UNIT NO. 1

THE BURDEN OF CARDIOVASCULAR DISEASE IN SINGAPORE

A/Prof Goh Lee Gan

ABSTRACT

The burden of cardiovascular disease in Singapore is sizeable. In 2008, coronary artery disease (CAD) accounted for 20.1% of all deaths, and resulted in 3.5% of all admissions to hospital. A global assessment of cardiovascular risk in asymptomatic people is the first step in prevention. The Northern California experience has shown that it is possible to achieve a relative reduction of 24% in acute myocardial infarction, despite increasing prevalence of obesity and diabetes. In asymptomatic people, key cardiovascular risk factors to correct are smoking, hypertension, and hyperlipidemia. In the Singapore setting, it has been found that in people under 45, the risk factors which tend to be under-treated are hypertension and hyperlipidemia.

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BACKGROUND

Global burden

Cardiovascular disease is a global disease burden. Not only is it the leading cause of death in the world, it also contributes to almost one third (29%) of global deaths. (Mendis, 2010; WHO, 2008)[1,2]. Cardiovascular disease can be thought of as a continuum that begins with the presence of cardiovascular risk factors and proceeds via progressive vascular disease to target organ damage, end-organ failure, and death. (Dahlof, 2010)[3].

This continuum can be seen to be made up of adverse lifestyle risk factors (smoking, physical inactivity, atherogenic diet, and excessive alcohol consumption); the high risk diseases (hypertension, diabetes, hyperlipidemia, and obesity), and the target organ damage. The inter-relationships are shown in Figure 1. The risk factors and high risk diseases together contribute to more than 90 percent of myocardial infarctions. (Yusuf, 2004)[4].

Primary prevention

Two concepts of disease control and health promotion arise out of the cardiovascular disease continuum: first, intervention anywhere along the chain of events can disrupt the pathophysiological process and thus confer cardiovascular protection; and second, because many of the cardiovascular events share the same etiology, it is essential to assess and treat an asymptomatic patient's total cardiovascular risks rather than to consider his or her risk factors singly. (Dahlof, 2010)[3].

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The world has come a long way in understanding where we should direct our preventive efforts in cardiovascular disease. (Mendis, 2010)[1]. In the 1960s, the Framingham Heart Study was a trail-blazer in setting up the global assessment framework which is still in use, although there are some addition of risk factors and refinements in the global risk computation. In 2002, WHO conducted a global study to quantify some of the most important risks to health and assess the cost effectiveness of intervention to address them. The list of 26 factors included cardiovascular factors. The findings of this survey indicated that more than three quarters of the global CVD burden was due to just 3 established risk factors: tobacco, blood pressure, cholesterol, or a combination of the 3. (WHO, 2002)[5].

More recently, the INTERHEART study (Yusuf, 2004)[4] established a large standardized care-control study of acute myocardial infarction to 52 low- and middle-income countries. It has provided evidence that 5 established risk factors (tobacco use, lipids, hypertension, diabetes, and obesity) predict approximately 80% of the population attributable risk of acute myocardial infarction.

The WHO estimates published in 2009 show that 8 preventable risk factors (tobacco, physical inactivity, raised blood pressure, alcohol use, high body mass index, and low fruit and vegetable intake) account for 61% of total CVD deaths. (WHO, 2009)[6].

Secondary prevention

For individuals who have had a CAD event, prevention of further events continue to be important. The recommendations on lifestyle and dietary factors to improve prognosis in these patients are shown in Table 1. (Iestra, 2005)[7]. Some modifications in accordance to local dietary guidelines may be needed.

Effect size

The approximate mortality reduction potential of lifestyle and dietary changes estimated from studies in CAD patients (secondary prevention) and the general population (primary prevention) are shown in Table 2.

Fig 1. Major Risk Factors for CVD

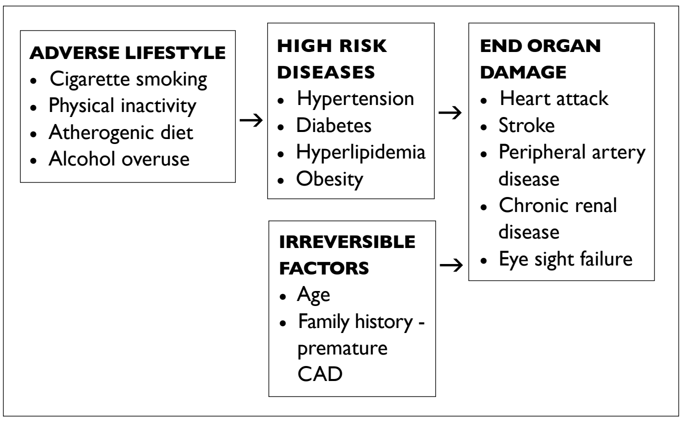


Table 1. Recommendations on lifestyle and dietary factors to improve prognosis in CVD patients

1. Stop smoking.
2. Engage in moderate intensive physical activity (for equal or more than 30 minutes on at least 5, but preferably all, days of the week)
3. If you use alcohol, do so in moderation (2=maximum 2 alcoholic drinks per day for women and maximum 3 drinks per day for men.
4. Maintain or attain a healthy body weight (BMI less than 25 kg/m2) [less than 23 kg/m2 for Asians], obese patients (BMI more than 30 kg/m2) [more than 27 kg/m2 for Asians] should try to lose 10-15% of their current body weight.
5. Limit your saturated fat intake (to a maximum of 10 energy%) and the intake of trans fatty acids (to maximal 1 energy%)
6. Consume fish regularly.
7. Consume sufficient amounts of fruits and vegetables.
8. Use sufficient fibre containing grain products, legumes, and/or nuts.
9. Reduce your salt intake.

Source: Iestra, 2005. Adapted.

In the setting of secondary prevention, smoking cessation, combined dietary changes, and physical activity have a potential of a 80% reduction of risk. In the setting of primary prevention, smoking cessation reduces CAD risk by 50%. (Iestra, 2005)[7].

Reduction of blood pressure and hyperlipidemia by pharmacological means may be needed if non-pharmacological means are not enough to achieve the reduction. (Weisman & Graham, 2002)[8], (LaRosa et al, 1999)[9], (Freemantle et al, 1999)[10], (Rodrigues et al, 2003)[11]. See Table 3.

EPIDEMIOLOGY OF CARDIOVASCULAR DISEASE IN SINGAPORE

Mortality and morbidity figures

In Singapore, coronary artery disease (CAD) has been the second major cause of mortality throughout the last decade. See Figure 2 and Table 4. As a cause of mortality it decreased from 24.8% in 1998 to 18.2% in 2005 and has since risen to 20.1% in 2008. (MOH, 2010)[12].

CAD is the third major cause of hospitalization in Singapore, which constituted 3.5% of hospital admissions in 2008, 3.7% in 2007, and 3.9% in 2006. (MOH, 2010)[13].

Lifestyle factors

The National Health Surveillance Survey 2007 Report (MOH, 2007)[14] which is part of the Ministry of Health's ongoing surveillance of non-communicable diseases and its risk factors in Singapore showed that over the 7 years from 2001 to 2007, the prevalence of cigarette smoking has increased by 0.4%, physical inactivity has dropped by 6.4%, and alcohol consumption has increased by 0.7% respectively. Table 5 and Table 6 provide the details of the lifestyle factor changes by gender, and by ethnic group respectively. The important figures to note are that in 2007, 24.4% of males smoke, and 4.1% of females smoke.

High risk diseases

The figures for high risk diseases in the same Report showed that over the 7 years from 2001 to 2007, the reported prevalence of hypertension increased by 3.1%, diabetes mellitus by 0.7%, high total cholesterol by 7.3%, and obesity (BMI equal or higher than 30 kg/m2) by 1.4% respectively.

Table 7 and Table 8 provide the details by gender, and by ethnic group respectively. The important figures to note are that in 2007, 10.6% of males and 10.0% females reported they had hypertension, and 11.6% of males and 10.7% of females reported they had high total cholesterol.

Hypertension control

A cross-sectional study of 9 government polyclinics on hypertension control on data collected over 1 week reported in the Annals yielded useful information. (Tan et al, 2006)[15]. Of the 506 patients studied, the prevalence of good BP control (less than 140/90 mm) was only 37.7% (95% CI:33.6% to 41.8%). Ninety seven percent were on medications with about half on monotherapy. Seventy percent of patients had a BMI of 23 kg/m2 or higher, and 27.8% had a BMI of equal or greater than 27.5 kg/m2. Sixty-four percent did not exercise regularly and 8% were current smokers. It was noted that BP control could be improved by lifestyle modifications – weight reduction, promotion of physical activity, healthier eating habits and smoking cessation.

Table 2. Approximate mortality reduction potential of lifestyle and dietary changes estimated from studies in CAD patients and the general population

Recommendation	Mortality Risk Reduction Estimated from Studies in CAD Patients (Secondary prevention)	Mortality Risk Reduction Estimated from Cohort Studies in General Population (Primary prevention)
Smoking cessation	35%	50%
Physical activity	25%	20-30%
Moderate alcohol	20%	15%
Combined dietary changes	45%	15-40%

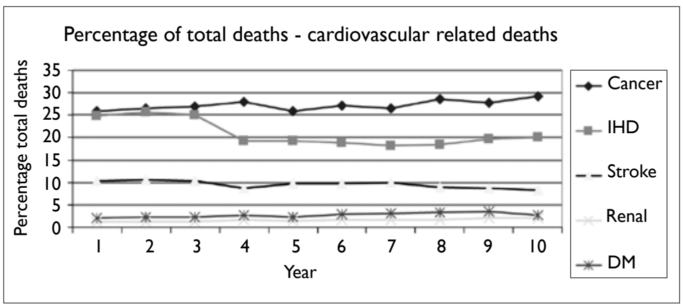
Source: Iestra, 2005

Table 3. Approximate mortality reduction potential of preventive drug interventions after MI

Intervention	Mortality Risk Reduction, Mean (95% CI)
Low-dose aspirin (Weisman & Graham)	18% (1% - 30%)
Statins (LaRosa et al)	21% (14% - 28%)
Beta-blockers (Freemantle et al)	23% (15% - 31%)
ACE Inhibitors (Rodrigues et al)	26% (16% - 35%)

Source: Iestra, 2005

Fig 2. Burden of Cardiovascular Diseases in Singapore



Notes: Year 1 = 1998; 2 = 1999; 3 = 2000; 4 = 2002; 5 = 2003; 6 = 2004; 7 = 2005; 8 = 2006; 9 = 2007; 10 = 2008 (Missing 2001 figures). Percentage deaths for cancer included for comparison.
Source: MOH

Table 4. Percentage of total number of deaths – cardiovascular related deaths

Rank	1998	1999	2000	2002	2003	2004	2005	2006	2007	2008
Cancer	25.9	26.6	27.0	28.0	25.9	27.1	26.5	28.5	27.7	29.3
IHD	24.8	25.7	25.1	19.3	19.3	18.8	18.2	18.5	19.8	20.1
Stroke	10.4	10.5	10.4	8.8	9.7	9.8	10.0	8.9	8.7	8.3
Renal	1.2	1.2	1.3	1.6	1.4	1.6	1.6	1.7	2.0	2.1
DM	2.0	2.3	2.3	2.7	2.3	3.0	3.1	3.3	3.6	2.7

MOH, 2010.Website http//www.moh.gov.sg/mohcorp/statistics.aspx?id=5526

Table 5. Prevalence (%) of lifestyle factors in Singapore by gender – 2001, 2007

Lifestyle factor Prevalence %	Age standardized prevalence (95% confidence interval)				Difference in age-standardised prevalence	Change
	2001		2007		2007 – 2001	
Cigarette smoking						Increase
- Total	13.8	(13.0, 14.6)	14.2	(13.4, 15.0)	0.4	
- Male	24.1	(22.6, 25.6)	24.4	(23.0, 25.8)	0.3	
- Female	3.6	(2.9, 4.2)	4.1	(3.4, 4.7)	0.5	
Physical inactivity						Decrease
- Total	57.3	(56.0, 58.6)	50.9	(49.7, 52.1)	-- 6.4***	
- Male	52.7	(50.9, 54.5)	45.9	(44.2, 47.6)	-- 6.8***	
- Female	61.9	(60.2, 63.7)	55.4	(54.3, 57.6)	-- 6.0***	
Alcohol consumption						Increase
- Total	0.6	(0.4, 0.8)	1.3	(1.0, 1.6)	0.7**	
- Male	1.1	(0.7, 1.5)	2.3	(1.8, 2.8)	1.2***	
- Female	0.2	(0.0, 0.3)	0.4	(0.2, 0.6)	0.2**	

Source: MOH. National Health Surveillance 2007: Pages 19, 12, 26.

Table 6. Prevalence (%) of lifestyle factors in Singapore by ethnic group – 2001, 2007

Lifestyle factor Prevalence %	Age standardized prevalence (95% confidence interval)				Difference in age-standardised prevalence	
	2001		2007		2007 – 2001	
Cigarette smoking						Increase
- Total	13.8	(13.0, 14.6)	14.2	(13.4, 15.0)	0.4	
- Chinese	12.9	(12.0, 13.8)	12.9	(12.0, 13.8)	0.0	
- Malay	21.6	(19.1, 24.2)	23.8	(21.4, 26.3)	2.2	
- Indian	10.3	(7.4, 13.3)	11.7	(9.1, 14.4)	1.4	
Physical inactivity						Decrease
- Total	57.3	(56.0, 58.6)	50.9	(49.7, 52.1)	-- 6.4***	
- Chinese	57.6	(56.2, 59.0)	51.8	(50.4, 53.1)	--5.8***	
- Malay	56.3	(52.9, 59.6)	48.4	(45.3, 51.5)	--7.9***	
- Indian	56.3	(51.3, 61.2)	45.9	(41.8, 50.1)	--10.4***	
Alcohol consumption						Increase
- Total	0.6	(0.4, 0.8)	1.3	(1.0, 1.6)	0.7**	
- Chinese	0.7	(0.5, 1.0)	1.4	(1.1, 1.7)	0.7**	
- Malay	0.2	(0.0, 0.6)	0.4	(0.0, 0.9)	0.2	
- Indian	0.3	(0.0, 0.8)	1.6	(0.3, 2.7)	1.3*	

Source: MOH. National Health Surveillance 2007: Pages 19, 12, 26.

Table 7. Prevalence (%) of high risk diseases in singapore by gender – 2001, 2007

High risk disease Prevalence %	Age standardized prevalence				Difference in age-standardised prevalence	
	2001		2007		2007 – 2001	
Reported hypertension						Increase
- Total	7.2	(6.5, 7.9)	10.3	(9.6, 11.0)	3.1***	
- Male	7.3	(6.5, 8.2)	10.6	(9.5, 11.6)	3.3***	
- Female	7.1	(6.2, 8.0)	10.0	(9.0, 11.0)	2.9***	
Reported diabetes mellitus						Increase
- Total	3.6	(3.2, 4.1)	4.3	(3.8, 4.7)	0.7	
- Male	3.8	(3.1, 4.5)	4.7	(4.0, 5.5)	0.9	
- Female	3.4	(2.8, 4.1)	3.8	(3.2, 4.4)	0.4	
Reported high total cholesterol						Increase
- Total	3.9	(3.4, 4.4)	11.2	(10.4, 11.9)	7.3***	
- Male	4.4	(3.7, 5.2)	11.6	(10.5, 12.7)	7.2***	
- Female	3.5	(2.8, 4.1)	10.7	(9.7, 11.8)	7.2***	
Obesity						Increase
- Total	4.3	(3.7, 4.8)	5.7	(5.1, 6.2)	1.4***	
- Male	4.3	(3.6, 5.1)	6.7	(5.8, 7.5)	2.4***	
- Female	4.2	(3.5, 5.0)	4.7	(4.0, 5.4)	0.5	

Source: MOH. National Health Surveillance 2007: Pages 44, 40, 36, 32.

Table 8. Prevalence (%) of high risk diseases in Singapore by ethnic group – 2001, 2007

High risk disease Prevalence %	Age standardized prevalence (95% confidence interval)				Difference in age-standardised prevalence	
	2001		2007		2007 – 2001	
Reported hypertension						Increase
- Total	7.2	(6.5, 7.9)	10.3	(9.6, 11.0)	3.1***	
- Chinese	7.1	(6.3, 7.8)	10.2	(9.3, 11.0)	3.1***	
- Malay	6.3	(5.1, 8.6)	11.4	(9.4, 13.4)	4.6***	
- Indian	9.2	(6.3, 12.1)	10.0	(7.1, 12.6)	0.8	
Reported diabetes mellitus						Increase
- Total	3.6	(3.2, 4.1)	4.3	(3.8, 5.7)	0.7	
- Chinese	3.1	(2.6, 3.6)	3.2	(2.8, 3.7)	0.1	
- Malay	4.0	(2.7, 5.3)	6.9	(5.3, 8.5)	2.9**	
- Indian	8.6	(5.8, 11.5)	10.6	(8.0, 13.2)	2.0	
Reported high total cholesterol						Increase
- Total	3.9	(3.4, 4.4)	11.2	(10.4, 11.9)	7.3***	
- Chinese	4.0	(3.4, 4.5)	11.1	(10.3, 12.0)	7.1***	
- Malay	3.3	(2.1, 4.5)	11.6	(9.3, 13.1)	8.3***	
- Indian	4.9	(2.8, 7.1)	11.1	(8.5, 13.7)	6.2***	
Obesity						Increase
- Total	4.3	(3.7, 4.8)	5.7	(5.1, 6.2)	1.4***	Except
- Chinese	3.1	(2.5, 3.6)	4.1	(3.5, 4.7)	1.0*	Indians
- Malay	9.1	(7.0, 11.2)	14.0	(11.7, 16.3)	4.9**	
- Indian	9.2	(6.1, 12.2)	8.5	(6.0, 11.0)	- 0.7	

Source: MOH. National Health Surveillance 2007: Pages 44, 40, 36, 32.

Myocardial infarction

A study of 1,556 patients admitted with a first myocardial infarct to a tertiary hospital, stratified into younger (45 years of age and younger) and older (older than 45 years) showed that 96% of patients younger than 45 years and 92% of patients older than 45 years had at least one antecedent risk factor (hypertension, diabetes, smoking, family history of premature MI, and hyperlipidemia). (Chan et al, 2006)[16].

The 45 years and younger age group had a higher incidence of untreated hypertension (odds ratio 2.99 955 CI 2.00-4.46, p-value is less than 0.001) and hyperlipidemia (odds ratio 1.71, 95% CI 1.20-2.43, p-value is equal to 0.002).

In this study also, as many as 83% of the younger group patients and 72% of the older group patients with hyperlipidemia were left untreated. For hypertension, 30% of the younger age group were untreated compared to 10% for the older age group. For diabetes, only 10% of the younger age group and 5% of the older age group were untreated.

This study has several learning points:

- It showed that the control of two main modifiable risk factors (hypertension and hyperlipidemia) was poorer in the younger patients; presumably preventive measures tend to be focused on the older population who are generally viewed to be a higher-risk group.
- It also highlights the pattern of prioritization in terms of controlling risk factors. Physicians and patients appear to pay greater emphasis on controlling diabetes mellitus compared to hypertension and dyslipidemia.
- Early lifestyle modification and pharmacological intervention for dyslipidemia has proven to be effective in reducing cardiovascular events. (De Baker et al, 2003)[17].

WHERE CAN WE IMPROVE?

It is clear that there is a need to reduce the key cardiovascular risk factors in our asymptomatic people. Two studies reported in this year's medical literature provide food for thought on how this can be done, namely primary care efforts, and screening by global assessment of asymptomatic people.

Primary care efforts

A paper by Yeh et al (2010)[18] reporting on the population trends in the incidence and outcomes of acute myocardial infarction in community based population in Northern California have some lessons that we can use. Between 2000 and 2008, the population there experienced a drop in the age-and sex-adjusted incidence of myocardial infarction from 287 cases per 100,000 person-years in 2000 to 208 cases per 100,000 person-years in 2008, representing a 24% relative decrease over the study period. This drop was attributed to, at least in part, by substantial improvements in primary-prevention efforts, and these trends occurred despite the increased prevalence of cardiovascular risk factors of obesity and diabetes. (Hoerger et al, 2008)[19].

The primary care efforts that worked in the Northern California setting were :

- public bans on smoking. (Yeh et al, 2010)[18]
- meeting target levels of low-density lipoprotein. (Yeh et al, 2010)[18]; (Mann D, 2008)[20]
- meeting target levels of blood-pressure. (Cutler et al, 2008)[21];
- increasing use of statins, beta-blockers, and aspirin as cardioprotective medications over time. (Go et al, 2006)[22].

Screening of risk factors globally in asymptomatic people

A paper by Peterson et al (2010)[23] showed the value of a systematic, organized way of screening cardiovascular risk factors globally in asymptomatic people. Subjects were given an information sheet to explain the study and a non-validated 20 item multiple-choice questionnaire (available in the paper) to assess knowledge of cardiovascular risk factors prior to their appointment. A 45-minute slot was allocated for each subject for filling up the questionnaire and for counselling.

Of the 655 (71.4% female) asymptomatic people screened in this programme run by 14 community pharmacies in Australia, as many as 28.1% had a 10-year risk of development cardiovascular disease greater than 15% (namely, those at high risk of cardiovascular disease). Almost half of the contacted high-risk subjects reported lifestyle changes or started drug therapy following re-testing by their general practitioners.

Similar collaborative programmes between pharmacies and general practitioners could be set up locally and these would be valuable in detecting cardiovascular risk factors in asymptomatic people. Early detection means early intervention to reduce cardiovascular disease burden.

CONCLUSIONS

Cardiovascular disease reduction depends on global risk assessment in asymptomatic people as the first step followed by primary care actions of reducing lifestyle risk factors (smoking, physical inactivity, atherogenic diet, and excessive alcohol intake), as well as the control of high risk diseases (hypertension, diabetes, hyperlipidemia, and obesity).

REFERENCES

1. Mendi S. The contribution of the Framingham Heart Study to the Prevention of Cardiovascular Disease: A Global Perspective. Prog Cardiovasc Dis 2010;53:10-4.
2. WHO. The global burden of disease: 2004 update. Geneva, Switzerland: World Health Organisation, 2008.
3. Dahlof B. Cardiovascular Disease Risk Factors Epidemiology and Risk Assessment. Am J Cardiol 2010;105[suppl]:3A-9A.
4. Yusuf S, Hawken S, Ounpuu S, et al. INTERHERAT Study Investigators: Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet 2004;937-57.
5. World Health Organisastion. The World Health Report 2002 Reducing Risks; Promoting Health. Geneva, Switzerland: WHO, 2002.
6. World Health Organisastion. Global Health Risks; mortality and burden of diseases attributable to selected major risks. Geneva, Switzerland: WHO, 2009.
7. Iestra Ja, Kromhout D, van der Schouw YT, et al. Effect Size Estimate of Lifestyle and Dietary Changes in All-Cause Mortality in Coronary Artery Disease Patients: A Systematic Review. Circulation 2005;112:924-34.
8. Weisman SM, Graham DY. Evaluation of the benefits and risks of low-dose aspirin in the secondary prevention of cardiovascular and cerebrovascular events. Arch Intern Med 2002;162:2197-2202.
9. LaRosa JC, He J, Vupputuri S. Effect of statins on risk of coronary disease: a meta-analysis of randomized controlled trials. JAMA, 1999;282:2340-6.
10. Freemantle N, Cleland J, Young P, Mason J, Harrison J. Beta blockade after myocardial infarction: systematic review and meta regression analysis. BMJ 1999;318: 1730-7.
11. Rodrigues EJ, Eisenberg MJ, Pilote L. Effects of early and late administration of angiotensin converting enzyme inhibitors on mortality after myocardial infarction. Am J Med 2003;115:473-9.
12. MOH. Principal Causes of Death. http://www.moh.gov.sg/mohcorp/statistics.aspx?id=5526 (Accessed 2010 July 20).
13. MOH. Top 10 conditions of hospitalisation. http://www.moh.gov.sg/mohcorp/statistics.aspx?id=5528 (Accessed 2010 July 20).
14. MOH. National Health Surveillance Survey 2007 Report. MOH, 2007.
15. Tan EK, Chung WL, Lew YJ, et al. Characteristics, and disease control and complications of hypertensive patients in primary care – a community-based study in Singapore. Ann Acad Med Singapore 2009 Oct; 38(10):850-6.
16. Chan MY, Woo KS, Wong HB, et al. Antecedent risk factors and their control in young patients with a first myocardial infarction. Singapore Med J 2006 Jan; 47(6):554-6.
17. De Baker G, Ambrosioni E, Borch-Johnsen K, et al. European guidelines on cardiovascular disease prevention in clinical practice: third joint task force of European and other societies on cardiovascular disease prevention in clinical practice. Eur J Cardiovasc Prev Rehabil 2003;10:S1-S10.
18. Yeh, et al. Population Trends in the Incidence and Outcomes of Acute Myocardial Infarction. N Engl J Med 2010;362:2155-65.
19. Hoerger TJ, Segel JE, Gregg EW, Saadine JB. Is glycemic control improving in US adults? Diabetes Care 2008;31;81-6.
20. Mann D, Reynolds K, Smith D, Munter P. Trends in statin use and low-density lipoprotein cholesterol levels among US adults: impact of the 2001 National Cholesterol Education Program guidelines. Ann Pharmacother 2008;42:1208-15.
21. Cutler JA, Sorlie PD, Wolz M, Thom T, Fields LE, Rocella EJ. Trends in hypertension prevalence, awareness, treatment, and control rates in United States adults between 1988-1994 and 1999-2004. Hypertension 2008;52:818-27.
22. Go AS, Iribarren C, Chandra M, et al. Statin and beta-blocker therapy and the initial presentation of coronary heart disease. Ann Intern Med 2006; 144:299-308.
23. Peterson GM, Fitzmaurice KD, Kruup H, Jackson SL, Rasiah RL. Cardiovasculr risk screening program in Australian community pharmacies. Pharm World Sci 2010 Jan; 32(3):373-80.

LEARNING POINTS

- **Like countries around the world, the burden of cardiovascular disease in Singapore is sizeable. In 2008, ischaemic heart disease accounted for 20.1% of all deaths, and resulted in 3.5% of all admissions to hospital.**
- **The Northern California experience has shown that it is possible to achieve a relative reduction of 24% in acute myocardial infarction, despite increasing prevalence of obesity and diabetes.**
- **In asymptomatic people, key cardiovascular risk factors to correct are smoking, hypertension, and hyperlipidemia.**
- **In people under 45, the risk factors which tend to be under treated were hypertension and hyperlipidemia.**