Non-communicable diseases and risk factors in migrants from South Asian countries

Literature review and scoping report

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CONTENTS

LITERATURE REVIEW: MIGRATION AND NCDS

Overview

The following document contains a review for a research project on migration and chronic or non-communicable diseases (NCDs). It begins with an overview of the geographical scope; the review focuses specifically on migrants that originate in small South Asian countries of Afghanistan, Bhutan, Maldives, Nepal and Sri Lanka. Next, it outlines the 'healthy migrant effect', a phenomenon where migrants experience better health outcomes than the local or sending populations initially, but worse outcomes over the longer-term. It then turns to NCDs and risk factors in turn. For each NCD or risk factor, an overview of data on incidence in sending countries is given, followed by a discussion of any relevant literature relating to the health of migrants from the sending countries of interest. Finally, a brief summary of NCD-related migration policy is discussed. Searches performed are detailed in Appendix A.

Geographical scope

This review is focused on migrants from smaller South Asian countries: Afghanistan (where possible), Bhutan, Maldives, Nepal and Sri Lanka (Figure 1). It is not specifically focused on any particular receiving countries, regions or cities, but instead captures available data on any of these.

Figure 1: Map of small South Asian countries in this review.

Migration is related to historical ties between populations, and reflects ongoing interplay between external ('pull') and internal ('push') factors, ecological events and market forces (Haque 2005). Today, according only to official figures collected by the IOM, labour migration from Afghanistan (approximately one in six workers from Afghanistan is abroad), Nepal (7%) and Sri Lanka (25%) is growing (Agunias & Aghazarm 2012). While, according to official figures, many of those who migrate from South Asian countries through formal channels today migrate temporarily to work in the Middle East, East and South East Asia, more permanent flows to Australia, Canada and the United States continue to occur (Agunias & Aghazarm 2012). There may also be less well-documented flows to South East and East Asia. More than 2 million South Asians (from India, Pakistan, Bangladesh, Sri Lanka and Nepal) live in the United States, almost 1 million live in Canada, and they comprise the largest ethnic minority group in the UK (representing 4% of the total UK population); many of these migrants belong to the lower socioeconomic classes and have a much higher risk of developing chronic diseases compared to migrants from other parts of the world (Bhowmik et al. 2013). At the same time, there continues to be significant rural-urban migration within South Asian countries (particularly in Bhutan (WHO SEARO 2013)), as well as forced (and often undocumented) migration of Afghan refugees to neighbouring countries of Iran and Pakistan (Otoukesh et al. 2012).

Migrant health data are of varying quality; there is a wide variety of reasons that this is the case. Amongst migrants to Europe, ethnicity-specific epidemiological mortality data exist for 24 countries. However, ethnicity-specific health and interview surveys have only been carried out in twelve countries (Belgium, Denmark, France, Germany, Italy, Netherlands, Portugal, Sweden, England, Scotland, Wales, and Northern Ireland), and only six countries (Denmark, Germany, Italy, Sweden, England and Scotland) have migrant and ethnicity-specific disease registers. These registers, which include data relating to cardiovascular disease and diabetes, tend to group migrants into 'South Asian' (Indian, Pakistani, Bangladeshi and Sri Lankan) or 'other Asian', using proxies such as self-reported country of birth, nationality, or parent/grandparent country of birth (Rafnsson & Bhopal 2009). Likewise, in a number of epidemiological studies reported here, data for Sri Lanka were combined with those from India. As discussed later in this paper, such categorical clustering has been shown to be problematic when investigating migrant health and NCDs.

Afghanistan

In 2013, there were an estimated 5 million Afghan refugees, over 4.5 million of which had migrated to less-developed regions (UN Department of Economic and Social Affairs 2013). Most Afghan emigrants can be found in Pakistan and Iran; while 1.7 million are formally registered in Pakistan and over one million in Iran, the number is expected to be much higher than this (Mehlmann 2011; UN Department of Economic and Social Affairs 2013). A significant proportion of these emigrated to Pakistan between 1979 and 1985, and Iran between 1980 and 1989. It is estimated that significant amounts of Afghan migrants also live in Russia (an estimated 150,000 people), the Gulf States (100,000), the US (66,000), Canada (25,000), Germany (72,000), the Netherlands (40,000), and the UK (estimates vary). Within Europe, there are also smaller Afghan diasporas in Sweden (11,000), Denmark (9,717), and Norway (7,500). Outside of Europe, Afghan communities are found in Australia, Greece and Turkey (Mehlmann 2011), as well as Saudi Arabia. A detailed review of data on Afghan migrants can be found in Mehlmann (2011; data are summarised in a table on pages 37-38).

Bhutan

In 2013, 90,000 migrants were reported to have originated from Bhutan, over 85,000 of which had migrated to less-developed regions (UN Department of Economic and Social Affairs 2013). Key destinations were Nepal (79,800) and India (6,700), as well as Australia (1,617) (*ibid.*). There continues to be significant rural-urban migration within Bhutan (WHO SEARO 2013)).

Maldives

External migration from the Maldives is very small; in 2008, the emigration rate was 0.4% (approximately 1,300 migrants in total, predominantly in Australia, New Zealand and India) (UN Department of Economic and Social Affairs 2013), and 1.1% of the population (3,200 people) was made up of returned migrants (UNDP 2010). However, migration within the country – especially from outer islands towards the capital city of Malé – is significant. At the same time, Maldives is a destination country for migrants (or 'expatriate workers') from South Asia. An estimated 80,000 migrants (25% of the population of Maldives) from this region – especially from Sri Lanka (9,500), India (23,000), Bangladesh (39,000), Nepal (3,000) and Indonesia (1,400) – were working in the Maldives in 2008 (UNDP 2010).

Nepal

An estimated 1 million Nepali migrants were living outside of Nepal in 2013; 188,000 in developed regions and 856,000 in developing regions (UN Department of Economic and Social Affairs 2013). Nepal is one of the largest suppliers of labour to Gulf countries such as Qatar, Saudi Arabia and the United Arab Emirates (Joshi et al. 2011); 30,000 Nepali migrants were estimated to be in this region in 2013 (UN Department of Economic and Social Affairs 2013). There are significant numbers of Nepali migrants recorded in Malaysia (201,000), India (553,000), and Bangladesh (38,000). There are also regular flows of Nepali migrants to the US (85,000), UK (44,000) and Australia (31,600); these migrants are given pre-departure health assessments through the Migration Health Department (MHD) located in Damak, Jhapa and the Migration Health Assessment Center (MHAC) located in Kathmandu; IOM Migration Health Department (MHD) in Nepal collaborates with the Ministry of Health and Population of Nepal, UN agencies and partner organizations to operate through these two centres.

Sri Lanka

In 2013, there were an estimated 1.25 million Sri Lankan migrants; approximately 660,000 were in more-developed regions and 588,000 in less-developed regions (UN Department of Economic and Social Affairs 2013). Annual labour migration from Sri Lanka averaged 200,000 people per year in the mid-2010s, with half of those emigrating being employed as housemaids, many in the United Arab Emirates (Abella & Ducanes 2009). There are significant numbers of Sri Lankan migrants living in Kuwait (27,200), Qatar (21,500), Saudi Arabia (147,000) and the UAE (106,400), as well as Korea (21,600), India (158,000), the UK (134,000), Italy (80,500), France (39,600), Germany (41,200), Switzerland (32,000), the Netherlands (10,000), Canada (124,000), the USA (53,300), and Australia (16,700) (UN Department of Economic and Social Affairs 2013).

Healthy migrant effect

The ‘healthy migrant phenomenon’ or ‘healthy migrant effect’ describes patterns observed in immigrant health status. Most studies supporting the healthy migrant effect theory originate from the United States (with reference to Latin American immigrants), Canada, Australia and Western Europe (Fennelly 2007). On a variety of measures drawn from available data sets (for example, see Table 1), especially those related to chronic conditions (McDonald & Kennedy 2004), immigrants are often healthier than native-born citizens in their new country

of residence; however, over time, this initial health advantage decreases significantly (Fennelly 2007; Davey Smith et al. 2000). This effect is stronger for immigrants from developing countries – including those in the South Asia region – than for those who migrate from developed countries (Kennedy et al. 2007). In addition, migrants from South Asian countries to the UK do not initially demonstrate the British class gradient in mortality (Williams et al. 1998).

Table 1: An example of the measures of health status used in research on the 'healthy immigrant effect' (McDonald & Kennedy, 2004: 1616).

Chronic medical conditions (diagnosed by a healthcare professional)		**Self-assessed general health status (on a five-point scale)**
Type A (not normally life-threatening)	**Type B * (more serious)**	
Asthma	Heart disease	Excellent
Back pain	Cancer	Very good
High blood pressure	Diseases of the thyroid	Good
Allergies	Crohn's disease	Fair
Migraines	Diabetes	Poor
Ulcers		
Bronchitis		
Arthritis		

* Glaucoma, stroke, cataracts, incontinence and Alzheimer's disease are excluded from analysis because of low incidence among people aged 21-65.

The healthy migrant effect is unexpected given that migrant status, ethnicity and race imply major economic and health inequalities and disadvantages (Bhopal 2009). Economic inequality in particular has been associated with increased rates of obesity and associated NCDs in developed countries (Pickett et al. 2005; Department of Health Public Health Research Consortium et al. 2007; Drewnowski 2009; Offer et al. 2012).

Various theoretical models have been advanced to attempt to explain this phenomenon (Kennedy et al. 2007). It has been suggested that initial 'health gains' might relate to: labour migrants initially being younger and healthier than the native population (Calderon et al. 2012); health screening by recipient countries; health convergence (healthy behaviour/lifestyle pre-migration followed by steady adoption of a recipient country lifestyle that is less-healthy) (McDonald & Kennedy 2004); or immigrant self-selection (i.e. healthier

and wealthier people tend to migrate) (Kennedy et al. 2007). Other authors have argued that Sri Lankans in Oslo experience a lower risk of cardiovascular disease as a result of changes in the type of fats consumed and increased adoption of leisure time physical activity (Tennakoon, Kumar & Meyer 2013). Others again have reviewed data on migrants to the UK and suggested that people who are sick might return to their original home; inaccurate recording of migration may further artificially reduce the mortality rate figures in the host country (Davey Smith et al. 2000).

Some researchers have instead focused on theorising declines in initial health gains; they argue that such gains conceal losses which are only manifested over time. In their review of ethnic inequalities in health amongst migrants in the UK, Davey Smith et al. (2000) discuss contributing factors that fall under broad themes of culture, beliefs and behaviour, kinship, racism, biology, health service access and use. Data from Indian, Bangladeshi and Pakistani migrants into the UK suggest that socioeconomic (or class) gradients which underlie inequality and standard of living are likely to first emerge in health behaviours and risk factors, and only later in NCDs and mortality data (Bhopal et al. 2002; Williams et al. 1998). Migrants' vulnerability to ill health is then likely to increase over time due to various cumulative risk factors including lack of health insurance, poverty and uncertain legal and social status (Calderon et al. 2012) as well as stress and possibly racism (Davey Smith et al. 2000). Downward social mobility is positively and iteratively correlated with long-term illness amongst South Asian migrants to the UK (Harding 2003).

Non-communicable diseases (NCDs)

Globally, NCDs contribute to more than 36 million deaths each year; nearly 80% of NCD-related deaths (29 million), and 90% of deaths which occur below the age of 60, occur in low- and middle-income countries (World Health Organisation 2013b) (Figure 2). NCDs are the leading cause of death in the South Asia region (Figure 3); accounting for 55% (or 7.9 million) of all deaths annually (World Health Organisation 2011; Narain 2011). This number is projected to rise by 21% by 2020 (Narain et al. 2011), such that the regions projected to have the greatest total number of NCD-related deaths in 2020 are South-East Asia (10.4 million deaths) and the Western Pacific (12.3 million deaths) (Alwan 2011).

There are four major NCDs which contribute to the total NCD burden in the region, and upon which this review is focused: cardiovascular diseases (CVDs), chronic respiratory diseases,

cancers and diabetes mellitus. Other chronic conditions which also contribute to the overall NCD burden include oral diseases (dental caries, periodontal diseases, and oral cancers), thalassaemia (particularly in the Maldives), renal, endocrinal, mental, neurological, haematological, gastroenterological, hepatic, musculoskeletal, skin and genetic disorders (World Health Organisation 2013a). In addition to increased mortality, NCDs are also associated with increased morbidity, which is outlined further throughout this report.

NCDs also have significant socioeconomic implications. At the microeconomic or household level, NCDs are linked to loss of productivity (due to disease, disability and premature death) and high healthcare expenditure, both of which reinforce cycles of poverty. In India, for example, treatment of diabetes can cost a household one-third of its income, and is often financed through household borrowing and sale of assets (Narain et al. 2011). In developing countries, NCD-related morbidity and mortality tend to occur in people of a younger age than they do in developed nations; of the 7.9 million deaths annually attributed to NCDs, 34% occurred before the age of 60 years (compared to 23% in the rest of the world). This means that NCDs also contribute to decreased life expectancy. The resultant loss of productivity amongst wage earners can have severe consequences for families, communities and even nations who rely on them (Reddy 2004). At the macroeconomic level, likewise, NCDs are associated with loss of productivity, decreasing economic growth and rising health-care costs. At the same time, remittances are often returned home by economic migrants; how this impacts the home population in terms of socioeconomic and demographic health change is not well understood.

Global initiatives to reduce NCDs include increased surveillance, primary prevention and strengthened health care provision. Several global and regional strategies, as well as targets and indicators, have been developed and endorsed by the World Health Assembly. Alongside global strategies, regional strategies to reduce NCDs include the creation of the South-East Asia Regional Network for Prevention and Control of Noncommunicable Diseases (SEANET-NCD) in November 2005 to strengthen regional cooperation and exchange of information. Regional attention has been particularly focused on salt-reduction strategies, research and information exchange, the development of an oral health strategy, and the provision of technical support in the areas of surveillance and intervention, action plan development and the introduction of the WHO Package of Essential Noncommunicable Disease Interventions (WHO PEN) into primary healthcare systems (World Health

Organisation 2013a). Some progress in creating the legislative and regulatory frameworks for preventing and controlling NCDs in the region has been made (Leowski & Krishnan 2009). Latest regionally-collated surveillance figures for the countries of interest are included in Appendix B: Country NCD profiles (Alwan et al. 2011).

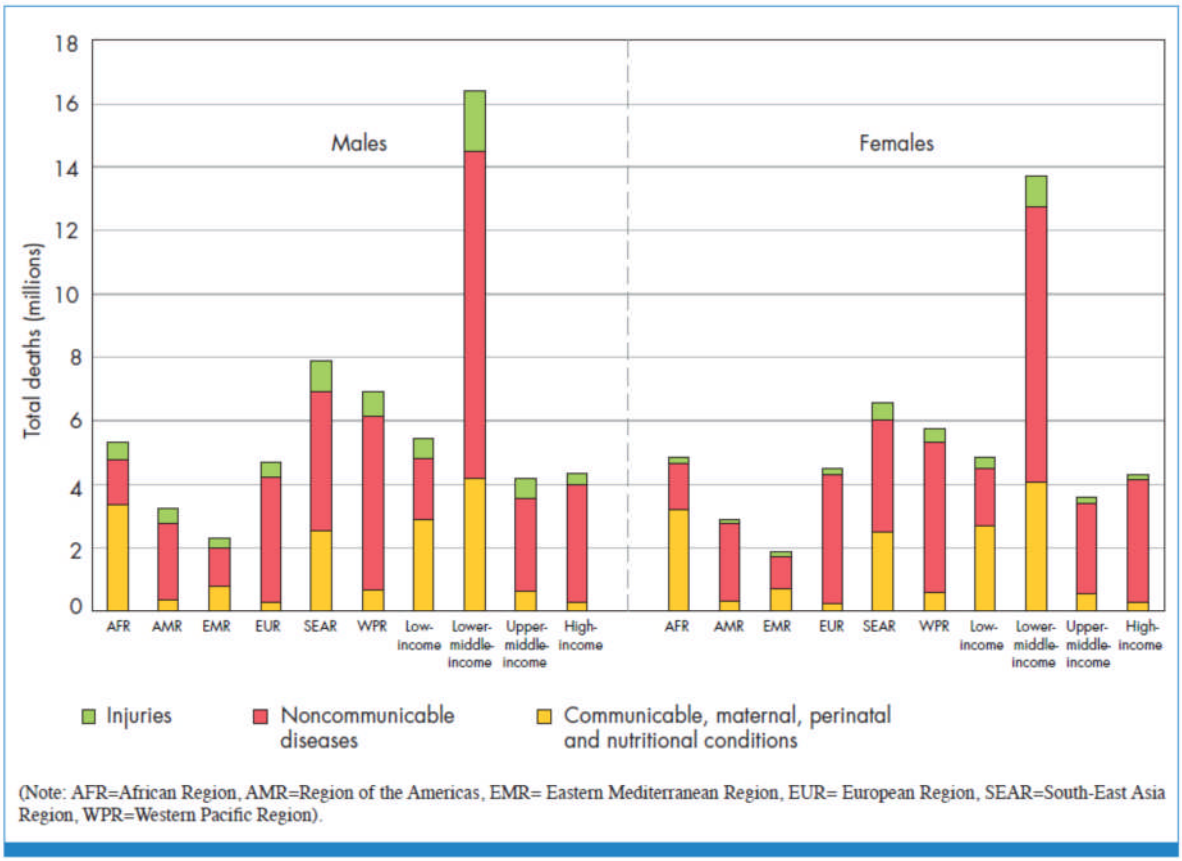

Figure 2: Total deaths in 2008 by cause group, grouped according to WHO Region, World Bank income group, and by sex (Alwan 2011: 10).

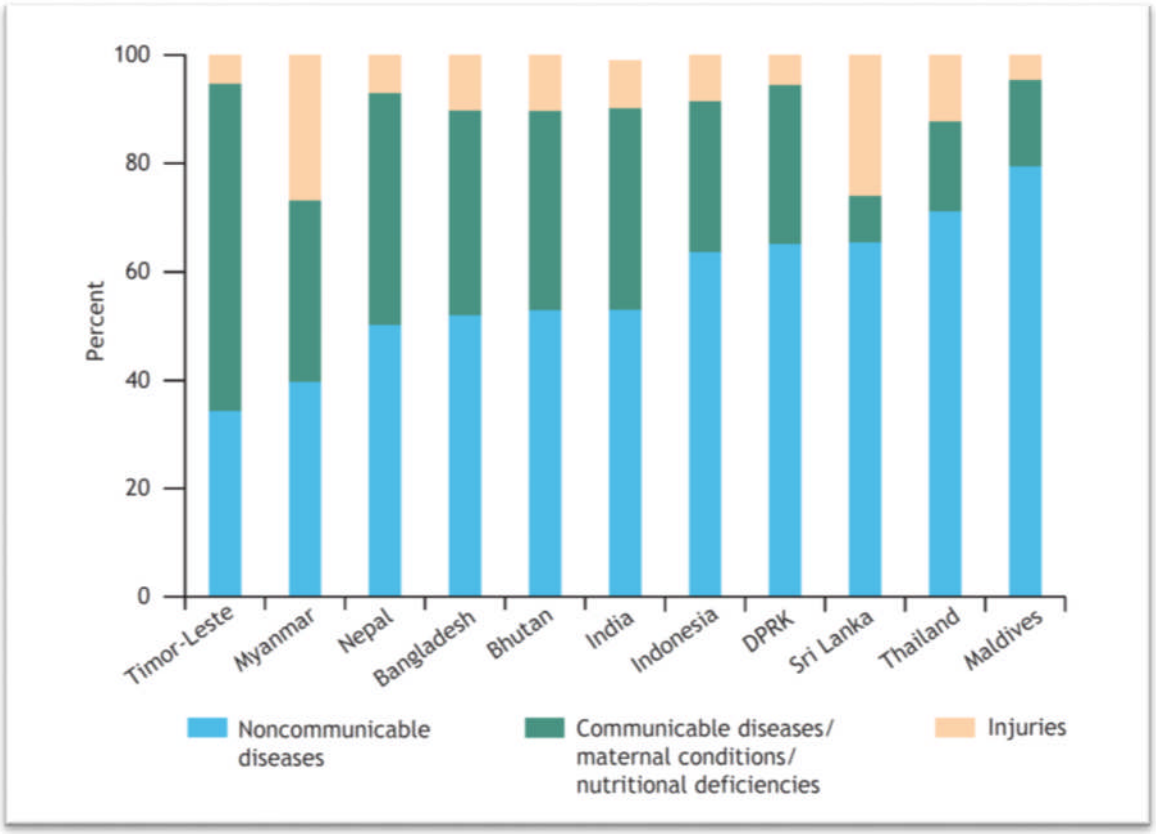

Figure 3: Estimated percentage of deaths by cause in the South-East Asia region, 2008 (World Health Organisation 2011).

At a local (national or sub-national) level, varying amounts of attention have been paid to NCDs and risk factors in the South Asian region so far. In Nepal, pilot health demographic surveillance surveys have been carried out in rural locations (Aryal et al. 2012) and in hospitals (Bhandari et al. 2014). Such small studies have identified significant levels of NCDs such as pulmonary disease, cardiovascular disease, diabetes mellitus and cancer (Bhandari et al. 2014). However, the Government of Nepal has not yet formalised NCD policy because evidence is not sufficient to do so (Bhandari et al. 2014); for this reason, surveillance and policies continue to be focused on equally-significant infectious disease and maternal/perinatal health (Vaidya et al. 2010). Data from Sri Lanka highlight a changing health landscape but at this stage curative services are prioritised over NCD-related prevention (Jayasekara & Schultz 2007).

Research at the sub-regional level is also limited. A systematic review and meta-analysis incorporating search terms for various NCDs and risk factors in Asia-Pacific countries including Bhutan, Maldives, Nepal or Sri Lanka identified predominantly regional studies; of the studies included in the final analysis, 7 articles were set in multiple countries, and of the

29 single-country studies, the most common settings were India (10 articles), Thailand (6 articles) and Sri Lanka (3 articles) (Mannava et al. 2013). The review of published articles and studies highlighted that while an increasing amount of health system attention is being paid to NCDs in the Asia Pacific region, the response is 'recent and incomplete' (Mannava et al. 2013: 13).

Research about the health of migrants from the region is equally patchy. It has been shown that South Asian migrants living in Europe have a higher risk of developing NCDs than either their counterparts in their country of origin or citizens from their host European country (Davies et al. 2011). In this case, the healthy migrant effect disappears if length of residence is not taken into consideration. Likewise, a study focusing on adult refugees in the US highlighted that chronic NCDs are common amongst adult refugees (in their sample, half of all refugees had at least one chronic NCD), and that refugees are also unlikely to be insured (Yun et al. 2012). In addition, rural-to-urban migration has been found to be a major risk factor for diabetes and obesity amongst South Asians in India (Ebrahim et al. 2010). This is of particular concern to Bhutan, whose rural-urban migration rate is one of the highest in South Asia, and where possible migration-related health risks such as hypertension and stress have not been well studied (WHO SEARO 2013). These findings tend to contradict the healthy migrant effect, or at least highlight that length of residence might be an important factor in determining migration-related health outcomes. However, as data pertaining to the health status of migrants pre-migration are patchy, it is difficult to make draw conclusions about whether increased health risk is associated with the sending context, receiving context, or processes of movement between the two.

There are widely varying patterns of NCDs and risk factors among South Asian migrants, especially between urban/rural populations, men/women, refugees/other immigrants, vulnerable sub-groups, temporary/permanent migrants and people from different South Asian countries. For example, coronary heart disease risk factors have been shown to vary widely between different migrant sub-populations from India, Pakistan and Bangladesh to the UK (Bhopal et al. 1999). At the same time, while all-cause mortality was lower amongst immigrants to Canada compared to the local population, cause-specific mortality rates relating to stroke, diabetes and cancers were comparatively higher amongst immigrants (DesMeules et al. 2005). This means that combining data for these different groups can be misleading, especially with regard to theories such as the healthy migrant phenomenon (Patil

et al. (2010) also make a similar observation). While this may be the case, the majority of migrant-specific research reviewed in this document draws conclusions based on analyses of merged categories (e.g. various interpretations of ‘South Asia’ or ‘Southeast Asia’), as this is what is most readily available.

Cardiovascular diseases

Cardiovascular diseases (CVDs) are a cluster of conditions relating to the heart and blood circulation. The major CVDs include hypertensive heart disease (heart failure and complications linked to high blood pressure), ischemic heart disease (coronary heart disease, or blockage of the blood supply to the heart), rheumatic heart disease (heart infection, inflammation and scarring), and cerebrovascular disease (stroke).

CVDs account for 45% of all deaths attributed to NCDs in the region. CVD prevalence varies across the region. In 2008 they were the leading cause of death in India and Bangladesh; they account for 34% of deaths in the Maldives and 53% of all deaths in Bhutan (World Health Organisation 2011). In Sri Lanka, hospitalisation due to hypertensive disease was predicted to rise by 40%, and ischemic heart disease by 29%, between 2005 and 2010, largely as a result of the ageing population (Premaratne et al. 2005). This burden is predicted to continue to rise exponentially. The Nepalese government recently recognised CVDs as a major public health issue and commenced drafting a policy intended to be a roadmap for the management of CVDs and NCDs in the country (Vaidya 2011); an overview of the risk factors for CVD in Nepal is presented in Figure 4.

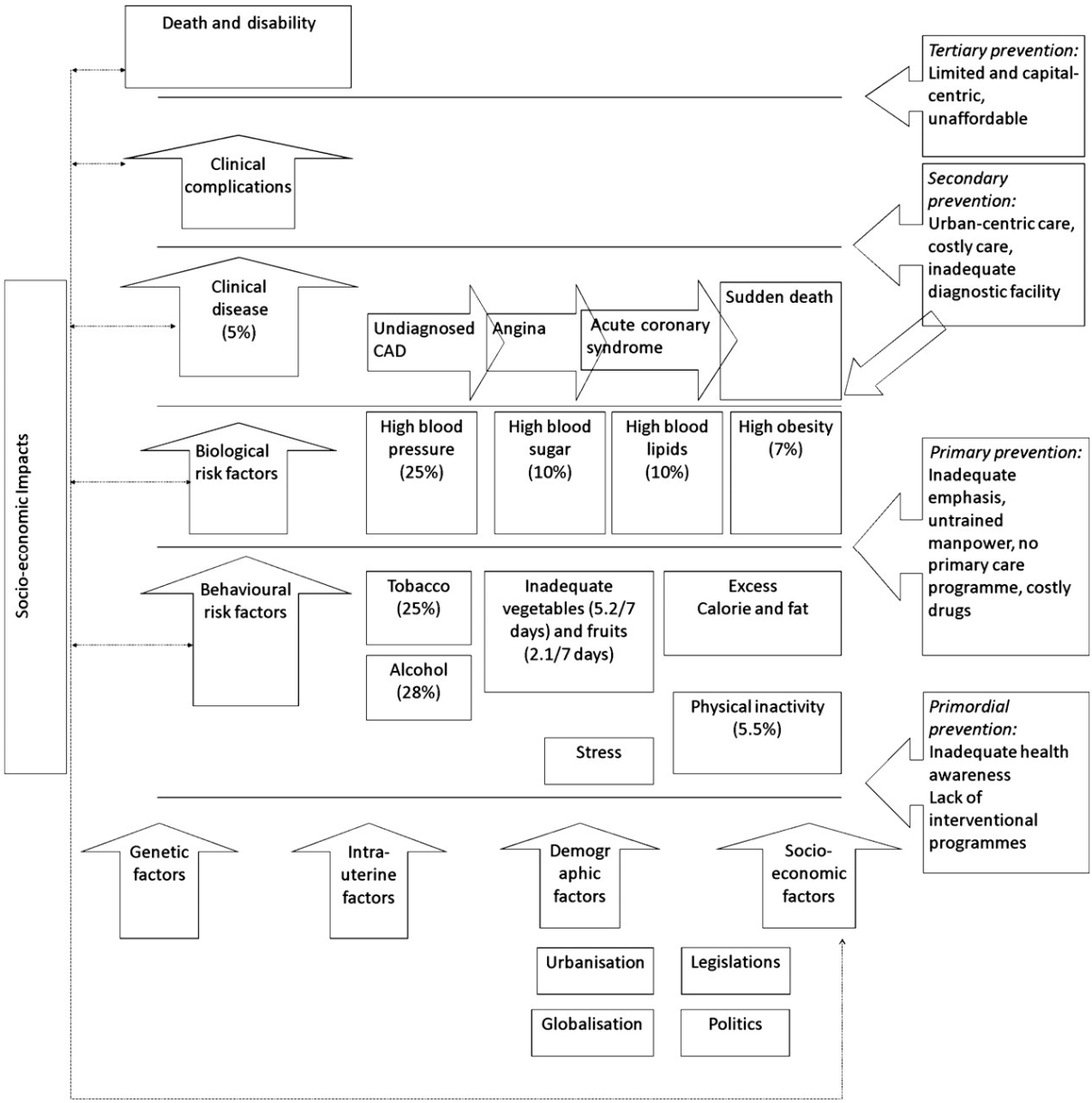

Figure 4: An overview of CVD risk factors in Nepal; figures given are based on national or subnational studies between 2003 and 2007 (Vaidya 2011: 88).

CVDs are the largest problem facing Europe's ethnic minorities, and South Asians have the highest rates of this disease (Bhopal 2009; McKeigue et al. 1989). Research amongst Indian, Pakistani and Bangladeshi immigrants to the UK has found that, contrary to the healthy migrant phenomenon, coronary heart disease is up to 50% higher amongst these South Asian migrants than Europeans (Bhopal et al. 1999; Gholap et al. 2011), and onset occurs at a younger age (Gholap et al. 2011). The authors did not consider the age at which migrants had arrived in the UK. Between 1979 and 1993, rates of death from ischemic heart disease in Canada were highest among Canadians of South Asian origin (Sheth et al. 1999), and South

Asians have also previously been shown to experience a higher prevalence of CVD than Canadians of European or Chinese origin (Anand et al. 2000). In addition, CVD-related mortality amongst South Asian migrants to England and Wales, which is significantly higher than for the local population, increased with increasing duration of residence; mortality was also positively related to age at migration (Harding 2003). Conversely, CVD-related mortality amongst South Asians (from India and Sri Lanka) was lower compared to Australia-born rates and declined with increasing duration of residence (Gray et al. 2007).

Chronic respiratory diseases

Chronic respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD, linked to bronchitis and/or emphysema) and occupational lung disease narrow airways and obstruct breathing. For this reason, they have significant impacts on a person's capacity for activity and quality of life; they are also linked to 9.6% of all deaths across the region. They are often linked directly to tobacco smoking, occupational or environmental exposure. Many are curable, and in the region are experienced by all age groups, but data on them are limited (World Health Organisation 2011).

Cancers

Type of cancer varies widely across the region, with the most common sites of cancer being the lungs, mouth, and liver (amongst men) and cervix and breast (among women). Cancers are particularly concerning because they are predicted to become an increasingly common cause of morbidity and mortality in the region in the coming decades. At the same time, survival rates in the region are not high; for example, more than half of cancer deaths in Bangladesh occur within five years of diagnosis. A large proportion of cancer deaths occur in the economically-productive age group in the region: 52% of cancer deaths among women and 45% among men occur below the age of 60 years (World Health Organisation 2011).

In a survey of mortality in Canadian citizens between 1979 and 1993, cancer mortality increased in Canadians of European origin but remained constant or declined in those of South Asian origin (Sheth et al. 1999). Total numbers of deaths from all cancers combined decreased significantly amongst migrants from Southeast Asia (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) to Australia between 1981 and 2007 (Anikeeva et al. 2012). The decrease in colorectal cancers was especially pronounced, while the initial decrease in stomach cancer appears to have levelled off over time. Over the same time

period, migrants from the South Asia region displayed more favourable cancer mortality outcomes than the Australian-born population (Anikeeva et al. 2012; Anikeeva et al. 2010). The most likely explanation is considered to relate to dietary transition of these groups away from fats and towards cereals, fruits and vegetables (*ibid.*). Risk of dying from nasopharyngeal and liver cancer was higher amongst South Asian migrants to Australia between 1975 and 1995, while an initial lower risk from colorectal, breast or prostate cancer converged towards the Australian-born level after 30 years in the same cohort (McCredie et al. 1999).

One possible explanation for improved survival amongst those diagnosed with cancer is that cancer screening and early diagnosis can significantly improve chances of post-treatment survival. However, migrant women from Asian countries to Australia have been shown to be less likely to participate in cervical cancer screening than Australian-born women. Further, variation of likelihood of screening according to socioeconomic status, smoking and parity is less pronounced amongst migrants than Australian-born women (Aminisani et al. 2012).

Diabetes mellitus (Type 2 diabetes)

Diabetes is the impairment of the systems which control and regulate blood sugar level. It increases risk of CVDs, and it is linked to a range of degenerative conditions including retinopathy (preventable blindness), nephropathy (kidney disease), gangrene (infection of wounds), and neuropathy (nerve damage). For this reason, late diagnosis amplifies its impact. Rates of diabetes and deaths related to diabetes vary considerably across the region; one reason for this is limited diabetes surveillance that has been carried out to date. Increasing trends have been noted in many South-East Asian countries (World Health Organisation 2011), but surveillance remains limited (see Table 2). Family history, urban residency, age, higher BMI, sedentary lifestyle, hypertension and waist-hip ratio have all been associated with increased risk of diabetes in regional studies (Jayawardena et al. 2012).

Table 2: Diabetes prevalence reported in STEPS surveys.

Country	STEPS year	Diabetes
Bhutan	2007	2.5% (only people previously diagnosed)
Maldives	2004	12% men (8.2% women) 45-54, 21% men (15.6% women) 55-64
Nepal	2003	3.80%
Nepal	2005	22% of people who had seen a physician
Nepal	2007	Only asked history of raised blood sugar (4.7%)
Sri Lanka	2003	Not reported
Sri Lanka	2006	Not reported*

* The prevalence of diabetes in urban Sri Lanka was reported as being 5% in 1994 (Bhattarai 2009).

There has been a rapid increase in diabetes prevalence in the region over the last two decades (Jayawardena et al. 2012). In Sri Lanka, hospitalisation due to diabetes mellitus was predicted to rise by 36% between 2005 and 2010, and to continue to rise exponentially thereafter, largely as a result of the ageing population (Premaratne et al. 2005). A systematic review of reported diabetes trends in the region identified diabetes prevalence figures for rural Bangladesh (8.5% in 2004-05), rural India (12.5% in 2007), Maldives (3.7% in 2004), urban Nepal (9.5% in 2007), rural Pakistan (7.2% in 2002) and Sri Lanka (10.3% in 2005-06) (Jayawardena et al. 2012). However, in the majority of surveys carried out to date, respondents are simply asked whether they have previously been diagnosed with diabetes or not; undiagnosed cases are not identified. As such, surveys are likely to significantly underestimate prevalence.

The prevalence of diabetes mellitus amongst migrants in the South Asian population in the UK is around 20%, which is nearly five times higher than the local European population. Furthermore, age of diabetes onset is five to ten years earlier, and chronic complications more pronounced, amongst migrant populations (Gholap et al. 2011). Similar observations have been made amongst migrant Asian Indians (Zimmet et al. 1997).

Risk factors

NCDs are commonly preceded by accumulating risk factors which, in biomedical literature, are often considered to be modifiable or behavioural. The risk factors underlying 75% of major chronic NCDs, and which are reviewed here, include smoking and tobacco use, alcohol consumption, unhealthy diet, physical inactivity, obesity and raised blood pressure (Ahmed et al. 2009). Proposed risk management interventions largely focus on education and lifestyle

programmes which aggressively target ‘factors related to South Asian culture including diet, lifestyle and health beliefs’ (Gholap et al. 2011: 52). In migrant receiving countries, some migrant-specific NCD interventions targeting such risk factors have been trialled. In Edinburgh, a programme aimed at South Asian migrants targeted motivation, behaviour, obesity, blood pressure and lipids, and had some impact (Mathews et al. 2007).

Investigations of social determinants of health emphasise that risk factors are often not modifiable or behavioural at an individual level. Researchers have highlighted links between NCDs and gender, ethnic group, occupation and education (Aryal et al. 2012), as well as ageing, rapid urbanisation (or transition from rural to urban ways of life), globalisation and relatively low literacy, infections and environmental factors (World Health Organisation 2013a). In their review of social determinants and NCD risk factors in South Asian migrant populations in Europe, Davies et al. (2011) summarise migration-specific risk factors into four broad areas: migrant profile and background, socioeconomic situation and migration legal status, lifestyle changes with migration, and access to health and social services. Fennelly (2007) discusses factors which contribute to risk and the loss of migrant health advantage; these may include poverty and income disparity, housing, acculturative stress, nutrition, dietary change and access to food, access to care, and social discrimination. Many risk factors are higher in developing countries, and the determinants of risks or vulnerabilities include complex and interrelated social, behavioural, economic, environmental and genetic factors (Davies et al. 2011).

Risk factor data used in the tables in this section are compiled from a regional WHO NCD report (World Health Organisation 2011) and action plan (World Health Organisation 2013a), as well as national or sub-national reports collated using the WHO STEPwise approach to Surveillance (STEPS) of NCD risk factors tool. STEPS surveys currently available for the region are summarised in

Table 3.

Table 3: Summary of available NCD STEPS surveillance reports, which are available via the WHO SEARO website.

Country	Data collected	Sample age range	Sample location	Sample size	Reference
Bhutan	2007	25-74 yrs	Thimpu city	2484	(Royal Government of Bhutan Ministry of Health 2009)
Maldives	2004	25-64 yrs	Malé city	2027	(Maldives Ministry of Health & WHO SEARO 2004)
Nepal	2003	25-64 yrs	Kathmandu city	2030	(WHO SEARO 2003)
Nepal	2005	15-64 yrs	Ilam, Lalitpur, Tanahu	7792	(Society for Local Integrated Development Nepal (SOLID Nepal) 2006)
Nepal	2007-08	15-64 yrs	15 districts (5 developmental regions, 3 ecological regions)	4328	(Government of Nepal Ministry of Health and Population 2008)
Sri Lanka	2003	15-74 yrs	Western Province	3000	(Somatunga 2004)
Sri Lanka	2006	15-64 yrs	5 districts	12500	(Sri Lanka Ministry of Healthcare and Nutrition & WHO SEARO 2008)

There are no national NCD data for Afghanistan; available estimates are therefore limited and so have a high degree of uncertainty (Otoukesh et al. 2012).

Smoking and tobacco use

Tobacco use is considered the most preventable cause of death in the world today; it kills up to half of those that use it, and can also impact others through second-hand smoke. This makes families of smokers vulnerable to NCDs in addition to smokers themselves. Smoking and smokeless tobacco are used widely in the region. Considerably more men than women smoke (see Table 4), and smoking amongst Sri Lankan men, for example, are thought to contribute to an increased NCD risk in men (Tennakoon, Kumar, Selmer, et al. 2013). While women in such studies are cited as being at comparatively low risk, it is not clear whether men smoke in the home (and so equally raise the risk of women and children in the home) or elsewhere. Declines in tobacco use have been observed in Sri Lanka and Myanmar. There is an inverse relationship between tobacco use and education, and tobacco consumption is universally more common among lower socioeconomic groups (World Health Organisation 2011). Up to 30% of CVDs in the region can be attributed to smoking (Martiniuk et al. 2006).

Table 4: Percentage of people who smoke (from STEPS surveys).

Country	STEPS year	% who smoke daily
Bhutan	2007	6.80%
Maldives	2004	24.7% (35% men, 10% women)
Nepal	2003	33%
Nepal	2005	25.7% men, 14.45% women
Nepal	2007	23.8%
Sri Lanka	2003	16.63%
Sri Lanka	2006	15%

There is significant ethnic, class and gender variation in smoking prevalence amongst migrants, but disaggregated data are sparse (Bhopal 2009; Kennedy et al. 2007). Smoking has been shown to be less prevalent amongst Indian migrants to Britain than the sending population (Patel et al. 2006), but it is not clear whether this is linked to changing behaviours after arriving in the host country, or self-selection beforehand. Other authors have suggested that deprivation in early life, followed by migration to a more affluent country or setting, can lead to an enthusiastic adoption of behaviours such as smoking (Wandel et al. 2008). Practices such as chewing tobacco, which are common to some sending countries, may also predispose migrants to taking up smoking in their host countries, where chewing tobacco is relatively less common. While host countries such as Britain have had significant and long-term anti-smoking campaigns, prior exposure to smoking and tobacco advertising in the sending country may increase post-migration vulnerability to it (Davies et al. 2011). Likewise, high documented use of chewing tobacco in sending countries may play a role.

Alcohol consumption

Alcohol consumption has considerable social and health consequences. There is evidence to suggest that lower socioeconomic groups experience a higher burden of alcohol-related NCDs (World Health Organisation 2011). Rates of alcohol consumption vary widely across the region (Table 5), potentially because stigma and cultural values around alcohol consumption also vary considerably. There appear to be few reliable studies of alcohol consumption amongst migrants in the context of NCDs; one reason for this is the lack of a consistent measure of alcohol consumption (Kennedy et al. 2007).

Table 5: Alcohol consumption reported in STEPS surveys.

Country	STEPS year	Alcohol	% current drinkers
Bhutan	2007	Higher in males than females in number and frequency	30.80%
Maldives	2004		
Nepal	2003		59% male and 26% female
Nepal	2005	High binge drinking	37%
Nepal	2007	1 in 3 men and 1 in 10 women drinking harmful amounts	28.5%
Sri Lanka	2003	60% men, 11% women	35.9%
Sri Lanka	2006	26% men, 1.2% women	13.5%

Unhealthy diet

An unhealthy diet which increases NCD risk is broadly characterised by low fruits and vegetables and high salt, fat and sugar. Dietary shifts towards high-risk foods are broadly attributed to processes of globalisation and urbanisation. STEPS surveys focus on fruit and vegetable consumption (Table 6). These surveys also present data on oil used for cooking; partially-hydrogenated vegetable oils (also known as trans-fats) which are often used in processed foods, for example, have well-established links to CVD. Fruit and vegetable consumption in the South Asia region is critiqued as too low, while salt intake is considered to be too high (World Health Organisation 2011).

Table 6: Dietary factors reported in STEPS surveys.

Country	STEPS year	Servings fruit+veg per day	<5 fruit and veg per day
Bhutan	2007	1.2 fruit, 3.2 vegetables	66.60%
Maldives	2004	Around 1 per day	84%
Nepal	2003	Over 50% of men and women have 1 veg	99%
Nepal	2005	2.32	96.1%
Nepal	2007		61.9%
Sri Lanka	2003	Mostly 1 serving per day	96.93%
Sri Lanka	2006	3.2	82.4%

Excess dietary sodium/salt intake is a well-established risk factor for hypertension and has been also shown to be associated with migration (WHO SEARO 2013). Research from Norway has focused on changing food habits amongst migrants from Sri Lanka and Pakistan to Oslo (Wandel et al. 2008). The majority of Sri Lankan respondents reported increased

meat, milk, butter, margarine and potato consumption, and a decrease in bean and lentil consumption. Frequency of fruit and vegetable consumption decreased with migration (Tennakoon, Kumar & Meyer 2013). Age of migrants was negatively related to increased butter and margarine consumption, while having a good command of the Norwegian language reduced the likelihood of increased consumption of oil and butter. Consumption of foods high in fat and sugar were reduced with age and years of education, and increased with index of integration (Wandel et al. 2008). A review of data relating to dietary change of migrants from South Asia (India, Pakistan, Bangladesh and Sri Lanka) to Europe came to similar conclusions (Holmboe-Ottesen & Wandel 2012).

Research with migrants to the US has documented, through qualitative research and narrative interviews, changing food practices amongst refugee migrants to the US, including those from Bhutan and Nepal (Patil et al. 2010). The authors argue that diminishing health outcomes amongst forced migrants results from a complex interplay between increasing insecurities, historical processes, local food ecology and relationships (see Figure 5).

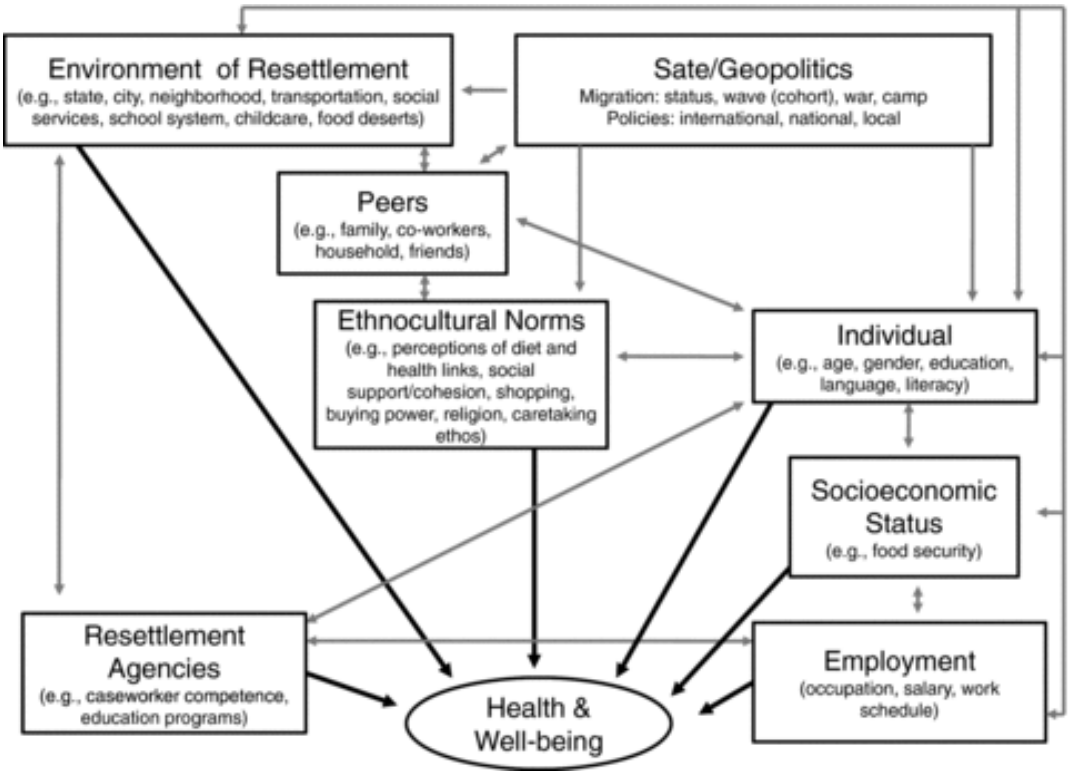

Figure 5: Themes relating to changing food practices which emerged from interviews with refugees in the US (Patil et al. 2010: 157).

Physical inactivity

Lack of physical activity, or sedentarism, is also strongly linked to NCDs. Measurement of physical activity is disaggregated into three categories: recreation (which tends to be low in the region), transport and occupational (which both tend to be relatively high in the region, and especially in rural areas) (Table 7). Inactivity is generally higher among females than males. Highest inactivity has been recorded in Bhutan, followed by the Maldives.

Table 7: Physical activity reported in STEPS surveys.

Country	STEPS year	Physical activity	% low PA	% high PA
Bhutan	2007		58.60% (41% males, 64% females)	
Maldives	2004		37% men, 42% women	3% men, 1% women (work)
Nepal	2003	Low recreational	74.5% of men, 91% of women	
Nepal	2005	Low among females and older groups	86%	
Nepal	2007	Low recreational, high work and transport	5.5%	82.9%
Sri Lanka	2003		15.57%	Men 5.2%, women 2.3%
Sri Lanka	2006	Men more active	25%	53.5%

Few studies of changing levels of physical activity have been carried out amongst migrants from the region. Migrants from Sri Lanka to Oslo were shown to engage in higher amounts of leisure time physical activity compared to Sri Lankans living in Kandy (Tennakoon, Kumar & Meyer 2013); however, this finding is problematic as the authors did not include occupational or transport physical activity in their investigation. Recreational physical activity is low in the South Asia region (possibly as a result of recreational physical activity being a somewhat culturally-constructed category), and it has been shown to increase amongst migrants.

Obesity

Obesity is defined based on body mass index (BMI), which is the function of a person's weight (in kilograms) divided by the square of their height (in metres). Overweight varies in the region between 8% to 30% among males, and between 8% and 52% among females (World Health Organisation 2011). Highest rates of obesity in the region were measured in

the Maldives (Table 8), and BMI tends to be higher in females than in males (Table 9). In Nepal, high rates of obesity are coupled with low health literacy rates and limited public health initiatives (Vaidya et al. 2010).

Table 8: Obesity reported in STEPS surveys.

Country	STEPS year	Mean BMI (kg/m^2)	% overweight (BMI 25-29.99) or obese (BMI > 30)
Bhutan	2007	25.6	51.5% males, 53.5% females
Maldives	2004	25.2	40.6% men, 51.9% women
Nepal	2003	22.82 male, 24.56 female	26.7% men, 41.9% women
Nepal	2005	22.5	20% male, 11% female
Nepal	2007	20.6	7.2%
Sri Lanka	2003	22.64	25.4%
Sri Lanka	2006	25	22.5%

Table 9: Mean BMI trends in the South East Asia region.

		Mean BMI (Finucane et al. 2011)			
		1980	1990	2000	2008
Afghanistan	Male	21.5	21.2	20.7	20.6
Afghanistan	Female	20.4	20.7	20.6	21.1
Bhutan	Male	21.8	21.8	22.2	22.8
Bhutan	Female	20.2	21	21.9	22.9
Maldives	Male	20.4	21.3	22.3	23.2
Maldives	Female	21.7	23.6	25.2	26.4
Nepal	Male	21	20.7	20.8	21
Nepal	Female	20.5	20.6	21	21.3
Sri Lanka	Male	20.4	20.8	21.5	22
Sri Lanka	Female	20.9	21.8	22.6	23.1

Amongst South Asians in the UK, diabetes and CVD develop at much lower levels of BMI than amongst local European populations (Gholap et al. 2011). A comparison between Sri Lankan migrants to Oslo and Sri Lankans living in Kandy, Sri Lanka, revealed that the migrants experienced more favourable lipid profiles and blood pressure levels, and therefore lower risk of CVD across all age groups, despite being more obese (Tennakoon et al. 2010; Tennakoon, Kumar, Selmer, et al. 2013; Tennakoon 2012).

Raised blood pressure

Raised blood pressure is a risk particularly associated with CVD. While it has been reported that high blood pressure is widespread in the region (World Health Organisation 2011), many STEPS surveys report relatively few people have had blood pressure measured at all. As with diabetes, such surveys do not always take measurements but instead rely on reports of diagnosis; for this reason, figures for elevated blood pressure are likely to be underestimated in surveys from sending countries. Elevated blood pressure has been identified in Myanmar, Nepal and India (Table 10). Rapid urbanisation has been reported to have contributed to higher blood pressure identified in urban compared to rural populations.

Table 10: Raised blood pressure reported in STEPS surveys.

Country	STEPS year	% high BP (SBP>140, DBP>90)
Bhutan	2007	22.10%
Maldives	2004	26.5%
Nepal	2003	38.7% men, 30.2% women
Nepal	2005	42% (but only 7% had history prior to survey)
Nepal	2007	21.5%
Sri Lanka	2003	6.87%
Sri Lanka	2006	16.1%

Tibetan migrants living in an urban environment in Nepal experience gradual increases in blood pressure during exercise compared to migrants and Sherpas living at high altitude. Effects of migration on blood pressure have been suggested to include stress, differences in diet, and urbanisation (Weitz 1982).

Immigration policy and NCDs

While the IOM and other immigration policy organisations make frequent mention of communicable diseases – notably HIV/AIDS and to a lesser extent TB – in reports and policies, NCDs are comparatively rarely considered. The majority of recent reports reviewed make little or no mention of specific chronic or non-communicable diseases (Donor Relations Division (IOM) 2013; International Organisation for Migration 2010b; International Organisation for Migration 2010c; International Organisation for Migration 2010a; World Health Organisation 2010; CARAM Asia 2007), apart from one mention that some facilities in sending countries do provide information on how to prevent both communicable and non-communicable diseases (International Organisation for Migration 2010b) or that limited

access to healthcare early in the migration period may increase the resultant non-communicable disease burden (World Health Organisation 2010).

The 2010 Global Consultation on Migrant Health convened by the WHO and IOM called for increased monitoring and evaluation of the impact of chronic diseases on migrants (World Health Organisation 2010). However, this point was not further elaborated in the report; the majority of the report focussed largely on infectious disease. The Action Plan for the Prevention and Control of Noncommunicable Diseases in South-East Asia 2013-2020 states, as one of its guiding principles, that 'policies and programmes should aim to reduce inequalities in NCD burden due to social determinants such as education, gender, socioeconomic status, ethnicity and migrant status' (World Health Organisation 2013: 12). However, it does not make any further mention of migration, nor any recommendations relating to it. In addition, some authors highlight the importance of NCD and health system management in response to the 'urban displacement phenomenon' (Guterres & Spiegel 2012: 673), or forced displacement to urban areas. They note the increasing global importance of NCDs, and also acknowledge that the challenge of NCDs in conflict and forced displacement settings has not been sufficiently addressed by existing global resolutions (*ibid.*).

One factor that this report highlights is the lack of surveillance and public health infrastructure in sending countries. As a result, NCDs and risk factors are likely to be under-diagnosed and under-reported in sending countries. Likewise, as public health education relating to NCDs and risk factors is limited in many of the sending countries (as reported in STEPS surveys, which measure health literacy as it relates to NCDs and risk factors), symptoms of NCDs (where they exist), as well as risk factors more broadly, may go unnoticed for long periods of time. In this case, receiving countries with a longer history of NCDs (and hence a longer legacy of public health interventions and education programmes) are more likely to identify NCDs and risk factors for them in migrants compared to sending countries. This may contribute to the healthy migrant phenomenon observed amongst some migrant populations, insofar as NCDs may go largely unreported in home countries (so initial assumptions of NCD-free status are made), and may continue to be made until migrants begin to access health services in the receiving country.

Local migration authorities have incorporated provisions for NCD screening and treatment to varying degrees. The Filipino Health Care Providers supplied a free consultation and check-

up for workers in Dubai in 2002; they reported that the most common complaints treated were hypertension, diabetes, respiratory tract infection, headache and back pain (Anon 2002). An investigation of the use of Thai health services by Myanmar migrants revealed that migrants sometimes preferred to treat chronic illnesses such as diabetes with local, traditional or herbal medicines and healers, at times citing failure of health services to cure the problem (Isarabhakdi 2004). The Foreign Domestic Worker template for women's self-examination published by the Coordination of Action Research on AIDS and Mobility (CARAM) Asia discusses high blood pressure and cancer (CARAM Asia n.d.).

News articles from both sending and receiving countries also offer glimpses into emergent issues related to NCDs and migration. One news item originating from the United Arab Emirates described a case illustrating the lack of screening available to migrants for NCDs:

> *Indian national offering door-to-door medical check-up*
>
> An Indian national came up with an innovative door-to-door medical check-up scheme using electronic gadgets, such as a blood pressure apparatus and a glucometer. According to residents of Istiqial Street, the man has visited the area offering blood pressure and diabetes tests on clients for a fee of Dh15. The man convinced his clients that the service was beneficial to poor workers who have neither time nor money to have these tests taken in private clinics. However, the Ministry of Health said that the man's services were illegal and punishable as criminal acts. (Hoath 2005: n.p.)

This highlights the lack of health monitoring services currently available to selected migrants in the UAE, and perhaps also a growing demand for them.

Occasionally, news reports and related discussion boards discuss the rise of NCDs such as diabetes and heart disease amongst migrants. Some authors demonstrate that Emiratis, for example, are more likely to develop diabetes, obesity and heart disease than expatriates, and claim that the local population cannot afford to be complacent about their health (Abbas 2013). Others report that expatriates who work in Gulf countries, especially migrants from Asian countries, appear more at risk for developing diabetes the longer they stay in the country (Ghafour & Khan 2013). Such reports draw attention to the need for immigrants to check their health regularly, and lead a healthy lifestyle. For example:

> Noted cardiologist Dr. K.M. Cheridan warned that the different food habits and lifestyles of young Asian expatriates have made them increasingly prone to heart attacks. Other risk factors that are common to Asians are genetic, high blood cholesterol, high blood

> pressure, high incidence of diabetes, lack of exercise, obesity, hypertension and smoking. He urged them to take steps to eliminate the risk factors. (Anon 1998)

Discussion boards which follow these articles contain significant numbers of comments criticising migrants as being burdens on the health systems in their receiving countries; such stigmatising discourses are similar to those directed at people with NCDs elsewhere in the world (e.g. Brewis et al. 2011), and are related to the perception of NCDs as lifestyle diseases which originate from individual behaviours and choices. Other news articles echo similar sentiments:

> Another complaint lodged against Singaporeans is their use of Malaysian government hospitals in Johor Baru, said Suresh Naidu of the Malaysian Indian Congress. He said that several doctors at the Sultanah Aminah Hospital in Johor Baru reported that several patients suffering from diabetes obtained a month's supply of medicine for only M$2, which would otherwise cost them M$250 in private clinics and M$600 in Singapore. Mr. Naidu said that in light of the economic crisis, government hospitals should take measures to ensure that only deserving Malaysians were given the privilege. (Guerrero & Mayo 1998)

Migrants' access to treatment for chronic conditions upon return to their home country may equally be limited because care services may either be unavailable or unaffordable for them (Asia-Europe Foundation & Casa Asia 2012). Such stigmatisation may add to factors such as stress and inequality, which have been shown to be closely linked to NCDs and risk factors (e.g. Offer et al. 2010; Department of Health Public Health Research Consortium et al. 2007).

Concluding remarks

This report contains a broad review of literature relating to migration and chronic or non-communicable diseases (NCDs). It focuses on migrants that originate in small South Asian countries of Afghanistan, Bhutan, Maldives, Nepal and Sri Lanka. Literature searches highlight the growing significance of NCDs both in these sending countries and amongst people who migrate from them. While theories such as the 'healthy migrant effect' have attempted to explain worse long-term health outcomes amongst migrant groups, such theories are based predominantly on explaining epidemiological patterns using constructs such as 'acculturation'. Such constructs have been thoroughly critiqued in the social sciences. There is space for further investigation, particularly in-depth multi-sited ethnographic research which looks more closely at the experiences of migrants in both sending and receiving countries, and how these experiences change across time and space. A focus on NCD-related

risk factors such as stress, socioeconomic inequality, physical environment, dietary change and social isolation, in addition to standard WHO risk factors reviewed here, may be especially informative.

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APPENDIX A: SEARCH HISTORY

Table 11: Online search history

	Name	Description	Link	Data / search terms
1	WHO	WHO databases	www.who.int/nmh/databases/en/	
2	SEARO WHO	WHO Regional Office for South-East Asia	www.searo.who.int/	STEPS reports for countries
3	Google Scholar	Search engine for general academic work	scholar.google.co.uk/	"ncds south east asia migrants" "ncd south east asia" "health migrant <country>" "health migrant ncd <country>" (where <country> is each of Bhutan, Nepal, Sri Lanka, Maldives, Afghanistan in turn) Reviewed first 50 results for each search; selected those that relate to theme
4	Paper references	Searched for papers referenced in works identified in #3		Selected those that relate to theme
5	IOM	Searched for relevant reports and publications	publications.iom.int/	Searched publications for "asia and health" (38 results; selected those that relate to theme)
6	Pubmed	Search engine for medical papers (mainly had results for India and Vietnam)	www.ncbi.nlm.nih.gov/pubmed	"south east asia ncd" (14 results only) "asia ncd" (115 results; selected those that relate to theme) "health migrant <country>" (where <country> is each of Bhutan (2 results, both infectious disease), Nepal (35 results, mostly HIV), Sri Lanka (42 results, mixed), Maldives (32 results, mixed), Afghanistan (12 results, none relevant))
7	CARAM Asia	Mainly human rights focused, but may have useful links or information	www.caramasia.org/	
8	Scalabrini Migration Centre	Welfare rights with Asian focus, potentially useful links	www.smc.org.ph/	
9	George Institute for Global Health	At Oxford, focus on India, may have useful publications and/or contacts	www.georgeinstitute.ox.ac.uk/	

Potential future searches following topic refinement

- Repeat #3-6 with specific NCDs/risk factors.
- Specific health factor associations (e.g. Bangladesh Diabetes Association: www.dab-bd.org/).

APPENDIX B: COUNTRY NCD PROFILES

Source: Alwan et al. 2011

Afghanistan

2010 total population: 31 411 743
Income group: Low

NCD mortality*

2008 estimates	*males*	*females*
Total NCD deaths (000s)	75.8	50.8
NCD deaths under age 60 (percent of all NCD deaths)	63.2	51.0
Age-standardized death rate per 100 000		
All NCDs	1285.0	952.7
Cancers	108.4	96.8
Chronic respiratory diseases	88.5	54.7
Cardiovascular diseases and diabetes	765.2	578.2

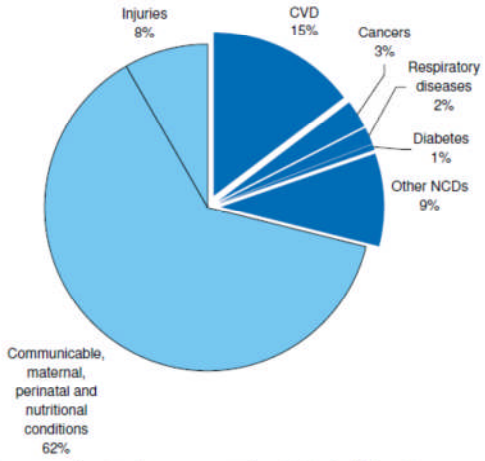
Behavioural risk factors

2008 estimated prevalence (%)	*males*	*females*	*total*
Current daily tobacco smoking	...	...	...
Physical inactivity	...	...	...

Metabolic risk factors

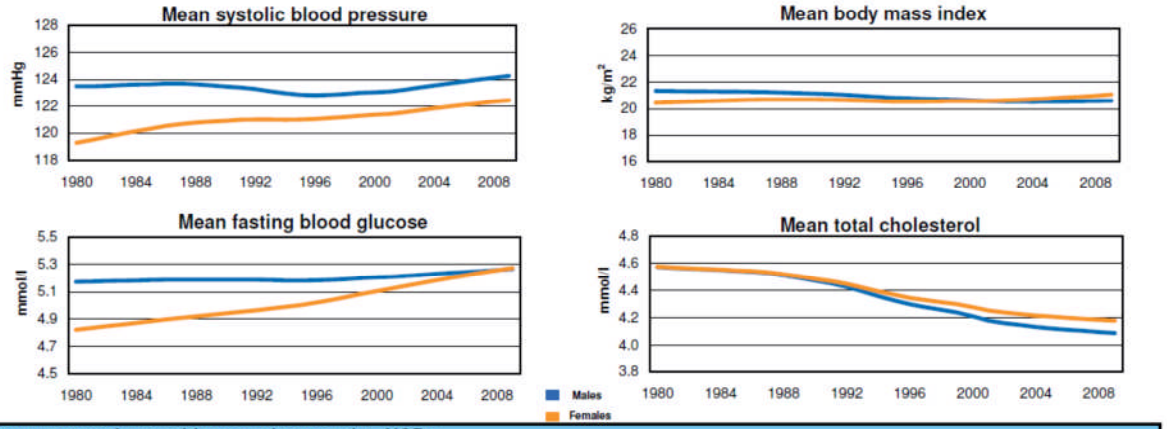
2008 estimated prevalence (%)	*males*	*females*	*total*
Raised blood pressure	...	...	...
Raised blood glucose	...	...	...
Overweight	...	...	...
Obesity	...	...	...
Raised cholesterol	...	...	...

Proportional mortality (% of total deaths, all ages)*



NCDs are estimated to account for 29% of all deaths.

Metabolic risk factor trends



Country capacity to address and respond to NCDs

Has a Unit / Branch / Dept in MOH with responsibility for NCDs	No	*Has an integrated or topic-specific policy / programme / action plan which is currently operational for:*	
There is funding available for:		Cardiovascular diseases	No
NCD treatment and control	No	Cancer	No
NCD prevention and health promotion	No	Chronic respiratory diseases	No
NCD surveillance, monitoring and evaluation	No	Diabetes	Yes
		Alcohol	No
National health reporting system includes:		Unhealthy diet / Overweight / Obesity	No
NCD cause-specific mortality	No	Physical inactivity	No
NCD morbidity	Yes	Tobacco	No
NCD risk factors	No		
		Number of tobacco (m)POWER measures implemented at the highest level of achievement	0/5
Has a national, population-based cancer registry	No		

* The mortality estimates for this country have a high degree of uncertainty because they are not based on any national NCD mortality data. The estimates are based on a combination of country life tables, cause of death models, regional cause of death patterns, and WHO and UNAIDS program estimates for some major causes of death (not including NCDs).

... = no data available

Bhutan

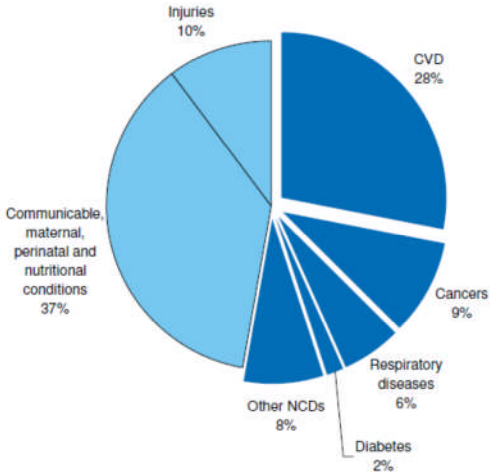
2010 total population: 725 940
Income group: Lower middle

NCD mortality*		
2008 estimates	***males***	***females***
Total NCD deaths (000s)	1.7	1.4
NCD deaths under age 60 (percent of all NCD deaths)	32.5	32.6
Age-standardized death rate per 100 000		
All NCDs	793.2	654.6
Cancers	131.2	118.4
Chronic respiratory diseases	92.8	71.8
Cardiovascular diseases and diabetes	465.0	381.3

Behavioural risk factors			
2008 estimated prevalence (%)	***males***	***females***	***total***
Current daily tobacco smoking	...	...	...
Physical inactivity	41.2	63.5	51.5

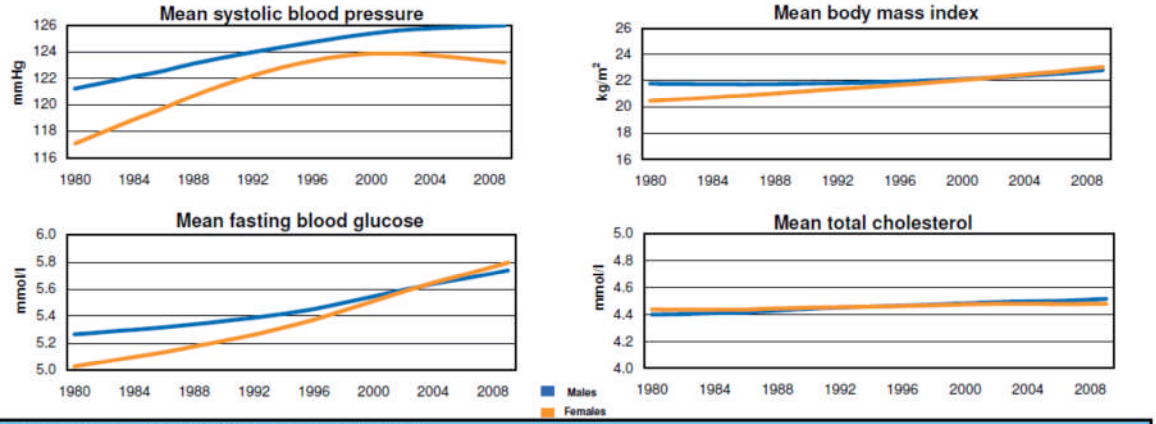
Metabolic risk factors			
2008 estimated prevalence (%)	***males***	***females***	***total***
Raised blood pressure	35.6	33.3	34.6
Raised blood glucose	10.6	11.6	11.1
Overweight	23.0	24.0	23.4
Obesity	4.3	6.4	5.3
Raised cholesterol	32.0	29.3	30.7

Proportional mortality (% of total deaths, all ages)*



NCDs are estimated to account for 53% of all deaths.

Metabolic risk factor trends



Country capacity to address and respond to NCDs

Has a Unit / Branch / Dept in MOH with responsibility for NCDs	**Yes**	*Has an integrated or topic-specific policy / programme / action plan which is currently operational for:*	
There is funding available for:		Cardiovascular diseases	**No**
NCD treatment and control	**Yes**	Cancer	**No**
NCD prevention and health promotion	**Yes**	Chronic respiratory diseases	**No**
NCD surveillance, monitoring and evaluation	**No**	Diabetes	**No**
		Alcohol	**No**
National health reporting system includes:		Unhealthy diet / Overweight / Obesity	**No**
NCD cause-specific mortality	**No**	Physical inactivity	**No**
NCD morbidity	**Yes**	Tobacco	**No**
NCD risk factors	**No**		
		Number of tobacco (m)POWER measures implemented at the highest level of achievement	**1/5**
Has a national, population-based cancer registry	**No**		

* The mortality estimates for this country have a high degree of uncertainty because they are not based on any national NCD mortality data. The estimates are based on a combination of country life tables, cause of death models, regional cause of death patterns, and WHO and UNAIDS program estimates for some major causes of death (not including NCDs).

... = no data available

Maldives

2010 total population: 315 885
Income group: Lower middle

NCD mortality

2008 estimates	*males*	*females*
Total NCD deaths (000s)	0.5	0.4
NCD deaths under age 60 (percent of all NCD deaths)	24.3	22.5
Age-standardized death rate per 100 000		
All NCDs	611.2	559.4
Cancers	64.0	40.5
Chronic respiratory diseases	93.0	111.4
Cardiovascular diseases and diabetes	368.8	333.2

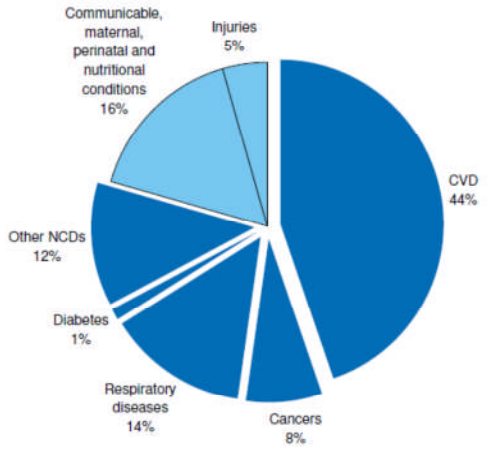
Behavioural risk factors

2008 estimated prevalence (%)	*males*	*females*	*total*
Current daily tobacco smoking	38.1	7.3	22.8
Physical inactivity	36.6	41.3	38.9

Metabolic risk factors

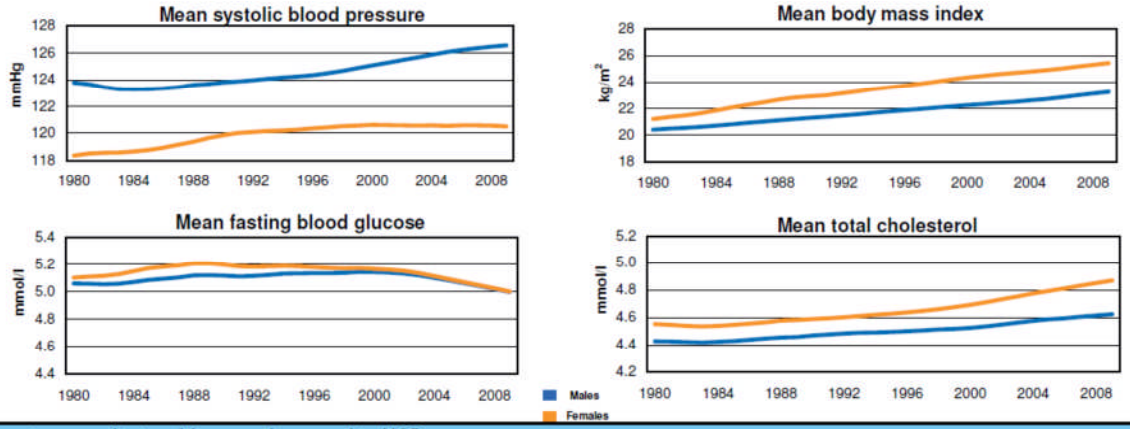
2008 estimated prevalence (%)	*males*	*females*	*total*
Raised blood pressure	...	...	...
Raised blood glucose	6.3	6.2	6.2
Overweight	27.3	43.8	35.4
Obesity	5.9	20.2	12.9
Raised cholesterol	...	...	...

Proportional mortality (% of total deaths, all ages)



NCDs are estimated to account for 79% of all deaths.

Metabolic risk factor trends



Country capacity to address and respond to NCDs

Has a Unit / Branch / Dept in MOH with responsibility for NCDs	**Yes**
There is funding available for:	
NCD treatment and control	**Yes**
NCD prevention and health promotion	**Yes**
NCD surveillance, monitoring and evaluation	**Yes**
National health reporting system includes:	
NCD cause-specific mortality	**Yes**
NCD morbidity	**Yes**
NCD risk factors	**No**
Has a national, population-based cancer registry	**No**

Has an integrated or topic-specific policy / programme / action plan which is currently operational for:	
Cardiovascular diseases	**Yes****
Cancer	**Yes****
Chronic respiratory diseases	**No**
Diabetes	**Yes****
Alcohol	**No**
Unhealthy diet / Overweight / Obesity	**Yes****
Physical inactivity	**Yes****
Tobacco	**Yes****
Number of tobacco (m)POWER measures implemented at the highest level of achievement	**1/5**

... = no data available
** = covered by integrated policy/programme/action plan

Nepal

2010 total population: 29 959 364
Income group: Low

NCD mortality*

2008 estimates	*males*	*females*
Total NCD deaths (000s)	48.8	42.8
NCD deaths under age 60 (percent of all NCD deaths)	35.3	31.3
Age-standardized death rate per 100 000		
All NCDs	705.5	536.3
Cancers	113.9	118.9
Chronic respiratory diseases	86.4	54.9
Cardiovascular diseases and diabetes	400.2	301.3

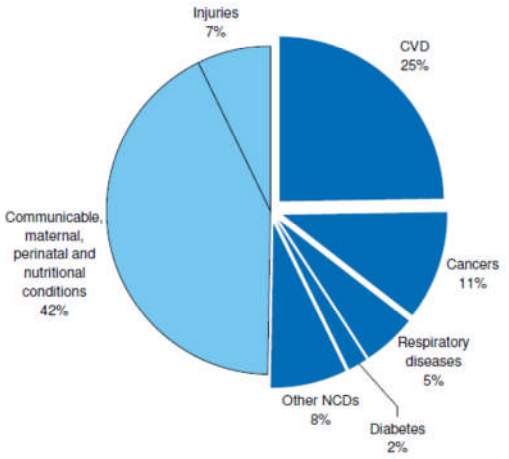
Behavioural risk factors

2008 estimated prevalence (%)	*males*	*females*	*total*
Current daily tobacco smoking	25.4	21.3	23.3
Physical inactivity	12.6	15.7	14.2

Metabolic risk factors

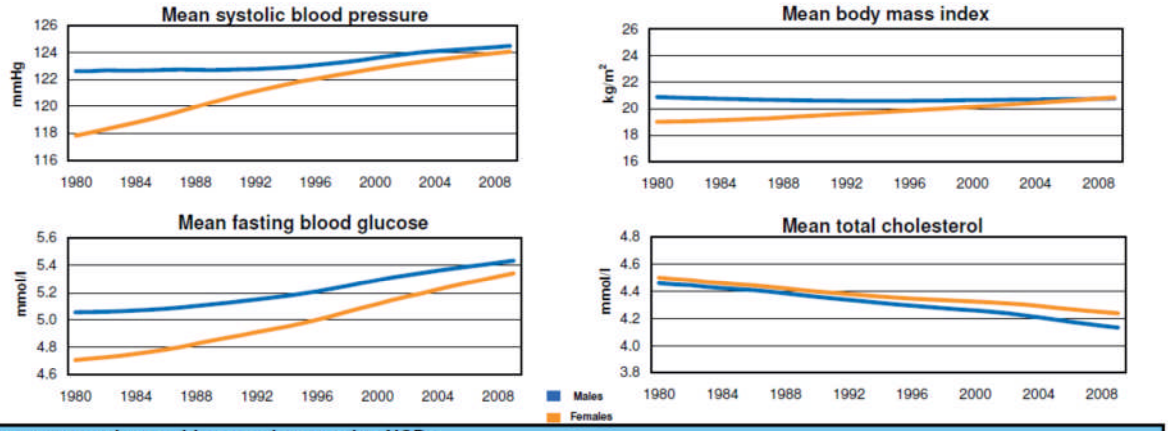
2008 estimated prevalence (%)	*males*	*females*	*total*
Raised blood pressure	...	...	...
Raised blood glucose	8.4	8.3	8.4
Overweight	9.3	8.9	9.1
Obesity	1.3	1.6	1.4
Raised cholesterol	...	...	...

Proportional mortality (% of total deaths, all ages)*



NCDs are estimated to account for 50% of all deaths.

Metabolic risk factor trends



Country capacity to address and respond to NCDs

Has a Unit / Branch / Dept in MOH with responsibility for NCDs	Yes	*Has an integrated or topic-specific policy / programme / action plan which is currently operational for:*	
There is funding available for:		Cardiovascular diseases	Yes
NCD treatment and control	Yes	Cancer	Yes
NCD prevention and health promotion	Yes	Chronic respiratory diseases	No
NCD surveillance, monitoring and evaluation	Yes	Diabetes	Yes
		Alcohol	Yes
National health reporting system includes:		Unhealthy diet / Overweight / Obesity	No
NCD cause-specific mortality	Yes	Physical inactivity	No
NCD morbidity	Yes	Tobacco	Yes
NCD risk factors	No		
		Number of tobacco (m)POWER measures implemented at the highest level of achievement	0/5
Has a national, population-based cancer registry	No		

* The mortality estimates for this country have a high degree of uncertainty because they are not based on any national NCD mortality data. The estimates are based on a combination of country life tables, cause of death models, regional cause of death patterns, and WHO and UNAIDS program estimates for some major causes of death (not including NCDs).

... = no data available

Sri Lanka

2010 total population: 20 859 949
Income group: Lower middle

NCD mortality

2008 estimates	*males*	*females*
Total NCD deaths (000s)	66.8	51.1
NCD deaths under age 60 (percent of all NCD deaths)	27.1	16.9
Age-standardized death rate per 100 000		
All NCDs	746.2	460.9
Cancers	90.0	77.8
Chronic respiratory diseases	101.5	57.5
Cardiovascular diseases and diabetes	384.9	240.8

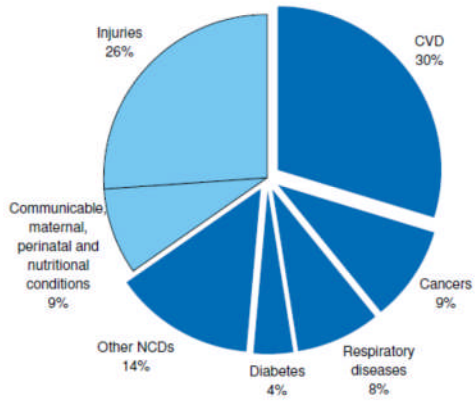
Behavioural risk factors

2008 estimated prevalence (%)	*males*	*females*	*total*
Current daily tobacco smoking	21.4	0.3	10.6
Physical inactivity	18.4	33.3	26.0

Metabolic risk factors

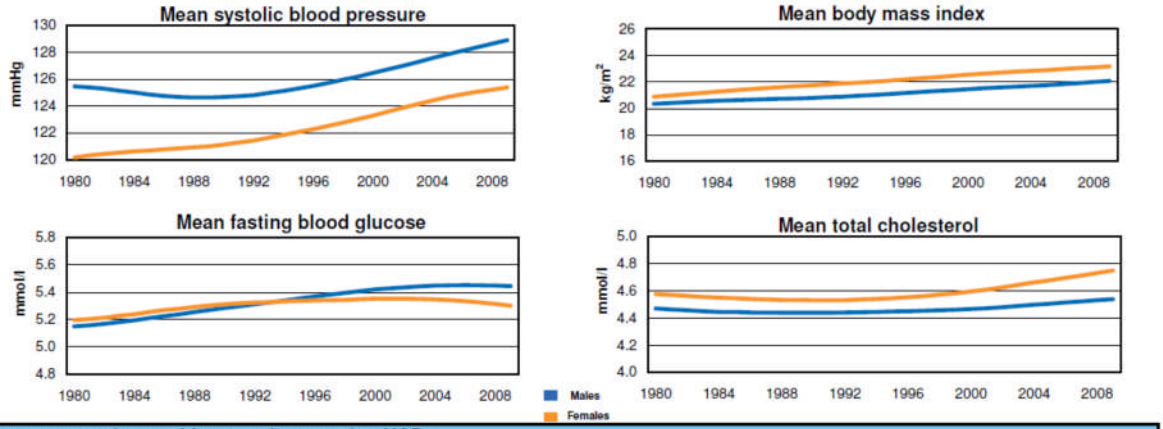
2008 estimated prevalence (%)	*males*	*females*	*total*
Raised blood pressure	41.4	37.1	39.2
Raised blood glucose	9.1	8.5	8.8
Overweight	16.7	26.8	21.9
Obesity	2.6	7.4	5.1
Raised cholesterol	...	...	...

Proportional mortality (% of total deaths, all ages)



NCDs are estimated to account for 65% of all deaths.

Metabolic risk factor trends



Country capacity to address and respond to NCDs

Has a Unit / Branch / Dept in MOH with responsibility for NCDs	Yes
There is funding available for:	
NCD treatment and control	Yes
NCD prevention and health promotion	No
NCD surveillance, monitoring and evaluation	No
National health reporting system includes:	
NCD cause-specific mortality	Yes
NCD morbidity	Yes
NCD risk factors	Yes
Has a national, population-based cancer registry	No

Has an integrated or topic-specific policy / programme / action plan which is currently operational for:	
Cardiovascular diseases	Yes**
Cancer	Yes**
Chronic respiratory diseases	Yes**
Diabetes	Yes**
Alcohol	Yes**
Unhealthy diet / Overweight / Obesity	Yes**
Physical inactivity	Yes**
Tobacco	Yes**
Number of tobacco (m)POWER measures implemented at the highest level of achievement	0/5

... = no data available
** = covered by integrated policy/programme/action plan