PHCM9129
Prevention and
Management of
Chronic Disease

Module 2

Chronic disease in Australia and globally

Basic concepts

This section is about chronic disease both globally and in Australia. We firstly explore what chronic diseases are and their causes including behavioural and physiological risk factors. We then describe their epidemiology in Australia and internationally, and their impact on health services and the community.

Learning objectives

By the end of this section you will be able to:

- Define chronic diseases and their causes
- Identify their risk factors
- Describe their epidemiology globally and in Australia
- Describe their impact on health services and the community

2.1 What are chronic conditions?

The World Health Organization (WHO) defined chronic diseases as having one or more of the following characteristics: they are permanent, leave residual disability, are caused by non-reversible pathological alteration, require special training of the patient for rehabilitation, or may be expected to require a long period of supervision, observation, or care [1]. The Australian Institute of Health and Welfare (AIHW) listed the eight chronic diseases that had the greatest impact on the Australian health-care system. In order of greatest burden of disease and mortality they were cardiovascular disease, cancer, chronic kidney disease, diabetes, mental health, musculoskeletal conditions, oral health and respiratory diseases [2]. Chronic conditions are associated with mortality, disability and loss of function, often from complications. For example, diabetes may lead to loss of vision, kidney disease, infection, loss of sensation or circulation to the limbs leading to amputations. Chronic diseases share some important features [3]:

- they take decades to become fully established – their causes begin operating at early in life;
- given their long duration (defined as 6 months or more), there are many opportunities for prevention;
- they require a long-term and systematic approach to treatment.
- they can have an important impact on the lives of individuals and the burden of disease in society.

2.2 What are their causes and risk factors?

Many chronic diseases have preventable causes. Although genetic factors play a role (and there is some evidence that up-regulation early in life and the human biome may contribute to physiological changes e.g. in obesity), up to 80% of heart disease, stroke, and type 2 diabetes and over one third of cancers could be prevented by changing behavioural risk factors including tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol. These behaviours contribute to physiological changes in the individual that often lead to chronic conditions. These physiological risk factors include overweight, high blood pressure, abnormal lipids (cholesterol) and abnormal glucose metabolism. Social factors including aging of the population, poverty, work, education, transport, and urbanisation contribute to the patterns of both the risk factors and thus chronic disease in communities.

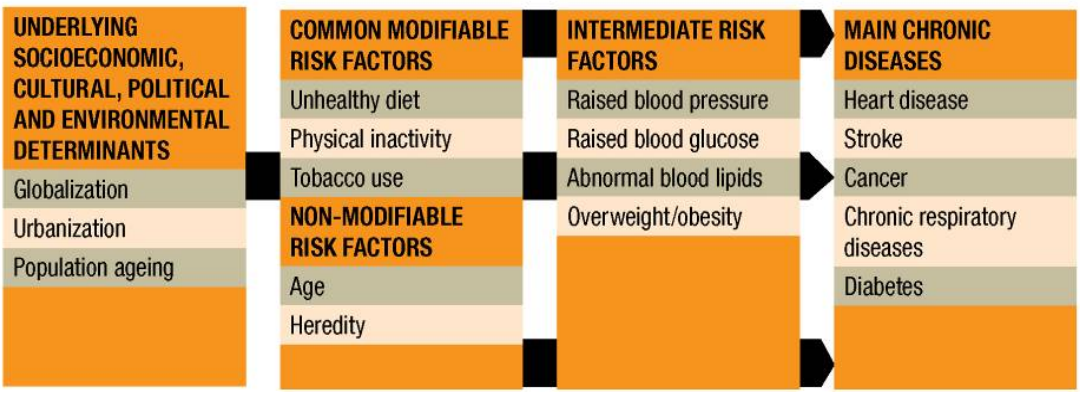

Figure 1: Risk factors for chronic disease [3]

2.3 What is the epidemiology of chronic diseases in Australia?

Data from the 2017-18 National Health Survey indicated that nearly half (47%) of the Australian population had at least 1 of 8 selected chronic diseases: arthritis, asthma, back pain and problems, cancer, cardiovascular disease, chronic obstructive pulmonary disease (COPD), diabetes, and mental health conditions [4]. In 2011, non-communicable (largely chronic) diseases accounted for about 90% of the total burden of disease in Australia [2]. Premature mortality from cardiovascular disease has decreased substantially over the past 30 years, with the rate decreasing by around 4% per year [5]. However, despite this decline, cardiovascular disease remained the leading cause of morbidity and mortality in Australia in 2011-12, with a prevalence of 22% and 30% of deaths recorded with cardiovascular disease as the underlying cause of death [5].

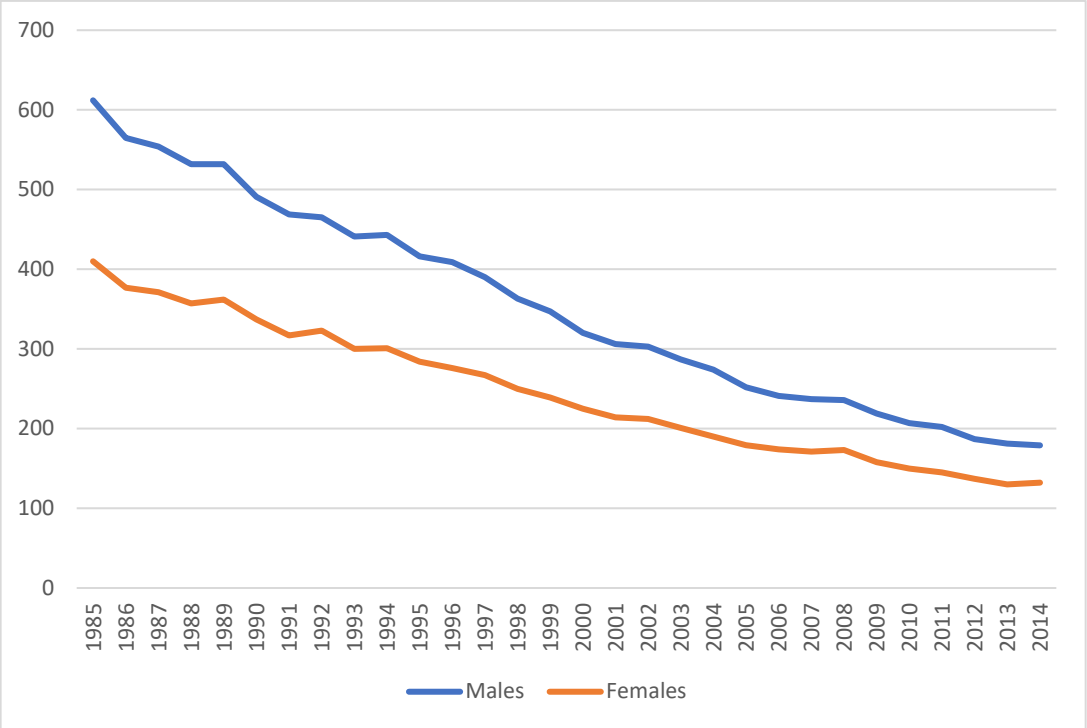

Figure 2: Trend in coronary heart disease death rates (rate per 100,000 25+yrs) Australia 1985-2014 (Age-standardised to the 2001 Australian Standard Population)
Source: AIHW National Mortality Database. [6]

Overall smoking rates and blood pressure have fallen (from 33% for males and 26% for females aged 18 years and older who reported smoking daily in 1985 to 20.4% and 16.3% respectively in 2011-12) along with a steady decline in premature cardiovascular disease mortality. Risky alcohol consumption has remained slightly increased (from 13.1 to 13.3% for males and 8.5% to 10.1% for females).

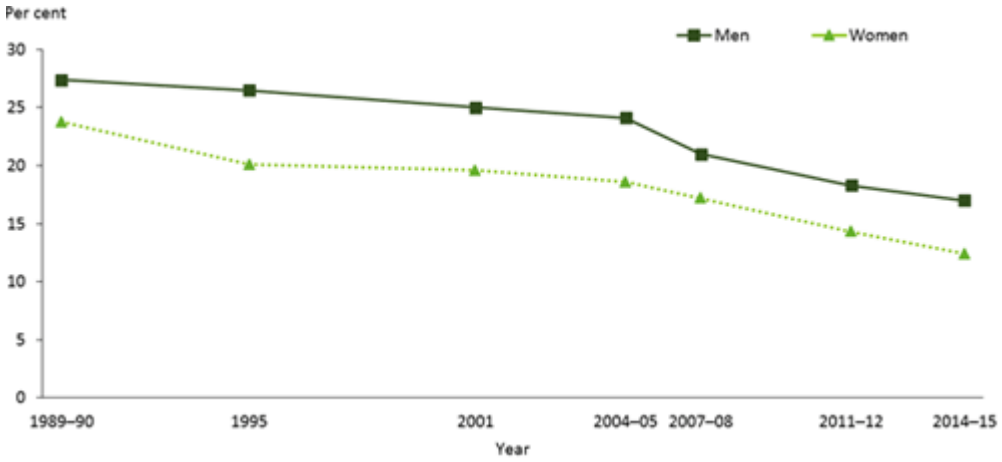

Figure 3: Prevalence of daily smoking in persons aged 18 and over, by sex, 1989–90 to 2014–15 [7]

The prevalence of type 2 diabetes increased almost three-fold between 1989-90 and 2011-12 [5]. The rate has stabilised since 2014-15 [4].

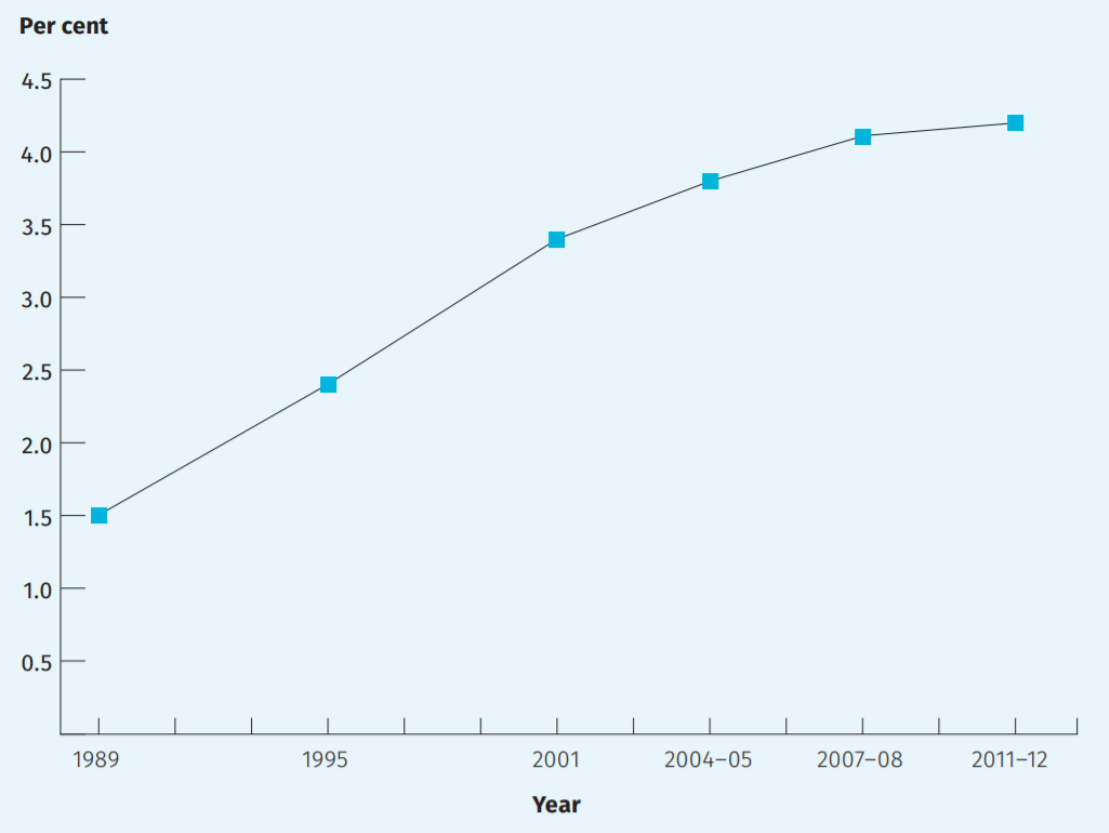

Figure 4: Trends in self-reported diabetes prevalence, 1989–90 to 2011–12 [8]

This is associated with the rise in overweight and obesity rates. The proportion who are overweight or obese has increased from 1995 to 2014/15 (males from 65% to 71% and females from 50% to 56%) [9]. Poor diet and physical activity levels are in turn related to broader societal and economic trends including the form of urban settlements in Australia. Physical inactivity rates have remained stable over the past decade with 54% of adult females and 51% of adult males not engaging in sufficient

physical activity. Sedentary activity occupied an average of 39 hours per week in 2011-12 [9].

Many Australians suffer from multiple long-term conditions: in 2011-12 20% of the total population reported having two or more chronic conditions, rising to almost 40% in the over 45-year age group [2]. Physical and emotional health problems frequently co-exist [10]. Over half of potentially preventable hospitalisations are from chronic disease [5].

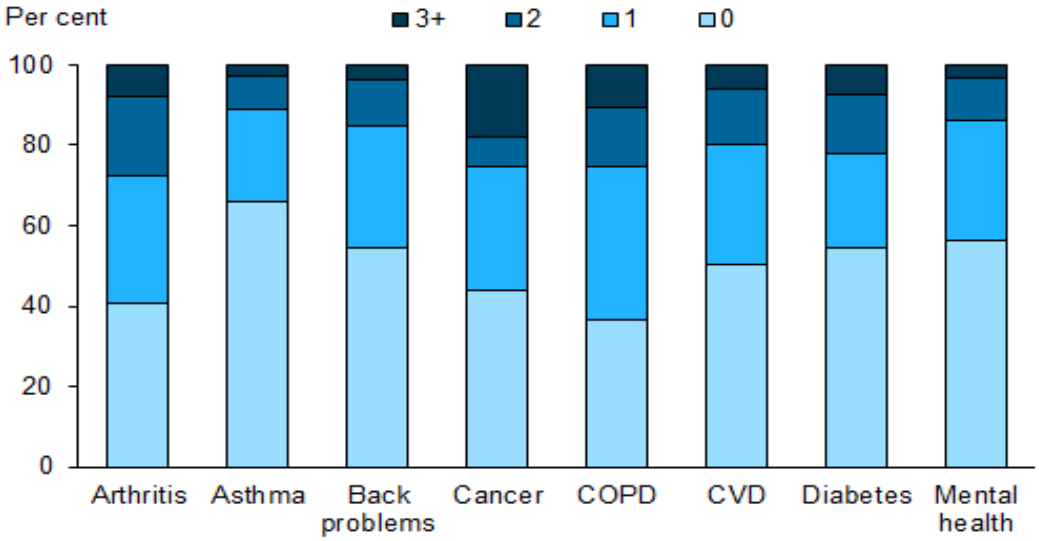

Figure 5: Proportion of people aged 0-44 years with additional chronic diseases (0, 1, 2 and 3 or more) among those with selected chronic diseases, 2011-12 [11]

The increasing prevalence of chronic illness is related to an ageing population in Australia where life expectancy at birth was 82.5 years in 2014-2016 [12].

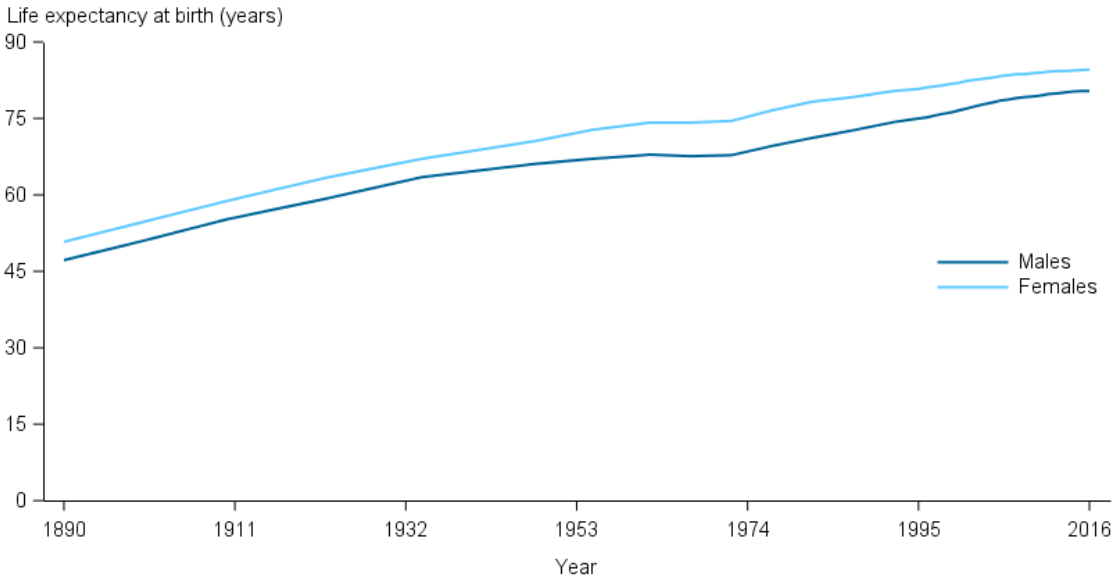

Figure 6: Life expectancy (years) at birth by gender, 1881-1890 to 2011-2013 [13]

It is also associated with the changing prevalence of the behavioural risk factors (smoking, poor nutrition, hazardous alcohol consumption and physical inactivity – SNAP) and physiological risks (overweight, abnormal lipids, hypertension and abnormal glucose metabolism). These translate into physiological risk factors. In 2011-12 the ABS found that 24% of adult males and 22% of females had high blood pressure [14]. One third (33%) of adults had elevated total cholesterol and 3% had impaired glucose tolerance putting them at high risk of developing diabetes.

Patients with chronic diseases frequently present in primary care. The five most common chronic conditions comprise over half of the reasons that patient's present in general practice [15]. However, there is a gap between current and optimal practice. For example, less than half of patients have all their risk factors recorded, less than half of people at risk are offered age appropriate lifestyle interventions and less than half of those with chronic conditions achieve optimal intermediate outcomes (such as control of blood pressure or glucose) [16]. These gaps are worse for patients with co- or multi-morbidity. A number of factors influence the management of these risk factors in primary health care including provider attitudes, the organisation of care including the roles of the members of health care teams, patient health literacy and access to referral and support services [17, 18].

Socially and economically disadvantaged Australians suffer the greatest burden of these illnesses [19], are at greater risk of their antecedent risk factors [20] and have reduced access to quality care. This inverse care [21] particularly affects Aboriginal and Torres Strait Islander communities [22]. Addressing these inequities requires attention not only to the capacity constraints operating on primary health care services in disadvantaged areas, but also to the complex social processes and contexts that shape chronic disease management. These inequities have emerged as a result of different rates of decline in overall rates of disease (such as cardiovascular disease) or increases in the rates (such as diabetes) between higher or lower socioeconomic groups. Risk factors for chronic disease are also socioeconomically distributed and there is a trend for the social gradient in the prevalence of these risk factors to have widened in relative terms over the past 20 years. This translates into continuing gradients in morbidity and mortality.

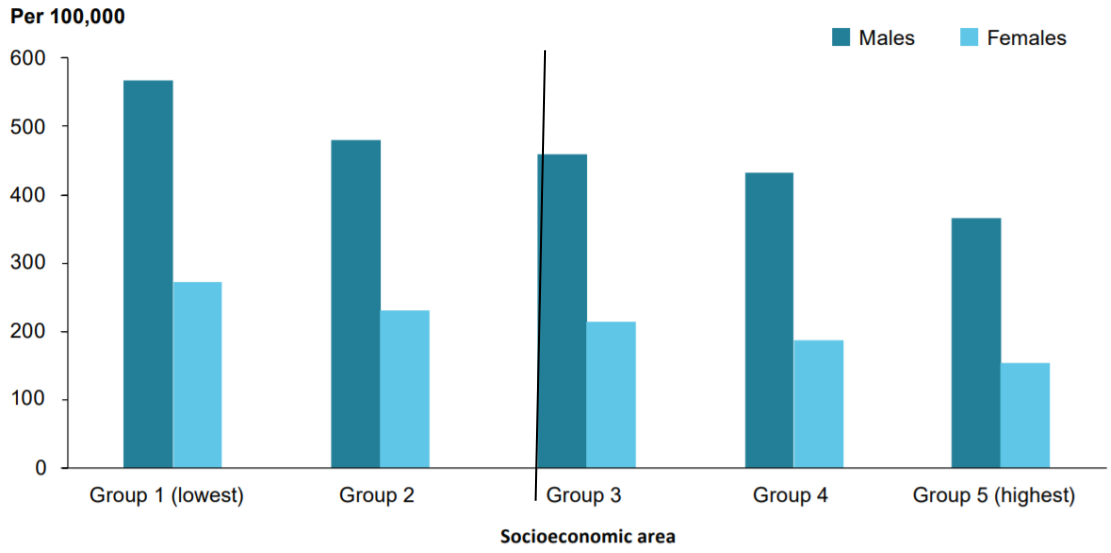

Figure 7: Heart attack incidence, people aged 25 and over, by socioeconomic area and sex, 2016 [23]

2.4 What is the epidemiology of chronic disease globally?

Non communicable disease (NCD) are estimated to cause 38 million deaths annually globally [24]. Of these, 28 million (74%) of them occurred in low-and middle-income countries (LMIC) [24]. In terms of total deaths, NCDs cause most deaths in all of the WHO regions, with it being highest in South Asia and Western Pacific, as these two regions contain the two countries with the largest populations in the world, China and India. These two countries contribute to LMICs having the largest burden of deaths due NCDs.

NCD deaths have been projected to increase by 15% (to an estimated 44 million deaths) between 2010-2020. In terms of geographical areas, the highest increases are projected to be in Africa, South-East Asia and Eastern Mediterranean, using WHO regions [25].

The leading causes of NCD deaths globally (in 2012) were: cardiovascular diseases (17.5 million deaths, or 48% of NCD deaths); cancers (8.2 million, or 21%); respiratory diseases, including asthma and chronic obstructive pulmonary disease (COPD), (4.2 million), and diabetes (1.3 million deaths) [24].

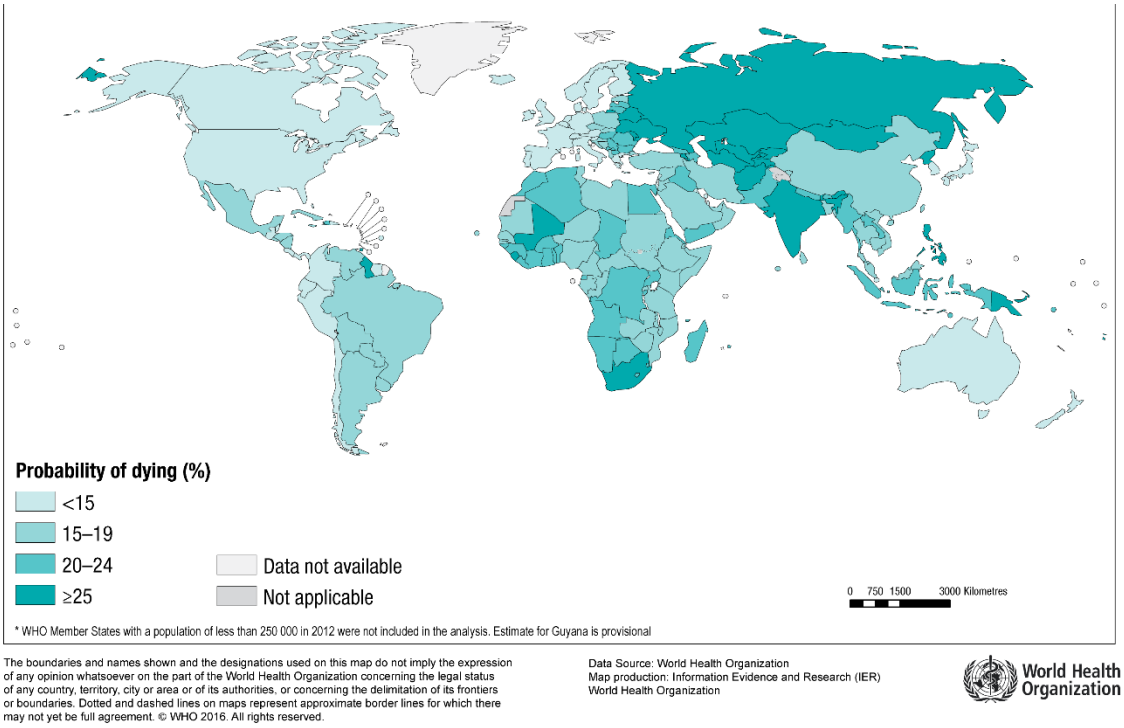

Figure 8: Probability of dying from CVD, Cancer, Diabetes or Chronic Respiratory Disease Aged 30-70 years WHO Global Health Observatory 2012 [26]

The Global Burden of Diseases, Injuries, and Risk Factors Study 2013 (GBD 2013) identified that while there have been major reductions in child mortality, demographic change has resulted from people living longer. The GBD uses premature deaths and disability (or DALYs) to calculate the burden of disease. The demographic changes are resulting in the increase in DALYs from NCDs. For instance, while in 1990, childhood underweight was the leading factor for ill health, by 2010 high body mass index (BMI) was the highest cause of premature death and disability.

Data from the GBD, allow us to look at leading cause of death and premature death by regions and countries. The three highest causes of death in South Asia were: Ischemic Heart Disease, COPD and Stroke, all NCDs [Figure 7]. In South Asia, GBD 2010 documented important regional trends that reveal substantial declines in health loss due to communicable, maternal, and childhood diseases; nonetheless, despite great progress, these conditions still topped many countries' health burdens in South Asia. At the same time, most countries experienced an increasing disease burden due to non-communicable diseases from 1990 to 2010. This dual burden of communicable and non-communicable diseases was largely driven by India, which is the largest country in the region. Road injuries and self-harm were also dominant causes of premature death and disability in the region.

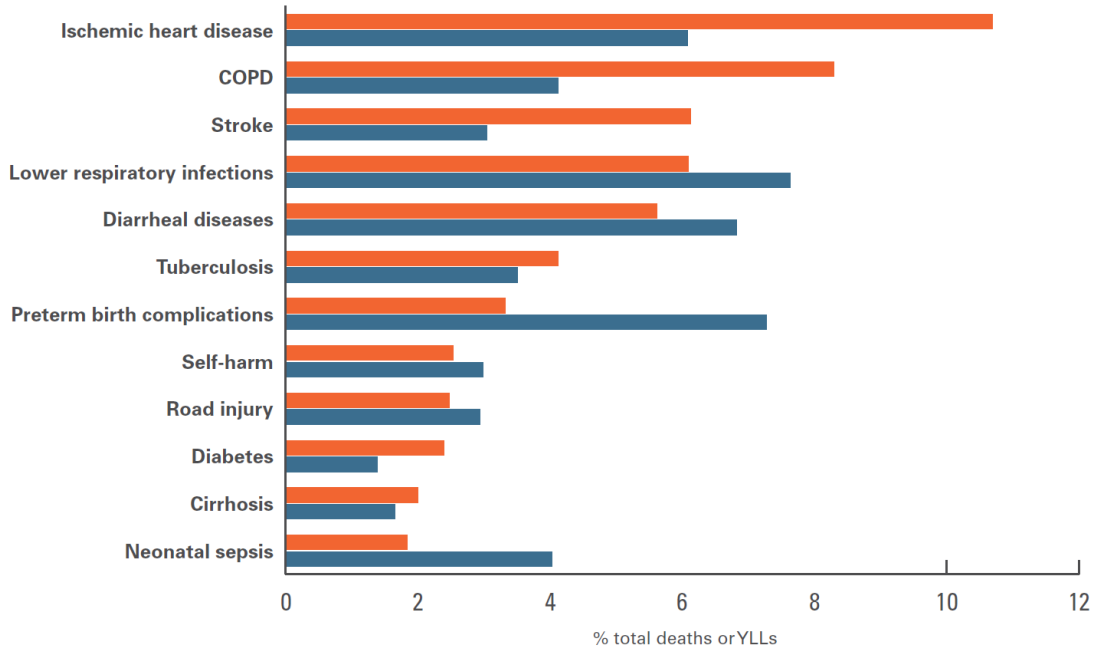

Figure 9: Leading causes of death and premature death in South Asia, 2010 [27]

Learning Activity 1

Go to the WHO website and download the report Global status report on non-communicable diseases 2014. Geneva, World Health Organization, 2014.
http://www.who.int/nmh/publications/ncd-status-report-2014/en/

What does this report say about the burden of chronic disease in different regions and countries with differing levels of economic development? What factors are associated with this?

Global prevalence in NCD risk factors

The four main behavioural risk factors are: tobacco use, physical inactivity, harmful use of alcohol and unhealthy diet. Smoking is estimated to cause about 71% of lung cancer, 42% of chronic respiratory disease and 10% of cardiovascular disease. Deaths due to tobacco use will increase from 6 million to 7.5 million by 2020. People with insufficient physical activity have a 20-30% increased risk of all-cause mortality. This is highest in high income countries, but very high levels are now seen in middle income countries especially among women. Harmful use of alcohol (as adult per capita consumption) is highest in high-income countries, but it is nearly as high in upper middle-income countries. Adequate intake of fruit and vegetables reduces risk of cardiovascular diseases, stomach cancer and colorectal cancer. High consumption of saturated fats and trans–fatty acids is linked to heart disease. Unhealthy diet is rising quickly in LMIC.

The data from the GBD provides some important insight to the changes in risk factors between 1990 and 2010 [Figure 8]. As the leading global risk factor for DALYs in 2010, dietary risks and alcohol use increased 30% between 1990 and 2010. Dietary

risks include components such as high sodium intake and lack of fruit, nuts and seeds, and whole grain intake. GBD found the diseases linked to dietary risks and physical inactivity are primarily cardiovascular diseases as well as cancer and diabetes [28]. When the intermediate risk factors (the immediate cause of NCDs: see figure 1) are considered, the GBD study shows that BMI and high fasting blood sugar has increase by 78% and 56% respectively from 1990 to 2020.

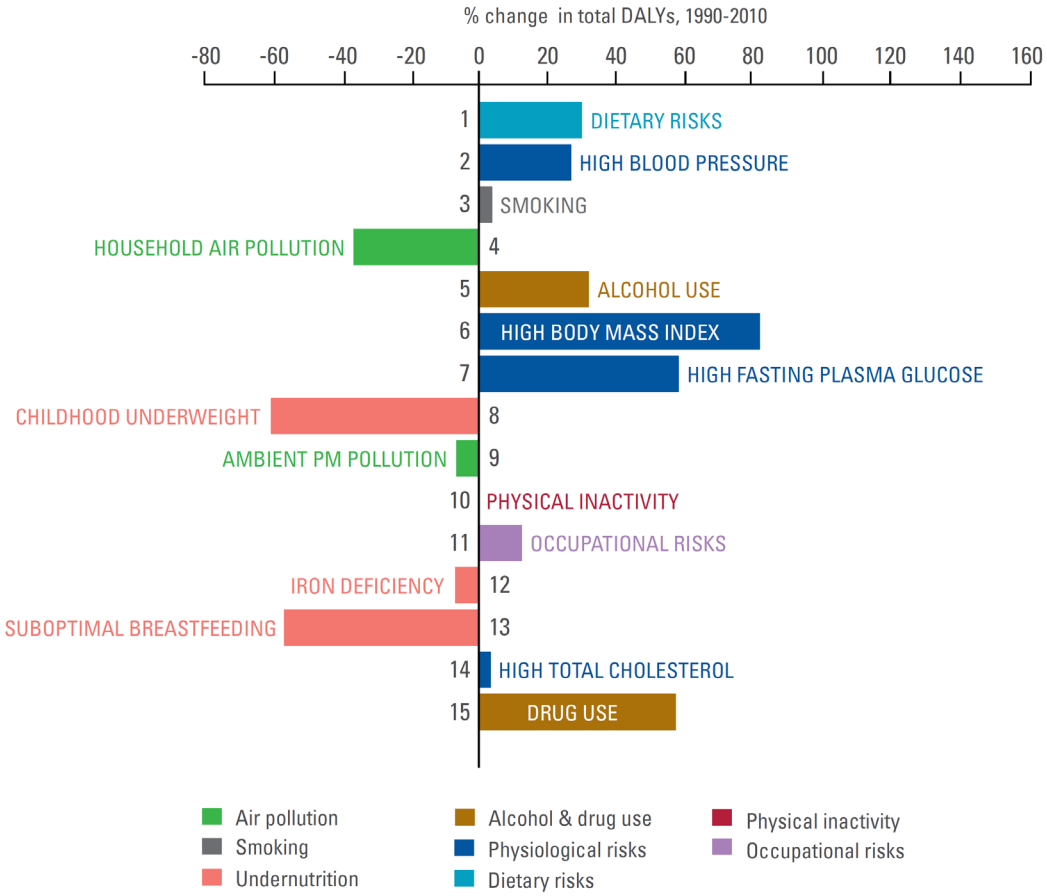

Figure 10: Shifts in ranking of DALY for top 15 risk factors, 1990-2010 [28]

Global action on NCDs

In 2011 the UN General Assembly adopted a declaration on the prevention and control of NCDs. Subsequently global targets were set to reduce premature mortality from the four main NCDs: cardiovascular diseases, chronic respiratory diseases, cancers and diabetes by 25% by 2025 (referred to as the 25x25 target).

Targets were set for individual risk factors:

Tobacco use	30% relative reduction
Harmful alcohol use	10% reduction in alcohol consumption
Salt intake	30% reduction in mean intake
Obesity	No increase
Raised BP	25% reduction in prevalence
Raised blood glucose and diabetes	No increase

Modelling based on these targets suggests that achieving these targets would reduce mortality from the four main NCDs by 22% in men and 19% in women. These benefits will occur mostly in low- and middle-income countries and help reduce health inequalities [25].

Australia's Strategic Framework for Chronic Disease

Based in part on the UN global strategy, the Council of Australian Governments (COAG) endorsed an overarching policy for the prevention and management of chronic conditions in Australia in 2017 for the next eight years [29]. This includes objectives in three areas:

1: Focus on prevention

- Promote health and reduce risk
- Partnerships for health
- Critical life stages
- Timely and appropriate detection and intervention

Objective 2: Efficient, effective and appropriate care to support people with chronic conditions to optimise quality of life

- Active engagement
- Continuity of care
- Accessible health services
- Information sharing
- Supportive systems

Objective 3: Target priority populations

- Aboriginal and Torres Strait Islander health
- Action and empowerment

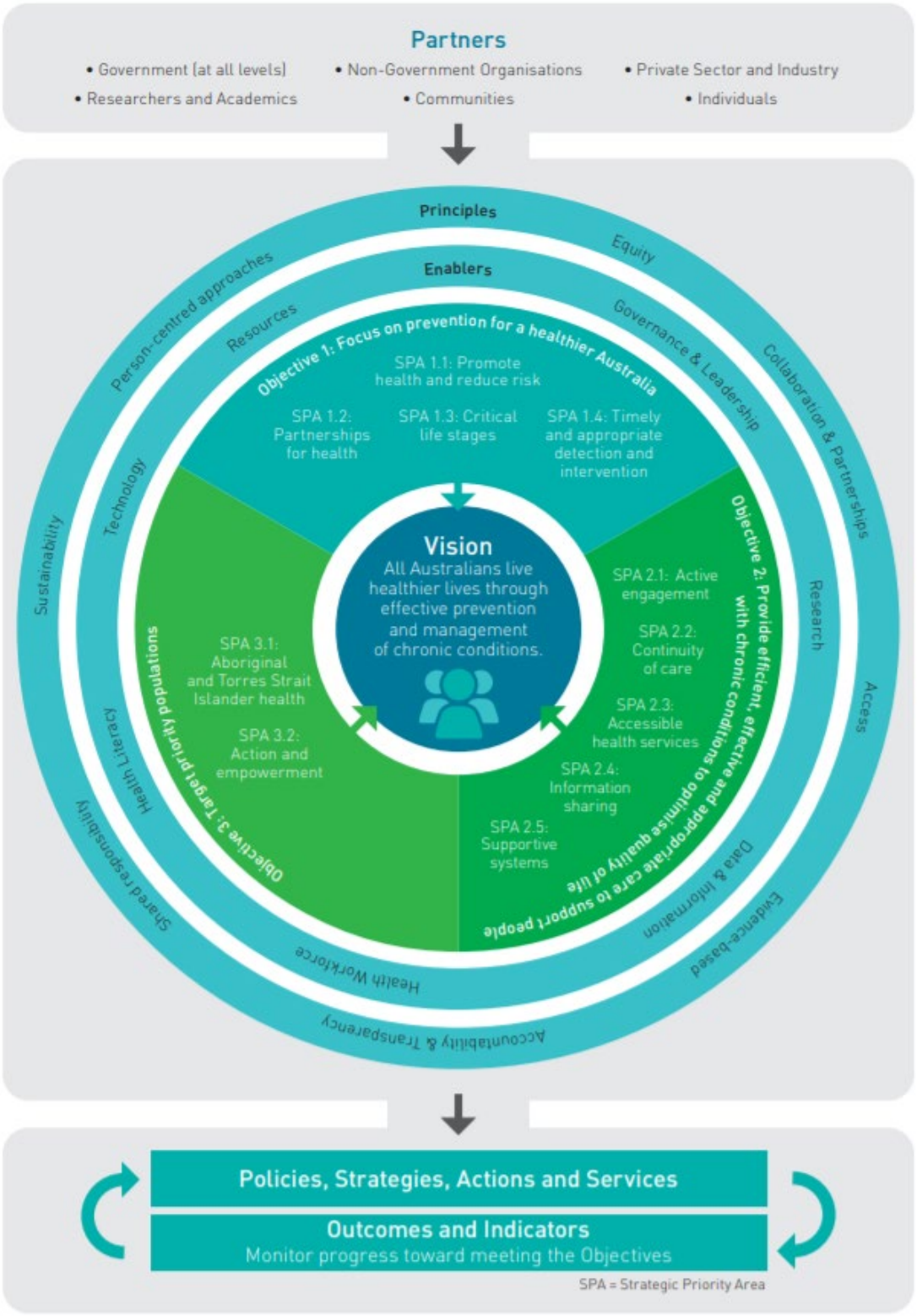

Figure 11: Concept map of the Australian National Strategic Framework for Chronic Conditions [29]

Learning Activity 2

Watch the presentation on WHOs Global Strategy on Non-Communicable Diseases

http://www.youtube.com/watch?v=uGZbbC0Smi4&list=UU07-dOwgza1IguKA86jqxNA

2.5 What is the impact of chronic diseases on health services and the Australian community?

Chronic long-term conditions place an increasing burden on Australia's health system and wider economy, accounting for the majority of disability adjusted life years lost or impaired due to ill health (DALYs). Ischaemic heart disease (9.8%), anxiety and depression (7%), Type 2 diabetes (4.9%), stroke (4.1%) and chronic respiratory disease (3.6%) accounted for approximately one third of DALYs arising from non-fatal/lower fatality diseases [22].

Globally, chronic diseases have an increasing economic impact on countries and place an increasing burden on the health system to cope with the demand on health facilities especially hospitals. People living in poor communities are both more vulnerable to chronic diseases because of poverty, higher levels of risk behaviour and limited access to good-quality health care and are more likely to suffer loss of employment or income as a result of having a chronic illness. Chronic disease may also contribute to poverty because of catastrophic expenditure on health care or because of the loss of income when a bread winner is not able to find or retain work.

Learning Activity 3

Go to the WHO website and download the report **Preventing chronic diseases: a vital investment**
http://www.who.int/chp/chronic_disease_report/en/

What does this report say about economic impact of chronic disease both on individuals and countries?

Suggested further reading

WHO. *Preventing chronic diseases: a vital investment*. WHO: Geneva; 2005. http://www.who.int/chp/chronic_disease_report/en/

WHO. *WHO Global action plan for the prevention and control of non communicable diseases 2013-2020*. Geneva: WHO; 2013. http://www.who.int/nmh/publications/ncd-action-plan/en/

Managing Chronic Conditions: Experience in eight countries. Nolte E, Knai C and McKee M (Eds). European Observatory on Health Systems and Policies Series No 15. WHO Regional Office for Europe: Copenhagen; 2008. http://www.euro.who.int/en/health-topics/Health-systems/primary-health-care/publications/pre-2009/managing-chronic-conditions.-experience-in-eight-countries-2008

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