

Chapter 2

NCDs and development

Noncommunicable diseases have potentially serious socioeconomic consequences, through increasing individual and household impoverishment and hindering social and economic development. This chapter examines the relationship between NCDs and socioeconomic conditions. It demonstrates that the distribution and impact of NCDs and their risk factors is highly inequitable and imposes a disproportionately large burden on low- and middle-income countries. Poverty is closely linked with NCDs, and the rapid rise in the magnitude of these health problems is therefore predicted to impede poverty reduction initiatives in low-income countries and communities. Finally, the chapter argues that scaling up global efforts to prevent and control NCDs will help accelerate the achievement of the United Nations Millennium Development Goals (MDGs).

Once thought of as diseases of the rich, NCDs are now the leading causes of death in low- and middle-income countries. As mentioned previously, nearly 30% of NCD-related deaths in low-income countries occur under the age of 60, whereas in high-income countries the proportion is only 13%. Without targeted and sustained interventions, these health inequities are likely to widen, causing even greater individual, social and economic consequences. NCDs are fundamentally a development and socioeconomic issue, striking both rich and poor people, but inflicting more ill-health and other consequences on the poor in all countries.

Poverty is closely linked with NCDs, and the rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries

Equity, social determinants and NCDs

Structural determinants and the conditions of daily life constitute the social determinants of health and are crucial to explaining and addressing health inequities. As with other priority health issues, prevailing social and economic conditions influence people's exposure and vulnerability to NCDs, as well as related health-care outcomes and consequences (1).

The rapidly growing burden of NCDs in developing countries is not only accelerated by population ageing; it is also driven by the negative effects of globalization, for example, unfair trade and irresponsible marketing, rapid and unplanned urbanization and increasingly sedentary lives. People in developing countries eat foods with higher levels of total energy. Increasing NCD levels are being influenced by many factors including tobacco use and availability, cost and marketing of foods high in salt, fat and sugar. A considerable proportion of global marketing targets children and adolescents as well as women in developing countries to promote tobacco smoking and consumption of 'junk' food and alcohol. Rapid, unplanned urbanization also changes people's way of living through more exposure to the shared risk factors. NCDs are exacerbated in urban areas by changes in diet and physical activity, exposure to air pollutants (including tobacco smoke) and harmful use of alcohol. Overwhelmed by the speed of growth, many governments are not keeping pace with ever-expanding needs for infrastructure and services and people are less likely to be protected by interventions like smoke-free laws, regulations to phase out trans-fats, protections against harmful use of alcohol, and urban planning to promote physical activity.

As a consequence, vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions; the factors determining social positions include education, occupation, income, gender and ethnicity (2).

There is strong evidence on the links between poverty and lower life expectancy, and on the associations between a host of social determinants, especially education, and prevalent levels of NCDs: people of lower social and economic positions fare far worse in countries at all levels of development.

In Singapore, for example, the prevalence of physical inactivity, daily smoking and regular alcohol consumption was found to be consistently highest among men and women with the least education (3). In the United States, an additional four years of schooling was associated with a decreased risk of heart disease and diabetes (4). In Australia, blue-collar workers have significantly higher levels of cancer and in Spain, female blue-collar workers had a higher incidence of metabolic

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syndrome compared to other female white-collar personnel (5, 6). Diabetes is more prevalent among immigrants in Australia and the Netherlands (7, 8), while immigrants in Canada also have higher mortality rates of ischaemic heart disease (9). In Finland, consumption of saturated fat increased with decreasing individual income (10).

Similarly, in low- and middle-income countries, an increasing number of studies show associations between NCDs and certain social determinants, particularly education and income levels.

In China, lower education levels and urban residency are strongly associated with an increased risk of diabetes (11). The findings of a recent study in India also revealed that tobacco use, hypertension and physical inactivity were significantly more prevalent in lower education groups (12). In Viet Nam, cardiovascular mortality rates decreased among educated people compared to those without formal education, as is the case with harmful use of alcohol in Nepal (13, 14). In South Africa, higher mortality from NCDs was found among the urban poor (15). Poor people are more likely to smoke in Bangladesh and India (16, 17). People in poor communities in South Africa are at greater risk of being exposed to a number of NCD risk factors, including second-hand smoke, excessive alcohol use and indoor air pollution, as well as suffering from asthma (18). In Brazil, obesity is higher among women with lower level of income (19).

Evidence now shows that the poor may begin life with increased vulnerability to NCDs and are then exposed to additional risks throughout life. Under-nutrition in utero and low birth weight, particularly prevalent among low-income populations, increases the subsequent risk of cardiovascular disease and diabetes. There is evidence that childhood socioeconomic status is associated with type 2 diabetes and obesity in later life (20). As a consequence, the poor are more likely to die prematurely from NCDs. The WHO Commission on Social Determinants of Health made an aspirational call for closing the health gap in a generation (2). To ensure that the call is fulfilled, focused research, coherent policies and multisectoral partnerships for action are required to expand the evidence base and implement interventions that show evidence of effectiveness in combating NCDs and their risk factors.

Economic impact of NCDs on households

In addition to the close links between poverty and NCD risk, the economic consequences of NCDs are also of critical importance. In a World Bank qualitative survey of 60 000 poor women and men in 60 countries, sickness and injury was the most frequent trigger for downward mobility (21).

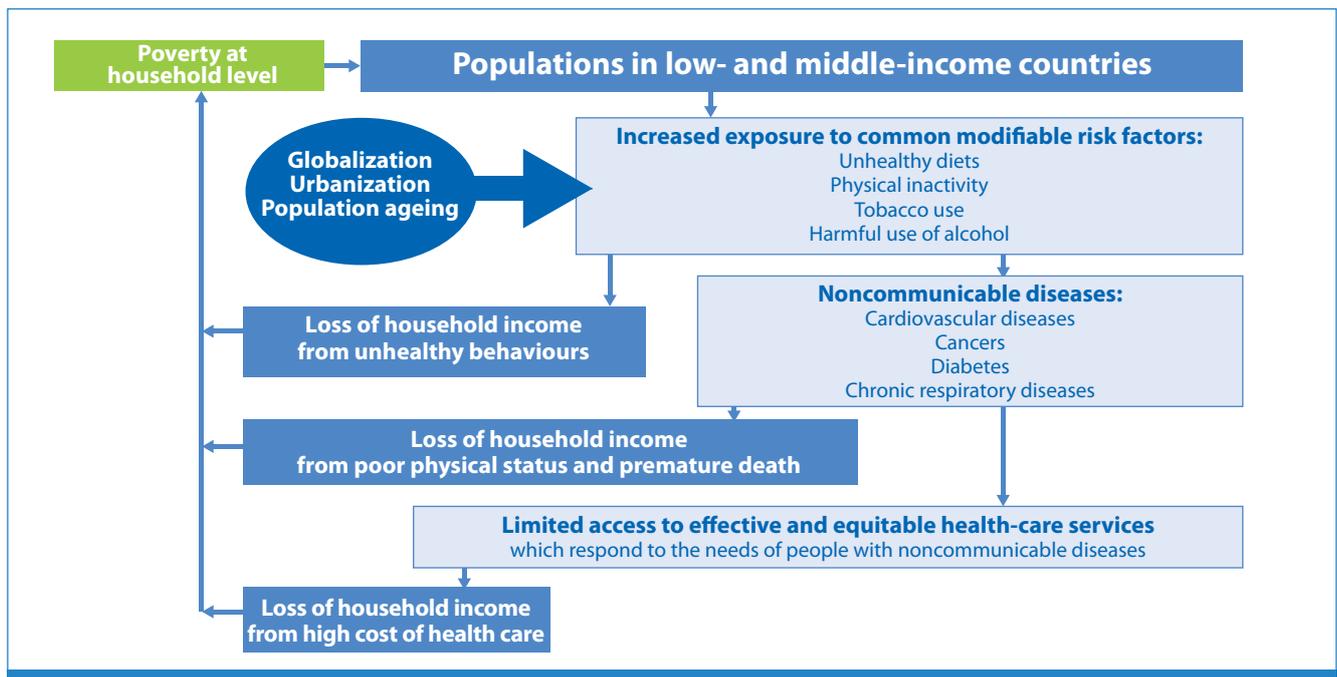
At the household level, unhealthy behaviours, poor physical status, and the high cost of NCD-related health care, lead to loss of household income. People often become trapped in a dangerous cycle where poverty and NCDs continually reinforce one another.

While measuring the economic impacts of NCDs remains a relatively complex and under-developed discipline, they invariably affect low- and middle-income countries and households more severely because they have the least financial cushion to withstand the economic consequences of NCDs.

The World Health Report 2010 (22) states that each year, 100 million people are pushed into poverty because they have to pay directly for health services; in some countries, this may represent 5% of the population forced into poverty each year. Financial hardship is not restricted to low- and middle-income countries: almost 4 million people in six OECD countries (Greece, Hungary, Mexico, Poland, Portugal and the Republic of Korea) reported forms of financial hardship caused by paying for health care. The report indicates that direct out-of-pocket payments still represent more than 50% of total health expenditures in a large number of low- and middle-income countries.

In low-resource settings, treatment for cardiovascular disease, cancer, diabetes or chronic lung disease can quickly drain household resources, driving families into impoverishment. NCDs exacerbate social inequity because most payments for health care in low- and middle-income countries are private and out-of-pocket; such costs weigh more heavily on those least able to afford them, increasing the risk of impoverishment.

About 150 million people each year suffer financial catastrophe and around 100 million are pushed under the poverty line because of payments for health care. More than 90% of these people live in low-income countries

Figure 1. Poverty contributes to NCDs and NCDs contribute to poverty

If those who become sick or die are the main income earners, NCDs can force a drastic cut in spending on food and education, the liquidation of family assets and a loss of care and investment in children. Where males are the primary income earners, widowhood or the burden of caring for a permanently disabled partner are routes to poverty. The high rate of disability due to NCDs is a particular burden on women and children. This may result in children losing opportunities for schooling, women losing the main sustenance for their families, and families losing their stability.

In some countries, the lowest income households have the highest levels of NCD risk factors, with negative consequences on household income. Data from Nepal indicate that the poor spent 10% of their income on cigarettes (23). In India, the risk of distress borrowing and distress selling of assets was notably higher for hospitalized patients who are smokers (24). Alcohol is often a significant part of family expenditure: Romanians spent an average of 11% of family income on alcohol in 1991 and Zimbabwean households averaged 7% (25). However, national averages conceal the impact on families of drinkers: families with frequent-drinking husbands in New Delhi spent 24% of family income on alcohol, compared to 2% in other families (25). Surveys among the urban poor in Sri Lanka found that 30% of families used alcohol and spent more than 30% of their income on it (25).

NCDs and their risk factors often prevent people from working or seeking employment, thus robbing families of income. A recent analysis by the World Economic Forum estimated that countries such as Brazil, China, India and the Russian Federation currently lose more than 20 million productive life years annually to NCDs (26). On average, 10 days are lost per employee per year due to NCDs and injuries in the Russian Federation (27). Annual income loss from NCDs, arising from days spent ill and in care-giving efforts, amounted to US\$ 23 billion (0.7% GDP) in India in 2004. In the Province of Taiwan, China, the probability of being in the labour force was reduced by 27% by cardiovascular disease and 19% by diabetes (28). Studies in China showed that tobacco use increased the odds of sick leave by between 32% and 56% (29, 30).

Financial catastrophe due to health problems can occur in countries of all levels of development. Yet the problem is most severe in low- and middle-income countries (31, 32).

Studies from India show that the contribution to poverty of high out-of-pocket expenditure for health care and NCDs is significant (33, 34). An estimated 1.4 million to 2 million Indians experienced catastrophic spending in 2004 and 600 000 to 800 000 people were impoverished by the costs of caring for cardiovascular disease and cancer (34). The findings of another study also reveal that one of every four families living in the world's poorest countries borrows money or sells assets to pay for health care (35).

The chronic nature of NCDs, and the projected increase in prevalence, means that the economic impact may grow cumulatively over many years. Using cross-sectional panel data from the Russian Federation Living Standards Measurement Study (1997–2004), NCDs were found to be associated with higher levels of long-term household health-care expenditure in the Russian Federation, especially in poorer households (36).

The costs of NCD treatments place a considerable burden on household income. A review of medicine prices in two multi-country studies showed that in the public sector, it cost on average from two to eight days' wages to purchase one month's supply of at least one cardiovascular medicine (37) and one day's wage to purchase one month's supply of at least one anti-diabetic medicine (38). One month of combination treatment for coronary heart disease costs 18.4 days' wages in Malawi, 6.1 days' wages in Nepal, 5.4 in Pakistan and 5.1 in Brazil. The cost of one month of combination treatment for asthma ranged from 1.3 days' wages in Bangladesh to 9.2 days' wages in Malawi (39). In India, paying for diabetes care can cost low-income households about one third of their incomes (40). In the United Republic of Tanzania, household costs for diabetes treatment were found to be 25% of the minimum wage (41).

Economic impact of NCDs on health systems and national incomes

National health-care budgets are being increasingly allocated to treatment of cardiovascular disease, cancer, diabetes and chronic respiratory disease. Costs for treating diabetes ranged from 1.8% of gross domestic product in Venezuela to 5.9% in Barbados (42). For the Latin America and Caribbean region, diabetes health-care costs were estimated at US\$ 65 billion annually, or between 2% and 4% of gross domestic product (GDP) (43) and 8% to 15.0% of national health-care budgets (44).

Oman is a high-income country and its per capita expenditure on health is lower than that of neighbouring Gulf states; but the sustainability of its health-care services has become a concern due to a 64% increase in health-care expenditure from 1995 to 2005. Treatment of cardiovascular disease alone will account for 21% of the total health-care expenditure in Oman in 2025 (45).

At the national level, threats and impacts of NCDs also include large-scale loss of productivity as a result of absenteeism and inability to work, and ultimately a decrease in national income. In 2010, the World Economic Forum placed NCDs among the most important and severe threats to economic development, alongside the current financial crisis, natural disasters and pandemic influenza (46).

Estimated losses in national income from heart disease, stroke and diabetes in 2005 were US\$ 18 billion in China, US\$ 11 billion in the Russian Federation, US\$ 9 billion in India and US\$ 3 billion in Brazil (47). One macroeconomic analysis demonstrated that each 10% rise in NCDs is associated with 0.5% lower rate of annual economic growth (48). According to this estimate, the expected 50% rise in NCDs predicted in Latin America by 2030 would correspond to about a 2.5% loss in economic growth rates. An Institute of Medicine study in the United States in 2010 found that NCDs cost developing countries between 0.02% and 6.77% of GDP (49). This economic burden is greater than that caused by malaria in the 1960s or AIDS in the 1990s, both of which were considered major economic threats.

From 2005 to 2015, China and India are projected to lose International \$ (I\$)¹² 558 billion (0.93% of the GDP) and I\$ 237 billion (1.5% of the GDP) respectively as a result of heart disease, strokes and diabetes. Significant losses are also estimated for other countries (48–50).

By 2025, the total direct and indirect costs from overweight and obesity alone among Chinese adults are projected to exceed 9% of China's gross national product (51).

¹²An international dollar is a hypothetical currency that is used as a means of translating and comparing costs from one country to another using a common reference point, the US dollar. An international dollar has the same purchasing power as the US dollar has in the United States.

Impact on Millennium Development Goals

Despite considerable progress, the health- and development-related MDGs are falling short of targets set in many countries. We now know that managing NCDs is of central importance to progress towards these goals.

Preventing NCDs is important for eliminating poverty and hunger because these diseases have a negative impact on productivity and family income and also because a substantial proportion of household income is spent on health care in low-income countries. NCDs' negative impact on national economies also means fewer jobs and therefore fewer people escaping poverty. It is also important for achieving MDG 2 (universal primary education), since costs for NCD health care, medicines, tobacco and alcohol consumption displace household resources that otherwise might be available for education. This problem is particularly acute in very poor families, which have the most to gain from education of their children.

There are also strong links with MDGs 4 and 5 (maternal and child health): the rising prevalence of high blood pressure and gestational diabetes is increasing the adverse outcomes of pregnancy and maternal health (52). Mothers who smoke are likely to breastfeed for shorter periods of time and have lower quantities of milk and milk that is less nutritious (53). Exposure to second-hand tobacco smoke increases the risks of childhood respiratory infections, sudden infant death and asthma (54).

The increasing NCD burden also threatens the possibility to effectively control tuberculosis. In an analysis of the 22 countries with a high burden of tuberculosis, which account for 80% of the global burden, HIV infection was estimated to be associated with 16% of adult tuberculosis cases, diabetes was associated with 10%, smoking with 21% and harmful alcohol use 13% (55). Smoking is already implicated in over 50% of tuberculosis deaths in India (56).

MDG Target 8e aspires to provide access to affordable essential drugs in developing countries. However, international efforts to provide access to essential drugs are limited largely to AIDS, tuberculosis and malaria (57). In a time when most ill-health and deaths are caused by NCDs, it is irrational that major development goals should be assessed in terms of communicable diseases alone.

Conclusions

The NCD epidemic exacts a massive socioeconomic toll throughout the world. It is rising rapidly in lower-income countries and among the poor in middle- and high-income countries. Each year, NCDs are estimated to cause more than 9 million deaths before the age of 60 years with concomitant negative impacts on productivity and development. The increasing burden of NCDs also imposes severe economic consequences that range from impoverishment of families to high health system costs and the weakening of country economies. The NCD epidemic is thwarting poverty reduction efforts and robbing societies of funds that could otherwise be devoted to social and economic development.

If common development goals are to be achieved, they must do more than raise incomes and consumption; they must free as many people as possible from disease and disability, and reduce the widening gap between the haves and have nots.

Key messages

- The NCD epidemic has a serious negative impact on human development in human, social and economic realms. NCDs reduce productivity and contribute to poverty.
- NCDs create a significant burden on health systems and a growing economic burden on country economies.
- NCDs impede progress towards the MDGs; they must be tackled if the global development agenda is to be realized

References

- 1) *Equity, social determinants and public health programmes*. Geneva, World Health Organization, 2010.
- 2) *Closing the gap in generation health equality through action on the social determinants of health. Commission on Social Determinants of Health Final Report*. Geneva, World Health Organization, 2008.
- 3) Fong CW et al. Educational inequalities associated with health-related behaviours in the adult population of Singapore. *Singapore Medical Journal*, 2007, 48:1091–1099.
- 4) Cutler D, Lleras-Muney A. *Policy brief: education and health*. Ann Arbor, MI, University of Michigan, 2007.
- 5) Burnley IH. Disadvantage and male cancer incidence and mortality in New South Wales 1985-1993. *Social Science & Medicine*, 1997, 45:465–476.
- 6) Sánchez-Chaparro MA et al. Occupation-related differences in the prevalence of metabolic syndrome. *Diabetes Care*, 2008, 31:1884-1885.
- 7) Hodge AM et al. Increased diabetes incidence in Greek and Italian migrants to Australia: how much can be explained by known risk factors? *Diabetes Care*, 2004, 27:2330–2334.
- 8) Ujic-Voortman JK et al. Diabetes prevalence and risk factors among ethnic minorities. *European Journal of Public Health*, 2009, 19:511–515.
- 9) Sheth T et al. Cardiovascular and cancer mortality among Canadians of European, south Asian and Chinese origin from 1979 to 1993: An analysis of 1.2 million deaths. *Canadian Medical Association Journal*, 1999, 161: 132–138.
- 10) Laaksonen M et al. Income and health behaviours. Evidence from monitoring surveys among Finnish adults. *Journal of Epidemiology and Community Health*, 2003, 57:711–717.
- 11) Yang W et al. Prevalence of Diabetes among Men and Women in China. *The New England Journal of Medicine*, 2010, 362: 1090–1101.
- 12) Reddy KS et al. Educational status and cardiovascular risk profile in Indians. *Proceedings of the National Academy of Science*, 2007, 104:16263–16268.
- 13) Minh HV et al. Cardiovascular disease mortality and its association with socioeconomic status: findings from a population-based cohort study in rural Vietnam, 1999–2003. *Preventing Chronic Disease*, 2006, 3:A89.
- 14) Jhingan HP et al. Prevalence of alcohol dependence in a town in Nepal as assessed by the CAGE questionnaire. *Addiction*, 2003, 98:339–343.
- 15) Vorster HH. The emergence of cardiovascular disease during urbanisation of Africans. *Public Health Nutrition*, 2002; 5(1A):239–243.
- 16) Efroymson D et al. Hungry for tobacco: an analysis of the economic impact of tobacco consumption on the poor in Bangladesh. *Tobacco Control*, 2001, 10:212–217.
- 17) Rani M et al. Tobacco use in India: prevalence and predictors of smoking and chewing in a national cross sectional household survey. *Tobacco Control*, 2003, 12:E4.
- 18) Bradshaw S, Steyn K. *Poverty and chronic diseases in South Africa*. Cape Town, Medical Research Council of South Africa and WHO, 2001.
- 19) Monteiro C, Conde, W, Popkin B. Income-specific trends in obesity in Brazil: 1975-2003. *American Journal of Public Health*, 2007, 97: 1808–1812.
- 20) Tamayo T, Christian H, Rathmann W. Impact of early psychosocial factors (childhood socioeconomic factors and adversities) on future risk of type 2 diabetes, metabolic disturbances and obesity: a systematic review. *BioMed Central Public Health*, 2010, 10:525.
- 21) Narayan D et al. *voices of the Poor: Crying Out for Change*. NY, Oxford University Press, 2000.
- 22) *The world health report 2010–Health Systems financing: the path to universal coverage*. Geneva, World Health Organization, 2010.
- 23) Karki Y, Pant KD, Pande BR. *A study on the economics of tobacco in Nepal*. Washington, DC, The World Bank, 2003.
- 24) Bonu S, Rani M, Peters DH. Does use of tobacco or alcohol contribute to impoverishment from hospitalization costs in India? *Health Policy and Planning*, 2005, 20:41–49.
- 25) *Alcohol at a glance*. Washington, DC, The World Bank, 2003.
- 26) *Working towards wellness. The business rationale*. Geneva, World Economic Forum, 2008.

- 27) Suhrcke M et al. *Economic consequences of noncommunicable diseases and injuries in the Russian Federation*. Geneva. World Health Organization, 2007.
- 28) Mete C, Schultz TP. *Health and labour-force participation of the elderly in Taiwan*. New Haven, CT, Yale University, 2002.
- 29) Tsai S et al. Workplace smoking related absenteeism and productivity costs in Taiwan. *Tobacco Control*, 2005, 14:i33–37.
- 30) Qun W, Dobson AJ. Cigarette smoking and sick leave in an industrial population in Shanghai, China. *International Journal of Epidemiology*, 1992, 21:293–297.
- 31) Xu K. Household catastrophic health expenditure: a multi-country analysis. *The Lancet*, 2003, 362:111–117.
- 32) Xu K et al. Protecting households from catastrophic health spending. *Health Affairs*, 2007, 26:972–983.
- 33) *Raising the sights: better health systems for India's poor*. Washington, DC, The World Bank, 2001.
- 34) Mahal A, Karan A, Engelgau M. *The economic implications of non-communicable disease for India. HNP Discussion Paper*. Washington, DC, The World Bank, 2010.
- 35) Kruk ME, Goldmann E, Galea S. Borrowing and selling to pay for health care in low- and middle-income countries. *Health Affairs*, 2009, 28:1056–1066.
- 36) Abegunde DO, Stanciole AE. The economic impact of chronic diseases: how do households respond to shocks? Evidence from Russia. *Social Science and Medicine*, 2008, 66(11):2296–3307.
- 37) Gelders S et al. *Price, availability and affordability. An international comparison of chronic disease medicines*. Cairo, World Health Organization Regional Office for the Eastern Mediterranean, 2006.
- 38) Cameron A et al. Medicines prices, availability, and affordability in 36 developing and middle-income countries: a secondary analysis. *The Lancet*, 2009, 373:240–49.
- 39) Mendis S et al. The availability and affordability of selected essential medicines for chronic diseases in six low- and middle-income countries. *Bulletin of the World Health Organization*, 2007, 85:279–288.
- 40) Ramachandran A et al. Increasing expenditure on health care incurred by diabetic subjects in a developing country: a study from India. *Diabetes Care*, 2007, 30:252–256.
- 41) Neuhann H et al. Diabetes care in Kilimanjaro region: clinical presentation and problems of patients of the diabetes clinic at the regional referral hospital – an inventory before structured intervention. *Diabetic Medicine*, 2001, 19:509–513.
- 42) Barcelo A et al. The cost of diabetes in Latin America and the Caribbean. *Bulletin of the World Health Organization*, 2003, 81:19–27.
- 43) Wild S, Gojka R, Green A. Global prevalence of diabetes estimates for the year 2000 and projections for 2030. *Diabetes Care*, 2004, 27:1047–1053.
- 44) Zhang P et al. Diabetes atlas: global health care expenditure on diabetes for 2010 and 2030. *Diabetes Research and Clinical Practice*, 2010, 87:293–301.
- 45) Al-Lawati J.A, Mabry R, Mohammed A.J. Addressing the treatment of chronic diseases in Oman. *Preventing Chronic Disease*, 2008, 5:A99.
- 46) *Global risks 2010: a Global risk network report*. Geneva, World Economic Forum, 2010.
- 47) *Preventing chronic diseases: a vital investment*. Geneva, World Health Organization, 2005.
- 48) Stuckler D. Population causes and consequences of leading chronic diseases: a comparative analysis of prevailing explanations. *Milbank Quarterly*, 2008, 86:273–326.
- 49) Fuster V, Kellz BB, eds. *Promoting cardiovascular health in the developing world*. Washington, DC, Institute of Medicine, 2010.
- 50) Abegunde D, Stanicole A. *An estimation of the economic impact of chronic noncommunicable diseases in selected countries (Working Paper)*. Geneva, World Health Organization, 2006.
- 51) Popkin BM et al. Measuring the full economic costs of diet, physical activity and obesity-related chronic diseases. *Obesity Reviews*, 2006, 7:271–293.
- 52) Vohr BR, Boney CM. Gestational diabetes: the forerunner for the development of maternal and childhood obesity and metabolic syndrome. *Journal of Maternal-Fetal and Neonatal Medicine*, 2008, 21:149–157.
- 53) Hopkinson JM et al. Milk production by mothers of premature infants: influence of cigarette smoking. *Pediatrics*, 1992, 90:934–938.

- 54) Woodward A, Laugesen M. How many deaths are caused by second-hand cigarette smoke? *Tobacco Control*, 2001, 10:383–388.
- 55) Lonnroth K et al. Tuberculosis control and elimination 2010--50: cure, care, and social development. *The Lancet*, 2010, 375:1814–1829.
- 56) Gajalakshmi V et al. Smoking and mortality from tuberculosis and other diseases in India: retrospective study of 43000 adult male deaths and 35000 controls. *The Lancet*, 2003,16:507–515.
- 57) *Delivering on the Global Partnership for Achieving the Millennium Development Goals*. New York, NY, United Nations, 2008.