4.5)	436 (10.4)	197 (11.1)	107 (6.8)	54 (5.9)	830 (19.8)	346 (19.6)	236 (14.9)	92 (10.0)					
2014	Alive	4,207 (92.1)	1,739 (92.1)	1,609 (93.8)	1,087 (95.3)	4,110 (90.0)	1,699 (90.0)	1,582 (92.2)	1,082 (94.8)	3,746 (82.0)	1,563 (82.8)	1,444 (84.1)	1,030 (90.3)					
	Died	361 (7.9)	149 (7.9)	107 (6.2)	54 (4.7)	458 (10.0)	189 (10.0)	134 (7.8)	59 (5.2)	822 (18.0)	325 (17.2)	272 (15.9)	111 (9.7)					
2014 - 2015	Alive	8,044 (91.8)	3,351 (91.7)	3,100 (94.1)	1,967 (95.4)	7,864 (89.8)	3,269 (89.4)	3,055 (92.7)	1,949 (94.5)	7,106 (81.1)	2,984 (81.6)	2,788 (84.6)	1,859 (90.2)					
	Died	714 (8.2)	304 (8.3)	196 (5.9)	95 (4.6)	894 (10.2)	386 (10.6)	241 (7.3)	113 (5.5)	1,652 (18.9)	671 (18.4)	508 (15.4)	203 (9.8)					

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.4 Overall outcomes for patients with ACS by gender, NCVD-ACS Registry, 2014 – 2015

Year	*Outcome	In-hospital				30-day*				1-year*			
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 - 2013	Alive	10,830 (93.1)	2,803 (89.7)	10,696 (91.9)	2,744 (87.8)								
	Died	808 (6.9)	322 (10.3)	942 (8.1)	381 (12.2)								
2014	Alive	6,234 (93.0)	1,586 (90.5)	6,120 (91.3)	1,544 (88.1)	5,598 (83.5)	1,356 (77.4)						
	Died	471 (7.0)	167 (9.5)	585 (8.7)	209 (11.9)	1,107 (16.5)	397 (22.6)						
2015	Alive	6,886 (93.3)	1,756 (91.0)	6,770 (91.7)	1,703 (88.3)	6,275 (85.0)	1,508 (78.2)						
	Died	498 (6.7)	173 (9.0)	614 (8.3)	226 (11.7)	1,109 (15.0)	421 (21.8)						
2014 - 2015	Alive	13,120 (93.1)	3,342 (90.8)	12,890 (91.5)	3,247 (88.2)	11,873 (84.3)	2,864 (77.8)						
	Died	969 (6.9)	340 (9.2)	1,199 (8.5)	435 (11.8)	2,216 (15.7)	818 (22.2)						

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.5 Overall outcomes for patients with ACS by pre-morbid diabetes, NCVD-ACS Registry, 2014 – 2015

	†Outcome	In-hospital			30-day*			1-year*		
		Yes	No	Not known	Yes	No	Not known	Yes	No	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	5,707 (90.8)	6,217 (93.7)	725 (91.5)	5,595 (89.0)	6,149 (92.6)	722 (91.2)			
	Died	577 (9.2)	421 (6.3)	67 (8.5)	689 (11.0)	489 (7.4)	70 (8.8)			
2014	Alive	3,345 (90.7)	3,516 (94.1)	419 (91.7)	3,267 (88.6)	3,450 (92.3)	410 (89.7)	2,856 (77.5)	3,207 (85.8)	378 (82.7)
	Died	342 (9.3)	220 (5.9)	38 (8.3)	420 (11.4)	286 (7.7)	47 (10.3)	831 (22.5)	529 (14.2)	79 (17.3)
2015	Alive	3,641 (91.2)	3,952 (94.1)	452 (90.9)	3,545 (88.8)	3,894 (92.7)	442 (88.9)	3,134 (78.5)	3,659 (87.1)	420 (84.5)
	Died	350 (8.8)	250 (5.9)	45 (9.1)	446 (11.2)	308 (7.3)	55 (11.1)	857 (21.5)	543 (12.9)	77 (15.5)
2014 – 2015	Alive	6,986 (91.0)	7,468 (94.1)	871 (91.3)	6,812 (88.7)	7,344 (92.5)	852 (89.3)	5,990 (78.0)	6,866 (86.5)	798 (83.6)
	Died	692 (9.0)	470 (5.9)	83 (8.7)	866 (11.3)	594 (7.5)	102 (10.7)	1,688 (22.0)	1,072 (13.5)	156 (16.4)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.6 Overall outcomes for patients with ACS by pre-morbid hypertension, NCVD-ACS Registry, 2014 – 2015

	†Outcome	In-hospital			30-day*			1-year*		
		Yes	No	Not known	Yes	No	Not known	Yes	No	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	8,199 (91.4)	3,973 (94.1)	562 (92.9)	8,054 (89.7)	3,935 (93.2)	560 (92.6)			
	Died	775 (8.6)	249 (5.9)	43 (7.1)	920 (10.3)	287 (6.8)	45 (7.4)			
2014	Alive	4,729 (92.0)	2,290 (93.5)	346 (91.1)	4,613 (89.7)	2,258 (92.2)	341 (89.7)	4,090 (79.6)	2,116 (86.4)	316 (83.2)
	Died	412 (8.0)	159 (6.5)	34 (8.9)	528 (10.3)	191 (7.8)	39 (10.3)	1,051 (20.4)	333 (13.6)	64 (16.8)
2015	Alive	5,237 (92.3)	2,487 (93.6)	393 (89.5)	5,118 (90.2)	2,447 (92.1)	389 (88.6)	4,610 (81.3)	2,301 (86.6)	370 (84.3)
	Died	434 (7.7)	171 (6.4)	46 (10.5)	553 (9.8)	211 (7.9)	50 (11.4)	1,061 (18.7)	357 (13.4)	69 (15.7)
2014 – 2015	Alive	9,966 (92.2)	4,777 (93.5)	739 (90.2)	9,731 (90.0)	4,705 (92.1)	730 (89.1)	8,700 (80.5)	4,417 (86.5)	686 (83.8)
	Died	846 (7.8)	330 (6.5)	80 (9.8)	1,081 (10.0)	402 (7.9)	89 (10.9)	2,112 (19.5)	690 (13.5)	133 (16.2)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.7 Overall outcomes for patients with ACS by pre-morbid dyslipidaemia, NCVd-ACS Registry, 2014 – 2015

	+Outcome	In-hospital			30-day*			1-year*		
		Yes	No	Not known	Yes	No	Not known	Yes	No	Not known
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	4,733 (92.8)	6,385 (92.3)	1,448 (90.9)	4,671 (91.6)	6,279 (90.7)	1,434 (90.0)			
	Died	367 (7.2)	535 (7.7)	145 (9.1)	429 (8.4)	641 (9.3)	159 (10.0)			
2014	Alive	2,797 (94.3)	3,662 (91.6)	750 (89.5)	2,745 (92.6)	3,586 (89.7)	726 (86.6)	2,456 (82.8)	3,265 (81.7)	659 (78.6)
	Died	168 (5.7)	335 (8.4)	88 (10.5)	220 (7.4)	411 (10.3)	112 (13.4)	509 (17.2)	732 (18.3)	179 (21.4)
2015	Alive	3,217 (94.3)	4,138 (92.1)	696 (88.3)	3,161 (92.7)	4,046 (90.0)	682 (86.5)	2,881 (84.5)	3,715 (82.7)	636 (80.7)
	Died	193 (5.7)	356 (7.9)	92 (11.7)	249 (7.3)	448 (10.0)	106 (13.5)	529 (15.5)	779 (17.3)	152 (19.3)
2014 – 2015	Alive	6,014 (94.3)	7,800 (91.9)	1,446 (88.9)	5,906 (92.6)	7,632 (89.9)	1,408 (86.6)	5,337 (83.7)	6,980 (82.2)	1,295 (79.6)
	Died	361 (5.7)	691 (8.1)	180 (11.1)	469 (7.4)	859 (10.1)	218 (13.4)	1,038 (16.3)	1,511 (17.8)	331 (20.4)

+ The outcome data is derived based on data matching with the National Death Register
 *Includes patients who died in-hospital

Table 5.8 Overall outcomes for patients by types of centre, NCVd-ACS Registry, 2014 – 2015

	+Outcome	In-hospital		30-day*		1-year*	
		PCI centre	Non-PCI centre	PCI centre	Non-PCI centre	PCI centre	Non-PCI centre
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	11,238 (92.3)	2,395 (92.4)	11,064 (90.9)	2,376 (91.7)		
	Died	934 (7.7)	196 (7.6)	1,108 (9.1)	215 (8.3)		
2014	Alive	6,873 (92.7)	947 (90.9)	6,741 (90.9)	923 (88.6)	6,130 (82.7)	824 (79.1)
	Died	543 (7.3)	95 (9.1)	675 (9.1)	119 (11.4)	1,286 (17.3)	218 (20.9)
2015	Alive	7,593 (93.4)	1,049 (88.4)	7,450 (91.7)	1,023 (86.2)	6,854 (84.3)	929 (78.3)
	Died	533 (6.6)	138 (11.6)	676 (8.3)	164 (13.8)	1,272 (15.7)	258 (21.7)
2014 – 2015	Alive	14,466 (93.1)	1,996 (89.5)	14,191 (91.3)	1,946 (87.3)	12,984 (83.5)	1,753 (78.6)
	Died	1,076 (6.9)	233 (10.5)	1,351 (8.7)	283 (12.7)	2,558 (16.5)	476 (21.4)

+ The outcome data is derived based on data matching with the National Death Register
 * Includes patients who died in-hospital

Table 5.9 Overall outcomes for patients with ACS by ACS stratum, NCDV-ACS Registry, 2014 – 2015

	+ Outcome	In-hospital			30-day*			1-year*		
		STEMI	NSTEMI	UA	STEMI	NSTEMI	UA	STEMI	NSTEMI	UA
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	6,705 (89.4)	3,550 (92.4)	3,378 (98.8)	6,617 (88.2)	3,486 (90.7)	3,337 (97.6)			
	Died	797 (10.6)	292 (7.6)	41 (1.2)	885 (11.8)	356 (9.3)	82 (2.4)			
2014	Alive	3,465 (89.2)	1,875 (91.5)	2,480 (98.3)	3,403 (87.6)	1,811 (88.4)	2,450 (97.1)	3,154 (81.2)	1,534 (74.9)	2,266 (89.8)
	Died	421 (10.8)	174 (8.5)	43 (1.7)	483 (12.4)	238 (11.6)	73 (2.9)	732 (18.8)	515 (25.1)	257 (10.2)
2015	Alive	3,857 (89.6)	2,244 (92.3)	2,541 (98.5)	3,783 (87.9)	2,182 (89.8)	2,508 (97.2)	3,573 (83.0)	1,916 (78.8)	2,294 (88.9)
	Died	447 (10.4)	186 (7.7)	38 (1.5)	521 (12.1)	248 (10.2)	71 (2.8)	731 (17.0)	514 (21.2)	285 (11.1)
2014 – 2015	Alive	7,322 (89.4)	4,119 (92.0)	5,021 (98.4)	7,186 (87.7)	3,993 (89.1)	4,958 (97.2)	6,727 (82.1)	3,450 (77.0)	4,560 (89.4)
	Died	868 (10.6)	360 (8.0)	81 (1.6)	1,004 (12.3)	486 (10.9)	144 (2.8)	1,463 (17.9)	1,029 (23.0)	542 (10.6)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.10.1 Overall outcomes for patients with STEMI by fibrinolytic therapy, NCDV-ACS Registry, 2014 – 2015

	+ Outcome	Fibrinolytic therapy					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	4,954 (90.3)	1,595 (86.8)	4,900 (89.3)	1,565 (85.2)		
	Died	533 (9.7)	242 (13.2)	587 (10.7)	272 (14.8)		
2014	Alive	1,650 (91.4)	1,800 (87.4)	1,621 (89.8)	1,766 (85.8)	1,514 (83.8)	1,626 (79.0)
	Died	156 (8.6)	259 (12.6)	185 (10.2)	293 (14.2)	292 (16.2)	433 (21.0)
2015	Alive	1,685 (90.5)	2,150 (88.9)	1,654 (88.9)	2,107 (87.1)	1,565 (84.1)	1,988 (82.2)
	Died	176 (9.5)	268 (11.1)	207 (11.1)	311 (12.9)	296 (15.9)	430 (17.8)
2014 – 2015	Alive	3,335 (90.9)	3,950 (88.2)	3,275 (89.3)	3,873 (86.5)	3,079 (84.0)	3,614 (80.7)
	Died	332 (9.1)	527 (11.8)	392 (10.7)	604 (13.5)	588 (16.0)	863 (19.3)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.10.2 Overall outcomes for patients with STEMI by percutaneous coronary intervention at admission, NCVD-ACS Registry, 2014 – 2015

	†Outcome	Percutaneous coronary intervention (PCI)					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	2,045 (92.2)	3,854 (87.8)	2,011 (90.7)	3,813 (86.8)		
	Died	173 (7.8)	537 (12.2)	207 (9.3)	578 (13.2)		
2014	Alive	1,282 (89.8)	1,948 (88.3)	1,270 (89.0)	1,900 (86.2)	1,205 (84.4)	1,734 (78.6)
	Died	145 (10.2)	257 (11.7)	157 (11.0)	305 (13.8)	222 (15.6)	471 (21.4)
2015	Alive	1,654 (93.9)	1,908 (86.1)	1,632 (92.7)	1,863 (84.0)	1,565 (88.9)	1,736 (78.3)
	Died	107 (6.1)	309 (13.9)	129 (7.3)	354 (16.0)	196 (11.1)	481 (21.7)
2014 – 2015	Alive	2,936 (92.1)	3,856 (87.2)	2,902 (91.0)	3,763 (85.1)	2,770 (86.9)	3,470 (78.5)
	Died	252 (7.9)	566 (12.8)	286 (9.0)	659 (14.9)	418 (13.1)	952 (21.5)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.10.3 Overall outcomes for patients with STEMI by coronary artery bypass graft at admission, NCVD-ACS Registry, 2014 – 2015

	†Outcome	Coronary artery bypass graft (CABG)					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	64 (97.0)	5,559 (89.3)	63 (95.5)	5,483 (88.0)		
	Died	2 (3.0)	669 (10.7)	3 (4.5)	745 (12.0)		
2014	Alive	27 (90.0)	3,145 (88.9)	26 (86.7)	3,088 (87.3)	24 (80.0)	2,862 (80.9)
	Died	3 (10.0)	394 (11.1)	4 (13.3)	451 (12.7)	6 (20.0)	677 (19.1)
2015	Alive	36 (92.3)	3,573 (89.6)	35 (89.7)	3,508 (88.0)	31 (79.5)	3,323 (83.3)
	Died	3 (7.7)	414 (10.4)	4 (10.3)	479 (12.0)	8 (20.5)	664 (16.7)
2014 – 2015	Alive	63 (91.3)	6,718 (89.3)	61 (88.4)	6,596 (87.6)	55 (79.7)	6,185 (82.2)
	Died	6 (8.7)	808 (10.7)	8 (11.6)	930 (12.4)	14 (20.3)	1,341 (17.8)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.10.4 Overall outcomes for patients with STEMI by pre-admission aspirin use, NCVd-ACS Registry, 2014 – 2015

	*Outcome	STEMI by pre-admission aspirin use					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	1,247 (87.2)	5,142 (90.1)	1,227 (85.8)	5,074 (88.9)		
	Died	183 (12.8)	565 (9.9)	203 (14.2)	633 (11.1)		
2014	Alive	606 (88.7)	2,743 (89.2)	600 (87.8)	2,691 (87.5)	537 (78.6)	2,516 (81.8)
	Died	77 (11.3)	333 (10.8)	83 (12.2)	385 (12.5)	146 (21.4)	560 (18.2)
2015	Alive	623 (87.5)	3,143 (90.2)	602 (84.6)	3,091 (88.7)	549 (77.1)	2,940 (84.4)
	Died	89 (12.5)	340 (9.8)	110 (15.4)	392 (11.3)	163 (22.9)	543 (15.6)
2014 – 2015	Alive	1,229 (88.1)	5,886 (89.7)	1,202 (86.2)	5,782 (88.2)	1,086 (77.8)	5,456 (83.2)
	Died	166 (11.9)	673 (10.3)	193 (13.8)	777 (11.8)	309 (22.2)	1,103 (16.8)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.11.1 Overall outcomes for patients with NSTEMI/UA by percutaneous coronary intervention at admission, NCVd-ACS Registry, 2014 – 2015

	*Outcome	Percutaneous coronary intervention (PCI)					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	950 (96.8)	4,743 (94.7)	943 (96.1)	4,659 (93.0)		
	Died	31 (3.2)	266 (5.3)	38 (3.9)	350 (7.0)		
2014	Alive	582 (98.0)	3,522 (95.2)	572 (96.3)	3,443 (93.1)	534 (89.9)	3,054 (82.6)
	Died	12 (2.0)	177 (4.8)	22 (3.7)	256 (6.9)	60 (10.1)	645 (17.4)
2015	Alive	801 (97.7)	3,733 (95.2)	790 (96.3)	3,653 (93.1)	751 (91.6)	3,234 (82.5)
	Died	19 (2.3)	189 (4.8)	30 (3.7)	269 (6.9)	69 (8.4)	688 (17.5)
2014 – 2015	Alive	1,383 (97.8)	7,255 (95.2)	1,362 (96.3)	7,096 (93.1)	1,285 (90.9)	6,288 (82.5)
	Died	31 (2.2)	366 (4.8)	52 (3.7)	525 (6.9)	129 (9.1)	1,333 (17.5)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.11.2 Overall outcomes for patients with NSTEMI/UA by coronary artery bypass graft at admission, NCVD-ACS Registry, 2014 – 2015

	*Outcome	Coronary artery bypass graft (CABG)					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	123 (93.2)	5,406 (95.2)	123 (93.2)	5,306 (93.4)		
	Died	9 (6.8)	273 (4.8)	9 (6.8)	373 (6.6)		
2014	Alive	82 (98.8)	4,008 (95.5)	81 (97.6)	3,920 (93.4)	80 (96.4)	3,492 (83.2)
	Died	1 (1.2)	187 (4.5)	2 (2.4)	275 (6.6)	3 (3.6)	703 (16.8)
2015	Alive	67 (98.5)	4,482 (95.5)	68 (100.0)	4,387 (93.5)	64 (94.1)	3,932 (83.8)
	Died	1 (1.5)	209 (4.5)	0 (0)	304 (6.5)	4 (5.9)	759 (16.2)
2014 – 2015	Alive	149 (98.7)	8,490 (95.5)	149 (98.7)	8,307 (93.5)	144 (95.4)	7,424 (83.5)
	Died	2 (1.3)	396 (4.5)	2 (1.3)	579 (6.5)	7 (4.6)	1,462 (16.5)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.11.3 Overall outcomes for patients with NSTEMI/UA by pre-admission aspirin use, NCVD-ACS Registry, 2014 – 2015

	*Outcome	Pre-admission aspirin use					
		In-hospital		30-day*		1-year*	
		Yes	No	Yes	No	Yes	No
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
2011 – 2013	Alive	3,419 (96.5)	3,077 (94.4)	3,362 (94.9)	3,031 (93.0)		
	Died	125 (3.5)	181 (5.6)	182 (5.1)	227 (7.0)		
2014	Alive	2,424 (96.4)	1,778 (93.7)	2,376 (94.5)	664 (16.2)	2,107 (83.8)	1,568 (82.7)
	Died	90 (3.6)	119 (6.3)	138 (5.5)	161 (8.5)	407 (16.2)	329 (17.3)
2015	Alive	2,571 (96.4)	2,074 (94.5)	2,515 (94.3)	2,037 (92.8)	2,230 (83.6)	1,860 (84.7)
	Died	96 (3.6)	121 (5.5)	152 (5.7)	158 (7.2)	437 (16.4)	335 (15.3)
2014 – 2015	Alive	4,995 (96.4)	3,852 (94.1)	4,891 (94.4)	3,773 (92.2)	4,337 (83.7)	3,428 (83.8)
	Died	186 (3.6)	240 (5.9)	290 (5.6)	319 (7.8)	844 (16.3)	664 (16.2)

+ The outcome data is derived based on data matching with the National Death Register

* Includes patients who died in-hospital

Table 5.12.1 Prognostic factors for death in hospital among STEMI patients, NCVd-ACS Registry, 2014 – 2015 (Multivariable Analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	623	1.00			
40 – < 60	3,680	1.05	0.70	1.57	0.831
≥ 60	2,452	1.57	1.05	2.36	0.028
Gender					
Male (ref)	5,843				
Female	912				
*Ethnic group					
Malay (ref)	3,699				
Chinese	1,120				
Indian	1,144				
Others	792				
Killip classification					
I (ref)	4,182	1.00			
II	1,152	1.13	0.87	1.46	0.376
III	277	1.80	1.32	2.47	< 0.001
IV	961	4.25	3.42	5.27	< 0.001
Not stated/inadequately described/missing	183	1.19	0.69	2.07	0.526
Percutaneous coronary intervention					
No (ref)	3,929				
Yes	2,826				
Cardiac catheterisation					
No (ref)	3,314	1.00			
Yes	3,441	0.64	0.55	0.75	< 0.001
TIMI risk score					
0 – 2 (ref)	2,141	1.00			
3 – 4	2,109	2.92	1.86	4.59	< 0.001
5 – 7	1,965	5.90	3.76	9.24	< 0.001
> 7	540	8.02	4.97	12.96	< 0.001
Fibrinolytic therapy					
Not given (ref)	2,183	1.00			
Given	4,572	0.78	0.67	0.91	0.002

Factors	N	Hazard ratio	95% CI		^p-value
Smoking					
Never (ref)	2,044	1.00			
Former (quit > 30 days)	1,046	0.92	0.75	1.14	0.443
Current (any tobacco use within last 30 days)	3,425	0.73	0.61	0.88	0.001
Unknown	240	1.32	1.01	1.72	0.040
Family history of premature cardiovascular disease					
No (ref)	5,020	1.00			
Yes	800	0.71	0.50	1.00	0.051
Unknown	935	1.32	1.10	1.60	0.004
Dyslipidaemia					
No (ref)	4,148				
Yes	1,643				
Unknown	964				
Hypertension					
No (ref)	2,734				
Yes	3,478				
Unknown	543				
Diabetes					
No (ref)	3,594	1.00			
Yes	2,584	1.25	1.06	1.46	0.006
Unknown	577	1.17	0.89	1.56	0.262
Heart failure					
No (ref)	6,352				
Yes	138				
Unknown	265				

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
 ^ using Cox regression with backward stepwise variable selection

Table 5.12.2 Prognostic factors for death within 30 days among STEMI patients, NCVD-ACS Registry, 2014 – 2015 (Multivariable analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	623	1.00			
40 – < 60	3,680	1.14	0.78	1.67	0.490
≥ 60	2,452	1.66	1.13	2.43	0.010
Gender					
Male (ref)	5,843				
Female	912				
*Ethnic group					
Malay (ref)	3,699	1.00			
Chinese	1,120	1.02	0.85	1.22	0.836
Indian	1,144	0.78	0.64	0.96	0.018
Others	792	0.69	0.52	0.93	0.013
Killip classification code					
I (ref)	4,182	1.00			
II	1,152	1.26	1.00	1.59	0.049
III	277	2.06	1.55	2.74	< 0.001
IV	961	4.61	3.78	5.63	< 0.001
Not stated/inadequately described	183	1.88	1.21	2.93	0.005
Percutaneous coronary intervention					
No (ref)	3,929				
Yes	2,826				
Cardiac catheterisation					
No (ref)	3,314	1.00			
Yes	3,441	0.64	0.55	0.74	< 0.001
TIMI risk score					
0 – 2 (ref)	2,141	1.00			
3 – 4	2,109	2.95	2.01	4.33	< 0.001
5 – 7	1,965	6.09	4.16	8.93	< 0.001
> 7	540	9.02	5.95	13.67	< 0.001
Fibrinolytic therapy					
Not given (ref)	2,183	1.00			
Given	4,572	0.77	0.66	0.89	< 0.001

Factors	N	Hazard ratio	95% CI		[^] p-value
Smoking					
Never (ref)	2,044	1.00			
Former (quit > 30 days)	1,046	0.86	0.71	1.05	0.149
Current (any tobacco use within last 30 days)	3,425	0.70	0.59	0.82	< 0.001
Unknown	240	1.34	1.04	1.72	0.022
Family history of premature cardiovascular disease					
No (ref)	5,020	1.00			
Yes	800	0.76	0.57	1.03	0.079
Unknown	935	1.33	1.11	1.58	0.002
Dyslipidaemia					
No (ref)	4,148				
Yes	1,643				
Unknown	964				
Hypertension					
No (ref)	2,734				
Yes	3,478				
Unknown	543				
Diabetes					
No (ref)	3,594	1.00			
Yes	2,584	1.36	1.18	1.58	< 0.001
Unknown	577	1.28	0.99	1.66	0.058
Heart failure					
No (ref)	6,352				
Yes	138				
Unknown	265				

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
[^] using Cox regression with backward stepwise variable selection

Table 5.12.3 Prognostic factors for death within one year among STEMI patients, NCVS-ACS Registry, 2014 – 2015 (Multivariable analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	623	1.00			
40 – < 60	3,680	1.22	0.89	1.66	0.212
≥ 60	2,452	1.75	1.28	2.40	0.000
Gender					
Male (ref)	5,843				
Female	912				
*Ethnic group					
Malay (ref)	3,699	1.00			
Chinese	1,120	0.98	0.85	1.14	0.803
Indian	1,144	0.81	0.69	0.95	0.009
Others	792	0.60	0.47	0.78	< 0.001
Killip classification code					
I (ref)	4,182	1.00			
II	1,152	1.26	1.06	1.50	0.010
III	277	1.88	1.50	2.37	< 0.001
IV	961	3.37	2.87	3.97	< 0.001
Not stated/inadequately described	183	1.59	1.12	2.27	0.010
Percutaneous coronary intervention					
No (ref)	3,929	1.00			
Yes	2,826	0.81	0.66	1.00	0.048
Cardiac catheterisation					
No (ref)	3,314	1.00			
Yes	3,441	0.76	0.62	0.92	0.005
TIMI risk score					
0 – 2 (ref)	2,141	1.00			
3 – 4	2,109	2.36	1.84	3.04	< 0.001
5 – 7	1,965	4.16	3.22	5.37	< 0.001
> 7	540	6.22	4.64	8.34	< 0.001
Fibrinolytic therapy					
Not given (ref)	2,183	1.00			
Given	4,572	0.75	0.67	0.85	< 0.001

Factors	N	Hazard ratio	95% CI		[^] p-value
Smoking					
Never (ref)	2,044	1.00			
Former (quit > 30 days)	1,046	0.84	0.71	0.98	0.032
Current (any tobacco use within last 30 days)	3,425	0.68	0.60	0.78	< 0.001
Unknown	240	1.21	0.96	1.52	0.103
Family history of premature cardiovascular disease					
No (ref)	5,020	1.00			
Yes	800	0.73	0.57	0.92	0.008
Unknown	935	1.21	1.04	1.41	0.013
Dyslipidaemia					
No (ref)	4,148				
Yes	1,643				
Unknown	964				
Hypertension					
No (ref)	2,734				
Yes	3,478				
Unknown	543				
Diabetes					
No (ref)	3,594	1.00			
Yes	2,584	1.43	1.27	1.61	< 0.001
Unknown	577	1.18	0.94	1.47	0.154
Heart failure					
No (ref)	6,352				
Yes	138				
Unknown	265				

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
[^] using Cox regression with backward stepwise variable selection

Table 5.12.4 Prognostic factors for death in hospital among NSTEMI/UA patients, NCVS-ACS Registry, 2014 – 2015 (Multivariable analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	342	1.00			
40 – < 60	3,317	2.03	0.75	5.53	0.166
≥ 60	4,271	3.37	1.25	9.07	0.016
Gender					
Male (ref)	5,741				
Female	2,189				
*Ethnic group					
Malay (ref)	3,525				
Chinese	1,974				
Indian	1,647				
Others	784				
Killip classification code					
I (ref)	3,796	1.00			
II	749	2.95	2.10	4.13	< 0.001
III	342	4.48	3.16	6.36	< 0.001
IV	218	12.18	8.96	16.56	< 0.001
Not stated/inadequately described	2,825	0.96	0.69	1.33	0.802
Percutaneous coronary intervention					
No (ref)	6,712				
Yes	1,218				
Cardiac catheterisation					
No (ref)	5,767	1.00			
Yes	2,163	0.44	0.32	0.60	< 0.001
TIMI risk score					
0 – 2 (ref)	2,040				
3 – 4	5,193				
5 – 7	697				
Smoking					
Never (ref)	3,297				
Former (quit > 30 days)	1,874				
Current (any tobacco use within last 30 days)	1,789				
Unknown	301				

Factors	N	Hazard ratio	95% CI		[^] p-value
Family history of premature cardiovascular disease					
No (ref)	4,924				
Yes	993				
Unknown	1,344				
Dyslipidaemia					
No (ref)	3,671	1.00			
Yes	3,844	0.75	0.60	0.93	0.008
Unknown	415	1.02	0.70	1.49	0.923
Hypertension					
No (ref)	1,928				
Yes	5,840				
Unknown	162				
Diabetes					
No (ref)	3,677				
Yes	4,014				
Unknown	239				
Heart failure					
No (ref)	7,048				
Yes	653				
Unknown	229				

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
[^] using Cox regression with backward stepwise variable selection

Table 5.12.5 Prognostic factors for death within 30 days among NSTEMI/UA patients, NCVDA-ACS Registry, 2014 – 2015 (Multivariable analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	342	1.00			
40 – < 60	3,317	1.74	0.81	3.73	0.155
≥ 60	4,271	3.23	1.52	6.87	0.002
Gender					
Male (ref)	5,741				
Female	2,189				
*Ethnic group					
Malay (ref)	3,525				
Chinese	1,974				
Indian	1,647				
Others	784				
Killip classification code					
I (ref)	3,796	1.00			
II	749	3.16	2.43	4.13	< 0.001
III	342	5.02	3.74	6.73	< 0.001
IV	218	17.30	13.39	22.35	< 0.001
Not stated/inadequately described	2,825	1.15	0.90	1.47	0.254
Percutaneous coronary intervention					
No (ref)	6,712				
Yes	1,218				
Cardiac catheterisation					
No (ref)	5,767	1.00			
Yes	2,163	0.62	0.49	0.78	< 0.001
TIMI risk score					
0 – 2 (ref)	2,040				
3 – 4	5,193				
5 – 7	697				
Smoking					
Never (ref)	3,855	1.00			
Former (quit > 30 days)	1,736	1.06	0.86	1.31	0.588
Current (any tobacco use within last 30 days)	1,942	0.82	0.65	1.03	0.092
Unknown	397	1.40	1.01	1.94	0.046

Factors	N	Hazard ratio	95% CI		^p-value
Family history of premature cardiovascular disease					
No (ref)	6,094				
Yes	966				
Unknown	870				
Dyslipidaemia					
No (ref)	3,671	1.00			
Yes	3,844	0.73	0.61	0.88	0.001
Unknown	415	1.18	0.86	1.62	0.317
Hypertension					
No (ref)	1,928				
Yes	5,840				
Unknown	162				
Diabetes					
No (ref)	3,677				
Yes	4,014				
Unknown	239				
Heart failure					
No (ref)	7,048				
Yes	653				
Unknown	229				

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
 ^ using Cox regression with backward stepwise variable selection

Table 5.12.6 Prognostic factors for death within one year among NSTEMI/UA patients, NCVDA-ACS Registry, 2014 – 2015 (Multivariable analysis)

Factors	N	Hazard ratio	95% CI		[^] p-value
Age group, years					
20 – < 40 (ref)	342	1.00			
40 – < 60	3,317	1.82	1.11	2.97	0.017
≥ 60	4,271	3.40	2.08	5.54	< 0.001
Gender					
Male (ref)	5,741				
Female	2,189				
*Ethnic group					
Malay (ref)	3,525	1.00			
Chinese	1,974	0.89	0.78	1.02	0.093
Indian	1,647	0.80	0.69	0.92	0.002
Others	784	0.69	0.54	0.87	0.002
Killip classification code					
I (ref)	3,796	1.00			
II	749	2.45	2.08	2.89	< 0.001
III	342	3.11	2.54	3.80	< 0.001
IV	218	8.35	6.86	10.18	< 0.001
Not stated/inadequately described	2,825	1.20	1.05	1.38	0.008
Percutaneous coronary intervention					
No (ref)	6,712	1.00			
Yes	1,218	0.73	0.57	0.94	0.015
Cardiac catheterisation					
No (ref)	5,767	1.00			
Yes	2,163	0.77	0.64	0.93	0.007
TIMI risk score					
0 – 2 (ref)	2,040	1.00			
3 – 4	5,193	1.20	1.03	1.40	0.020
5 – 7	697	1.43	1.14	1.79	0.002
Smoking					
Never (ref)	3,855	1.00			
Former (quit > 30 days)	1,736	1.05	0.91	1.20	0.508
Current (any tobacco use within last 30 days)	1,942	1.02	0.88	1.18	0.827
Unknown	397	1.48	1.20	1.83	< 0.001

Factors	N	Hazard ratio	95% CI		^p-value
Family history of premature cardiovascular disease					
No (ref)	6,094	1.00			
Yes	966	0.79	0.64	0.96	0.019
Unknown	870	1.11	0.93	1.32	0.235
Dyslipidaemia					
No (ref)	3,671	1.00			
Yes	3,844	0.75	0.66	0.84	< 0.001
Unknown	415	1.05	0.81	1.37	0.710
Hypertension					
No (ref)	1,928	1.00			
Yes	5,840	1.14	0.98	1.32	0.100
Unknown	162	2.08	1.12	3.84	0.020
Diabetes					
No (ref)	3,677	1.00			
Yes	4,014	1.30	1.15	1.47	< 0.001
Unknown	239	0.67	0.39	1.15	0.150
Heart failure					
No (ref)	7,048	1.00			
Yes	653	1.31	1.12	1.54	< 0.001
Unknown	229	0.86	0.62	1.20	0.388

* 'Others' includes Orang Asli, Kadazan, Melanau, Murut, Bajau, Bidayuh, Iban, other Malaysian and Foreigner
 ^ using Cox regression with backward stepwise variable selection