

National Disease Management Plans for Key Chronic Non-communicable Diseases in Singapore

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Abstract

In Singapore, chronic, non-communicable diseases, namely coronary heart disease, stroke and cancer, account for more than 60% of all deaths and a high burden of disability and healthcare expenditure. The burden of these diseases is likely to rise with our rapidly ageing population and changing lifestyles, and will present profound challenges to our healthcare delivery and financing systems over the next 20 to 30 years. The containment and optimal management of these conditions require a strong emphasis on patient education and the development of integrated models of healthcare delivery in place of the present uncoordinated, compartmentalised way of delivering healthcare. To meet these challenges, the Ministry of Health's major thrusts are disease control measures which focus mainly on primary prevention; and disease management, which coordinates the national effort to reduce the incidence of these key diseases and their predisposing factors and to ameliorate their long-term impact by optimising control to reduce mortality, morbidity and complications, and improving functional status through rehabilitation. The key initiatives include restructuring of the public sector healthcare institutions into two clusters, each comprising a network of primary health care polyclinics, regional hospitals and tertiary institutions. The functional integration of these healthcare elements within each cluster under a common senior administrative and professional management, and the development of common clinical IT systems will greatly facilitate the implementation of disease management programmes. Secondly, the Ministry is establishing National Disease Registries in coronary heart disease, cancer, stroke, myopia and kidney failure, which will be valuable sources of clinical and outcomes data. Thirdly, in partnership with expert groups, national committees and professional agencies, the Ministry will produce clinical practice guidelines which will assist doctors and healthcare professionals to better manage important aspects of the key diseases. Finally, the Ministry has committed funds to support selected National Disease Management programmes, illustrated by the disease management plan for asthma.

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Introduction

Like most other newly industrialised economies, Singapore has undergone a rapid epidemiological transition over the last 50 years. Chronic, non-communicable diseases have replaced infectious diseases as the dominant public health problems in Singapore today. Three major sets of conditions, namely coronary heart disease, stroke and cancer, account for more than 60% of all deaths and a high burden of disability and healthcare cost.¹ The prevalence of diabetes and hypertension, conditions which are major causes of coronary heart disease, stroke, kidney failure and blindness are also high (Table I).

With Singapore's rapidly ageing population,¹ the impact of these diseases on individuals and on the country as a whole can be expected to grow in the future. In addition, while active health promotion efforts have contained obesity and smoking rates in the past decade,^{2,3} lifestyle changes associated with increasing affluence will continue to exert

TABLE I: PREVALENCE OF DIABETES, HYPERTENSION, HYPERCHOLESTEROLAEMIA, OBESITY AND SMOKING IN SINGAPOREANS AGED 18 TO 69 YEARS^{2,3}

	1992	1998
Diabetes	8.6%	9.0%
Hypertension	16.1%	21.5%
Total cholesterol >6.2 mmol/L	19.4%	25.4%
Obesity (BMI ≥30 kg/m ²)	5.1%	6.0%*
Smoking ≥1 cigarette/day	18.3%	15.0%

BMI: body mass index

* difference not statistically significant ($P > 0.05$)

strong upward pressure on the prevalence of these key risk factors (Table I).

Meeting the Challenge of Major Chronic Non-communicable Diseases

The rapidly ageing Singaporean population alone will present profound challenges to our healthcare delivery and

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health financing systems over the next 20 to 30 years. These difficulties will be greatly compounded if, in addition, we do not take vigorous and effective steps today to reduce the potential long-term impact of the burden of the major chronic non-communicable diseases and their risk factors.

While the Ministry of Health continues to work to continually upgrade the overall quality and outcomes of our healthcare system across the whole spectrum of diseases, in relation to the major chronic non-communicable diseases, the Ministry has 3 key priorities, namely:

1. to reduce the incidence of diabetes, hypertension, coronary heart disease, stroke, end-stage renal failure, common cancers, myopia and mental illness through comprehensive and effective primary and secondary prevention programmes.
2. to improve the overall management and clinical outcomes, at a national level, of patients with diabetes and hypertension, and to reduce the contribution which these conditions make to the burden of coronary heart disease, stroke, renal failure and blindness.
3. to improve the survival and to mitigate the morbidity and disability arising from coronary heart disease, stroke, common cancers, asthma and mental illness.

To achieve these goals, the Ministry's major thrusts can be considered under 2 main categories, namely disease control measures and disease management plans for the key chronic non-communicable diseases.

Disease Control Measures

A major strategy is to reduce the incidence of chronic non-communicable diseases through strong primary prevention programmes.

Primary prevention has been the major focus of a number of national programmes which have been put in place over the past several years. These include the National Healthy Lifestyle campaign, comprehensive School Health Services programmes, workplace health programmes and the nutritional food labelling programme. These programmes are primarily targeted at reducing smoking rates and promoting physical activity and healthy dietary habits amongst the population, to reduce the occurrence of hypercholesterolaemia and obesity and thence, diabetes and hypertension.

The Ministry has worked towards strengthening and expanding these efforts further. A new statutory board, the Health Promotion Board, was formed in 2001 to specifically focus on public education and primary prevention, and to provide greater responsiveness in capability-building and programme development in these areas. The Health Promotion Board has also been made responsible for the establishment of national screening programmes for

diabetes, hypertension, hypercholesterolaemia and breast and cervical cancers.

National Key Disease Management Plans

The Need

Beyond primary prevention, it is crucial that at a national level, we are able to optimise the management of patients with chronic non-communicable illnesses to reduce the occurrence of complications and to reduce mortality and morbidity.

Singapore is fortunate to have well-trained doctors and healthcare professionals and excellent medical institutions. In general, patients seen in our clinics and admitted to our hospitals can be confident of receiving a good level of care. However, if we look at the *overall* clinical outcomes achieved for conditions such as diabetes and hypertension, the picture is less reassuring. For example, the 1998 National Health Survey showed that only 27.5% of adult diabetic patients had a HbA1c level of 7.0% or less, while the mean HbA1c overall was 8.5%. For patients with hypertension, only 29.6% had blood pressure readings of $\leq 140/80$ mm Hg.³ This situation is not unique to Singapore. Numerous studies in developed countries have reported similar findings and have shown wide practice variations among providers for the same disease, and frequently large gaps between the current practice and what would generally be accepted as optimal care based on evidence.⁴⁻⁶

There are 2 main reasons for this. Firstly, the optimal management of many of the chronic diseases, such as diabetes and hypertension, requires full and active participation by patients. Patients need to have a good understanding of their medical problems and how best to manage them. Very importantly, they must also be motivated to modify their lifestyles and to comply with treatment and a regular regime of monitoring. This frequently requires intensive and repeated education, counselling and discussion between the patient and the healthcare team. In practice, this is often not achieved because of the lack of time, training and resources on the part of healthcare professionals and providers. In addition, it is often not easy to convince patients to modify their current lifestyles and to go on long-term medication for the sake of the distant goal of preventing a possible medical complication in the future.⁷

Secondly, optimal patient-centred care is also often impeded by the fact that our healthcare system, like most of the other developed countries, is compartmentalised and largely focused on the treatment of acute, severe illness or the complications of major chronic diseases, in hospital settings. This creates structural, funding and organisational impediments to the much more patient-centred and disease-

focused mode of care, which is necessary if patients with major chronic diseases are to be managed optimally and holistically.

As an illustration, asthma is a major public health problem in Singapore, accounting for an estimated 20,000 Emergency Department attendances and up to 100 deaths each year.⁸⁻¹⁰ Analyses of populations of asthmatic patients typically find that a small proportion of severely ill patients account for the bulk of the costs of care. For example, the 22% of asthmatics classified by one United States insurer as severely ill accounted for about 85% of expenditures. A central problem is the optimisation of management of this relatively small group of “high burden” asthma patients within a compartmentalised healthcare delivery system. These are patients with severe or poorly controlled asthma who attend at Emergency Departments or who require admission for treatment of acute severe asthmatic attacks. For most of such patients, effective long-term control of their asthmatic condition can substantially reduce the incidence of acute or severe attacks requiring Emergency Department attendances, hospitalisation, intensive care unit management, intubation and death. However, a local study in 1996 reported that of patients presenting with asthma to one public sector Emergency Medicine Department, only 23% were on maintenance inhaled steroids and half of the patients had had an Emergency Medicine Department visit in the preceding 6 months.¹¹

Disease management as a tool to optimise management of chronic diseases nationally

Disease management has been variously defined but 3 definitions which perhaps best reflect key facets of the concept of disease management as being introduced within the Singapore context, are: “an integrated, systematic approach to the delivery of healthcare to optimise total patient outcomes in the most cost-effective manner”;¹² “a clinical improvement process aimed at ensuring that best practices are incorporated within *an acceptable range of variation* over the entire continuum of care”;¹³ “an approach to patient care that coordinates medical resources for patients across the entire healthcare delivery system”.¹⁴

Formulating and implementing national key disease management plans

For each of the key chronic diseases, the relevant national committee or expert group assists the Ministry in identifying major gaps in overall healthcare delivery, and recommends programmes that should be initiated or strengthened to address these gaps. This is followed by a period of extensive consultation with the medical professionals and institutions, whose inputs are incorporated or used to modify the recommendations. Once the concept and recommendations are approved by the Ministry, the Ministry works closely

with the relevant medical institutions or healthcare professional groups to implement them systematically. A critical point is that the majority of programmes are physician-driven but with Ministry oversight. A concerted effort is also made to identify meaningful short and long-term indicators to monitor the progress and effectiveness of each programme.

For most of the national disease management plans, health promotion and primary prevention are critical components of the control programmes for these diseases. Where early detection of disease through screening has been shown to be cost-effective, these will be systematically implemented at a national level. For individuals who already have chronic diseases, clinical practice guidelines and/or structured programmes or clinical-care processes will be put in place to optimise management, to retard disease progression and to reduce mortality and morbidity. For those with disabilities, integrated rehabilitative programmes within acute hospitals, community hospitals, nursing homes and home care facilities will be developed as an integral part of the disease management plans.

Enabling platforms and drivers for effective disease management

Apart from the active coordination and enhancement of existing services to adopt generally accepted best practices for better clinical outcomes, the Ministry has embarked on 4 further initiatives that would serve as enabling platforms or drivers for effective national disease management.

Firstly, the Ministry has re-organised the public sector healthcare institutions into 2 clusters, each comprising a network of primary health care polyclinics, regional hospitals and tertiary institutions. The functional integration of these healthcare elements within each cluster under a common senior administrative and professional management, and the development of common clinical IT systems will greatly facilitate the implementation of disease management programmes. Secondly, the Ministry is substantially expanding its regular clinical and epidemiological data collection to support and monitor disease management programmes and improve patient care. One key initiative in this regard is the establishment of National Disease Registries in coronary heart disease, cancer, stroke, myopia and kidney failure, which will be valuable sources of clinical and outcomes data. Thirdly, in partnership with expert groups, national committees and professional agencies, the Ministry will produce clinical practice guidelines which will assist doctors and healthcare professionals to better manage important aspects of the key diseases. Finally, the Ministry has committed specific streams of funding which can be used to support National Disease Management programmes. For example, direct

funding was provided to establish the National Disease Registries and to the Health Promotion Board to set up and to run national screening programmes for breast and cervical cancer. The Health Services Development programme (HSDP) fund, which supports the upgrading of our clinical services and nurtures the development of areas of medical excellence, has also been used to drive a number of specific disease management programmes.

Disease Management Plan for Asthma as an Illustration

As an illustration, the disease management plan for asthma is described briefly. There are 3 main components. The first is intensive public education stressing the following main messages:

- Acute asthma attacks can be life-threatening, i.e. asthma patients should pay due attention to their condition.
- Acute asthma attacks can be prevented.
- Optimal treatment will help to prevent worsening of disease and improve outcome. This usually requires long-term treatment with preventor medication.
- Low-dose inhaled steroids are safe, even for children.

The second component is intensive physician education. In line with this, new clinical practice guidelines on the management of asthma have been produced, which are targeted mainly at primary care physicians. These will form the basis for an intensive programme of continuing medical education for physicians and healthcare professionals in asthma management.

The third component of the disease management plan is the establishment of a system to identify and track high-burden asthma patients presenting with acute asthmatic attacks to the 5 acute restructured hospitals and the KK Women's and Children's Hospital. Such patients are referred to special clinics supported in part by HSDP funds. These clinics have dedicated nurses who would educate patients on their condition and the proper use of inhalers, and case-managers who would track the patients' progress and contact defaulters. For needy patients who require second-line, non-standard drugs to control their asthma optimally, subsidies are provided for such drugs within these clinics. The individual programmes at these 6 hospitals are coordinated centrally by the programme director, who is a senior physician in one of the hospitals.

The outcome indicators which will be monitored include: asthma attendances and re-attendances at the Emergency Department, hospital admissions and re-admissions for

asthma, school absenteeism from asthma for children and asthma mortality.

Conclusion

The key chronic, non-communicable diseases are major causes of death, disability and healthcare expenditure today, and their impact is set to grow with our ageing population and changing lifestyles. As a healthcare system, uncoordinated, compartmentalised models of healthcare delivery cannot optimally manage these conditions. Failure to contain the impact of these key diseases will predictably result in a very heavy burden on the healthcare system in the future. Disease management is a useful tool for a coordinated national effort to reduce the incidence of these key diseases and their predisposing factors, to optimise control to reduce mortality and morbidity, improve functional status through rehabilitation and, hence, ameliorate their long-term impact.

REFERENCES

1. Ministry of Health, Singapore. State of Health 2000—The report of the Director of Medical Services.
2. Ministry of Health, Singapore. National Health Survey 1992. Singapore: Ministry of Health.
3. Ministry of Health, Singapore. National Health Survey 1998. Singapore: Ministry of Health.
4. Bodenheimer T. Disease management—promises and pitfalls. *N Engl J Med* 1999; 340:1202-5.
5. Stockwell D H, Madhavan S, Cohen H, Gibson G, Alderman M H. The determinants of hypertension awareness, treatment and control in an insured population. *Am J Public Health* 1994; 84:1768-74.
6. Chassin M R, Galvin R H. The urgent need to improve healthcare quality. *JAMA* 1998; 280:1000-5.
7. Davis RM, Wagner EG, Groves T. Advances in managing chronic disease. *BMJ* 2000; 320:525-6.
8. Chew F T, Lee B W. Utilisation of healthcare resources for asthma in Singapore: Demographic features and trends. *Asian Pac J Allergy Immunol* 1998; 16:57-68.
9. Chew F T, Goh D Y, Lee B W. The economic costs of asthma in Singapore. *Aust N Z J Med* 1999; 29:228-33.
10. Ng T P, Tan W C. Temporal trends and ethnic variations in asthma mortality in Singapore, 1976-1995. *Thorax* 1999; 54:990-4.
11. Abisheganaden J, Sin F L, Lim T K. A profile of acute asthma patients presenting to the emergency room. *Singapore Med J* 1996; 37:252-4.
12. Mallarkey G, Sutherland J, editors. Disease Management Handbook. Hong Kong: Adis International, 1997:2-3.
13. Bernard D B, Coburn K D, Miani M A. Health and disease management within an academic health system. *Disease Management Health Outcomes* 2000. Hong Kong: Adis International, 2000:21-37.
14. Ellrodt G, Cook D J, Jee J, Cho M, Hunt D, Weingarten S. Evidence based disease management. *JAMA* 1997; 278:1687-92.