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Preface

This inaugural report is the result of a collective effort by the Singapore Burden of Disease and Injury Study Working Group to quantify the burden of disease in Singapore using methods developed at the global level by the WHO and the World Bank.

This report provides a comprehensive assessment of the burden of diseases and injuries in Singapore in 2004. It also gives an overview of the approaches adopted and discusses the major findings, including their possible impact on policy formulation. This report is not intended to give a full explanation of the concept and methodology. Those who are interested in the details are recommended to read Murray & Lopez (1996), and other relevant documents available from the World Health Organization. In addition, many of the methods for estimation are adapted from the burden of disease and injury in Australia 2003 study.

Further work by the Singapore Burden of Disease and Injury Study Working Group will include estimating the attributable burden of disease due to several well-recognised risk factors and conducting cost-effectiveness study of health interventions. We hope that all these work will help guide national health priority setting and provide a baseline for further epidemiological research where critical information gaps have been identified.

Singapore Burden of Disease and Injury Working Group
March 2009
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  - Rubella
  - *Haemophilus influenzae* type b
  - Meningitis
  - Septicaemia
- Dengue
- Hepatitis
  - Hepatitis A
  - Hepatitis B
  - Hepatitis C
- Malaria

1B Acute respiratory infections
- Lower and upper respiratory tract infections
- Otitis media

1C Maternal conditions

1D Perinatal conditions
- Birth trauma & asphyxia
- Low birth weight
- Neonatal infections

1E Nutritional deficiency
- Iron deficiency anaemia

2F Malignant neoplasms

2G Other neoplasms

2H Diabetes
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- Renal failure
- Neuropathy
- Peripheral vascular disease
- Amputation and diabetic foot
- Ischaemic heart disease and stroke

2I Endocrine disorders

4.3 Methodological issues and developments
- 4.3.1 Comorbidity
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4.5 Conclusions
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   Schizophrenia
   Anxiety & depression
   Bipolar disorder
   Eating disorders (anorexia and bulimia)
   Attention-deficit hyperactive disorder.
   Autism spectrum disorders

2K Neurological and sense disorders
   Alzheimer’s & other dementias
   Epilepsy
   Parkinson’s disease
   Migraine
   Vision disorders
   Adult-onset hearing loss

2L Cardiovascular diseases
   Ischaemic heart disease
   Heart diseases resulting in heart failure
   Stroke
   Other cardiovascular diseases

2M Chronic respiratory diseases
   Chronic obstructive pulmonary disease
   Asthma

2N Digestive diseases
   Peptic ulcer disease
   Cirrhosis of the liver
   Appendicitis

2O Genitourinary diseases
   Nephritis & nephrosis
   Benign prostatic hypertrophy

2P Skin diseases

2Q Musculoskeletal diseases
   Rheumatoid arthritis
   Osteoarthritis
   Low back pain
   Gout

2R Congenital anomalies
   Anencephaly
   Spina bifida
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Executive Summary

The growing demand for health services under limited resources has always been a challenge for governments. To cope with this growing demand, careful health policy planning and wise allocation of resources are needed so as to respond to people’s health needs. Inadequate information to guide decisions on health policies and resource allocation is one of the obstacles for better policy development. To make rational decisions on resource allocation, adequate tools that are able to summarise the health of the population based on health outcomes are essentially required.

This report provides the first complete comprehensive assessment of the health status of Singapore residents in 2004. It quantifies the contribution to the ‘burden of disease’ in relation to mortality, disability, impairment, illness and injury in 2004 from over 130 specific diseases. The single indicator known as the disability-adjusted life year (DALY) is used to measure the burden. One DALY can be thought of as one lost year of ‘healthy’ life and is calculated as a combination of 1) years of life lost (YLL) due to premature mortality and 2) equivalent years of ‘healthy’ years of life lost due to disability (YLD). It should be noted that the term ‘disability’ is used here in the widest sense of the word, to include any departure from good health. The burden of disease, therefore, measures the gap between current health status and an ideal situation in which everyone lives into old age without any disease and ill-health. Hence, it indicates the ‘incomplete’ health agenda, identifying areas in which additional health gains can be made.

The Singapore Burden of Disease 2004 Study used methods developed by the WHO and the World Bank for the Global Burden of Disease study. We also had access to a complete set of disease worksheets from the School of Population Health, University of Queensland which oversaw the burden of disease and injury in Australia 2003 study. The set of materials provided us with a useful introduction to the disease models and types of data used. Our local study had modified these worksheets when necessary, based on the availability of detailed local data and local expert opinion. This report is the first part of the study providing results of the estimates of burden of diseases and injuries in Singapore in 2004. Further publication will follow on the burden of disease attributable to selected risk factors.
Key Findings

Total burden of disease and injury

- More than 360 thousand years of ‘healthy’ life (that is DALYs) were lost due to premature deaths and ill-health in Singapore in 2004. This translates to 104 DALYs lost per thousand residents or, in other words, an average probability of 0.104 of losing health due to illness or death in the population.

- Cardiovascular diseases and cancers were the leading causes of the burden of disease and injury, accounting for 38% of total DALYs. More than fourth-fifths (83%) of this burden was due to mortality.

- Ischaemic heart disease and stroke dominated the burden of cardiovascular diseases.

- Lung, colon & rectum and breast cancers were the top specific causes of cancer burden.

- Mental disorders, diabetes, and neurological and sense disorders were the next largest contributors, which together, accounted for another 33% of total DALYs. Less than one-tenth (7%) of the burden from these groups was due to mortality.

- Anxiety & depression, schizophrenia and autism spectrum disorders were the main specific causes of mental disorders burden.

- Leading conditions of neurological and sense disorders burden were Alzheimer’s & other dementias, adult-onset hearing loss and vision disorders.

- Diabetes carries a risk of ischaemic heart disease and stroke. Inclusion of the burden of these cardiovascular diseases attributable to diabetes would increase the burden of diabetes from 11% to about 15% of total DALYs, making it the third largest contributor to overall burden after cardiovascular diseases and cancers.

- Distribution of DALYs between men and women was approximately equal (52% vs. 48%). Non-fatal burden was responsible for 47% of the males’ total burden and 57% of the females’ total burden.

- For musculoskeletal diseases and mental disorders, DALYs were notably higher in women. Conversely, men experienced higher burden for injuries, chronic respiratory and cardiovascular diseases.

- The five leading specific causes of disease burden in men were ischaemic heart disease (12.5%), diabetes (10.4%), stroke (7.2%), lung cancer (4.8%) and anxiety & depression (3.9%).

- The five leading specific causes of disease burden in women were diabetes (11.4%), anxiety & depression (8.5%), ischaemic heart disease (7.8%), stroke (6.9%) and breast cancer (5.4%).

- Total burden per capita increased exponentially with age, with an initial peak at birth. Perinatal conditions and congenital anomalies were the common causes of DALYs in these babies. A smaller but significant peak was also observed in early adulthood, dominated primarily by burden due to mental disorders and injuries.

- Ischaemic heart disease (16.1%), followed by stroke (11.6%), diabetes (8.2%), Alzheimer’s & other dementias (6.5%) and lung cancer (5.3%) were the top five leading causes of DALYs among the elderly aged 65 years and above.
Mortality burden

- Mortality burden – measured in years of life lost (YLL) – was responsible for 48% of the total burden of disease and injury in Singapore in 2004.
- Three-quarters of the YLL were due to cardiovascular diseases (34%), cancers (32%) and injuries (9%).
- Men experienced 57% of the total mortality burden and accounted for 30% more burden than women.
- Ischaemic heart disease was by far the largest specific cause of YLL in both men and women. Other causes ranked among the top 5 contributors include stroke, lower respiratory tract infections (primarily pneumonia) and lung cancer in both genders; breast cancer in women and self-inflicted injuries in men.

Disability burden

- Disability burden – measured in years of ‘healthy life’ lost due to disability or ill-health (YLD) – was responsible for 52% of the total burden of disease and injury in Singapore in 2004.
- Mental disorders, neurological and sense disorders, and diabetes accounted for nearly 60% of the YLD burden.
- In contrast to the mortality burden, overall disability burden was higher in women than in men (13% more).
- The most important specific cause of YLD in both men and women was diabetes mellitus, followed by anxiety & depression. The third, fourth and fifth largest YLD contributors were stroke, adult-onset hearing loss and osteoarthritis in men; Alzheimer’s & other dementias, schizophrenia and osteoarthritis in women.
- YLD burden of anxiety & depression in women was about twice that in men.

Health-adjusted life expectancy

- Health-adjusted life expectancy (HALE) is an estimate of the average number of years that a person can expect to live in “full health” by taking into account years lived in less than full health due to disease and/or injury (at reduced weightage). In 2004, HALE at birth was 70.4 years for men and 73.7 years for women in Singapore.