

# Social and Economic Implications of Noncommunicable diseases in India

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## ABSTRACT

Noncommunicable diseases (NCDs) have become a major public health problem in India accounting for 62% of the total burden of foregone DALYs and 53% of total deaths. In this paper, we review the social and economic impact of NCDs in India. We outline this impact at household, health system and the macroeconomic level. Cardiovascular diseases (CVDs) figure at the top among the leading ten causes of adult (25–69 years) deaths in India. The effects of NCDs are inequitable with evidence of reversal in social gradient of risk factors and greater financial implications for the poorer households in India. Out-of-pocket expenditure associated with the acute and long-term effects of NCDs is high resulting in catastrophic health expenditure for the households. Study in India showed that about 25% of families with a member with CVD and 50% with cancer experience catastrophic expenditure and 10% and 25%, respectively, are driven to poverty. The odds of incurring catastrophic hospitalization expenditure were nearly 160% higher with cancer than the odds of incurring catastrophic spending when hospitalization was due to a communicable disease. These high numbers also pose significant challenge for the health system for providing treatment, care and support. The proportion of hospitalizations and outpatient consultations as a result of NCDs rose from 32% to 40% and 22% to 35%, respectively, within a decade from 1995 to 2004. In macroeconomic term, most of the estimates suggest that the NCDs in India account for an economic burden in the range of 5–10% of GDP, which is significant and slowing down GDP thus hampering development. While India is simultaneously experiencing several disease burdens due to old and new infections, nutritional deficiencies, chronic diseases, and injuries, individual interventions for clinical care are unlikely to be affordable on a large scale. While it is clear that “treating our way out” of the NCDs may not be the efficient way, it has to be strongly supplemented with population-based services aimed at health promotion and action on social determinants of health along with individual services. Since health sector alone cannot deal with the “chronic emergency” of NCDs, a multi-sectoral action addressing the social determinants and strengthening of health systems for universal coverage to population and individual services is required.

**Keywords:** Cardiovascular disease, cost of illness, economic impact, India, noncommunicable diseases

## Introduction

India has witnessed a phenomenal growth in economy since the last decade, with projections of nearly 7–8%

growth rate for the next year.<sup>(1)</sup> With a contribution of one-sixth of the world population, developments in India touch upon the global performance in a significant way. Besides encouraging developments on the overall economic front, the demographic, epidemiological and social transitions potentially pose serious challenge not only at household level, but also at health system and macroeconomic level. While on one hand the demographic transition has led to increase in productive workforce, it has also resulted in an increase in aged population. This aged population has contributed to an increase in the burden of noncommunicable diseases.

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Together with the aging population, increasing risk factors such as tobacco smoking, harmful use of alcohol, physical inactivity and unhealthy eating patterns has catapulted the share of NCDs in total mortality from 40% in 1990 to a projected 67% in 2020.<sup>(2)</sup> This high NCD burden poses a significant challenge to the health system, which accounts for 35% of all outpatient and 40% of inpatient hospitalization bed-days in 2004.<sup>(3)</sup> Moreover, NCDs have been estimated to reduce the economic growth by about 5–10%.<sup>(3)</sup> As a result of this multi-dimensional effect at individual, household, health system, and macroeconomic level, NCDs are being labeled as a global ‘chronic emergency’.<sup>(4)</sup> In a way, NCDs are linked to the achievement of some of the most important Millennium Development Goals (MDGs).

Few issues have acquired such global importance that the United Nations has convened a special session to discuss the potential implications. While the first being HIV/AIDS followed by reproductive, maternal and newborn child health, recent interest has been generated by the Noncommunicable Diseases (NCDs), for which a special session of the United Nations was convened in September, 2011. In this paper, we explore the socio-economic implications of NCDs, especially with focus on India. India alone contributes a significant proportion of global deaths and disability adjusted life years (DALYs) lost, respectively, and this merits for discussion on the social and economic implications of the ‘chronic emergency’ of NCD in India.<sup>(4)</sup> Moreover, the age of onset for CVD is almost a decade earlier in India than the most developed countries. About 52% of deaths from such disorders in India occur before 70 years of age, compared with 23% in established-market economies.<sup>(5,6)</sup> Hence the magnitude of economic losses owing to loss of productive years of life in India is likely to be higher than much of developed countries.

In the next section,<sup>(2)</sup> we review the disease burden of NCD in India and the contribution of the key transition i.e. demographic, epidemiological and social including nutritional and behavioral transition. We also discuss the social determinants of NCDs in this section and develop a theoretical framework to establish the causal link of social and economic effects of NCDs. Later in section 3, we review the economic effects of NCD from efficiency and equity perspectives. From an efficiency viewpoint, we look at the extent to which the cost of hospitalization for NCDs poses barriers for treatment and how preventive strategies (both population and individual based) at initial stages can be more cost effective; we use an equity lens for catastrophic impact of treatment expenditure for those who access care, to explore the differential impact of NCDs on the population, according to their socio-economic status in terms of the reversal of social gradient of disease burden; and skewed economic

impact of access to NCD care on the poorer sections of the society.

We next turn our attention to the macroeconomic impact of NCDs on the health system and the economic growth of India. Existing arguments quoting NCDs as a global ‘chronic emergency’ are reviewed here. In section 4, we attempt to answer the question whether Government action to control NCDs is justified and what are the ‘best-buys’ based on proven effectiveness and efficiency.

Finally, we conclude that NCDs have significant social and economic implications for households, healthcare budgets and the economic growth and development of India. So as highlighted in the political declaration of the United Nations General Assembly, there is an urgent need to develop and implement multisectoral policies for population-wide prevention of noncommunicable diseases with a special focus on curbing tobacco use, harmful alcohol use, promoting physical activity, reduction of salt and transfat consumption. In addition, investment is required at least to equitably scale up very cost effective, high impact individual interventions for cardiovascular disease, diabetes and cancer; best buys which give a good return on investment.

## Burden and Social Determinants of NCD in India

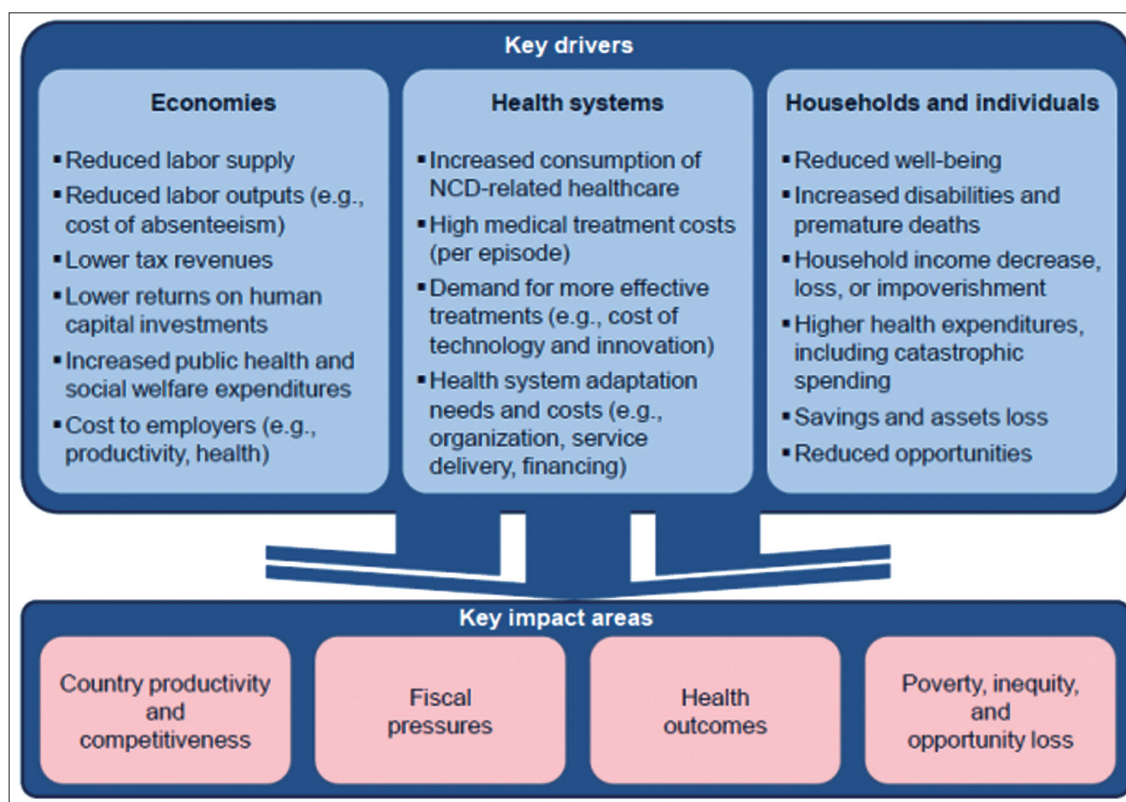
A recent report by the World Bank for South-East Asia Region estimated NCDs to account for 62% of DALY losses in India in 2004.<sup>(7)</sup> While most of the developed countries witnessed a rise in NCD at a time when the communicable diseases had reached significantly lower levels; India is one of the developing countries which has witnessed a ‘double burden’ epidemiological transition with high rates of NCD morbidity and mortality at a time when the communicable diseases have yet not been controlled. Secondly, even within India, different states are at a different stage of the transition.<sup>(2)</sup> This epidemiological transition is propelled by a demographic transition. The proportion of the population 65 years and older will move from 4.4 percent in 2000 to 7.6 percent in 2025.<sup>(5)</sup> The proportion of the population older than 35 years is expected to rise from 28% in 1981 to 42% in 2021. Besides the demographic factors, economic and social factors, of which urbanization, industrialization, and globalization, are the main determinants, are also contributing to the NCD epidemic in India.<sup>(2)</sup> The Indian economy is growing at 7% per year. Expectation of income is driving rural population to urban areas. The proportion of urban population, presently around 30%, is expected to rise to about 43% in 2021. During the decade 1991–2001, the population grew by 18% in the rural areas and 31% in urban regions.<sup>(8)</sup> Urbanization and industrialization are changing the patterns of living

in ways that increase behavioral and biological risk factor levels in the population. Substantial variations exist between different regions, but risk levels are rising across the country, most notably in urban areas of demographically and economically more advanced states of India.

The age standardized death rate per 100 000 males is 781.7 for all NCDs, with 78.8 for cancer, 178.4 for chronic respiratory diseases and 386.3 for CVDs and diabetes and among females is 571 for all NCDs with 71.8 for cancer, 125.5 for chronic respiratory disease and 283 for CVDs and diabetes<sup>(9)</sup> In absolute numbers, Indians contribute to 2.7 million CVD cases, 62.4 million diabetes, 1.5 million stroke, more than 30 million chronic respiratory diseases and 0.95 million incident cancer cases.<sup>(10)</sup> As per latest projections, the number of diabetics in India are estimated to 62.4 million, which is the second largest in the world after China.<sup>(11)</sup> While the prevalence of CVD has increased by nearly two times in rural areas, it has increased by six times in urban areas during the past four decades.<sup>(2)</sup> This rate of increase has been estimated to be twice the rate at which CVDs increased in the developed countries.<sup>(12)</sup> In developed countries, the socio-economic mortality differentials have been studied extensively showing that the low socio-economic groups suffer the highest mortality losses as a result of NCDs.<sup>(13-15)</sup> Such a trend was not observed for CVD in India until the 1990s, and CVD was initially regarded as a disease of the affluent classes.<sup>(16)</sup> Effect of socio-economic differentials in NCDs in India has been studied in terms of its contribution in occurrence of risk factors for NCD, health outcomes (herein we use prevalence of CVD to demonstrate socio-economic differentials in health outcomes from NCD perspective), treatment seeking for an episode of NCD, and finally in terms of mortality as a result of NCD. These socio-economic differentials have been demonstrated using different indicators of socioeconomic position i.e. education, occupation and economic capacity. Among the different social determinants, education has been shown to have the greatest association.<sup>(12)</sup> To begin with, the epidemic of CVD struck the more affluent sections of India first. However, as the epidemic is maturing, we are observing a graded reversal of social gradient, with socio-economically disadvantaged groups becoming increasingly vulnerable. For example, the social class gradient in cardiovascular event rates among Indians has reversed with evidence for excess CVD events among the lower socio-economic groups.<sup>(17,18)</sup> CVD risk is also increasing among poor in slum and rural areas. In selected urban, rural and slum communities of north India, prevalence of hypertension was found to be statistically similar after controlling for age, gender and education ( $P>0.05$ ). Prevalence of physical inactivity, central obesity, overweight and hypertension were found to be statistically similar among illiterate and

literate population after controlling the effect of age, sex and place of residence ( $P>0.05$ ). However, risk of tobacco use was significantly lower among literates.<sup>(15)</sup> In a survey conducted in 45 rural villages in India, 32 per cent of all deaths were due to CVD, outranking infectious diseases, which were responsible for 13 per cent giving clear evidence that the epidemic has reached its advanced stage even in rural India.<sup>(19)</sup> As per Million Death Study (2001-03) in India, CVDs are already at the top among top 10 causes of adult deaths (25-69 years) in urban and rural India contributing to 32.8% and 23% of deaths, respectively.<sup>(20)</sup> Such numbers are compounded by the barriers to care for the rural poor with NCDs. In addition, technology for NCD care is usually concentrated in hospitals, making it harder to reach for rural dwellers. In a multi-centric trial spanning 50 cities and about 21,000 patients from India, it was found that the CVD mortality was higher for poor patients than for rich patients (8.2% vs. 5.5%,  $p<0.0001$ ).<sup>(17)</sup> On further review, the study found that use of key treatments also differed by socioeconomic status: more rich patients than poor patients were given thrombolytics (60.6% vs. 52.3%),  $\beta$  blockers (58.8% vs. 49.6%), lipid-lowering drugs (61.2% vs. 36.0%), ACE inhibitors or ARB (63.2% vs. 54.1%), percutaneous coronary intervention (15.3% vs. 2.0%), and coronary artery bypass graft surgery (7.5% vs. 0.7%,  $p<0.0001$  for all comparisons). Ultimately, adjustment for treatments (but not risk factors and baseline characteristics) eliminated this difference in mortality.<sup>(17)</sup> It is a clear evidence for limitation in access to treatments for poor people, which leads to adverse outcomes in case of an episode of NCD.

Attempts have been made to explain the pathways through which the increased prevalence of NCDs has an impact on socioeconomic status and health outcomes [Figure 1]. Socioeconomic inequalities affect health through more than one mechanism and involve material, psychosocial and behavioral factors. Low income may affect health directly, for example, due to low purchasing power for a healthy diet, or indirectly, through the psychosocial effects of deprivation. Health-damaging behaviors such as smoking, drinking, consuming unhealthy diets (rich in salt, sugar and fats, and low in vegetables and fruits) are also found to be common among the low socioeconomic group.<sup>(21)</sup> Moreover, the uptake of a 'universal' prevention program to improve behaviors is least among the poor. This inverse care law has been demonstrated in a number of countries.<sup>(22)</sup> However, as we argue later in our article, personal behaviors are not only a matter of personal choice, but may be driven by factors such as higher levels of urbanization, technological change, market integration and foreign direct investment. A study which estimated causes of premature mortality in US found that 40% of premature mortality in the US



**Figure 1:** Causal pathway to socio-economic impact of noncommunicable diseases

is the result of behavioral factors, compared with 30% arising from genetic predisposition, 20% from social and environmental factors and 10% from healthcare deficiencies.<sup>(23)</sup> However, Marmot *et al* have shown that the role of social determinants in the causation of NCDs seems to be more important than even the role of major behavioral risk factors.<sup>(24)</sup> Thus social determinants play a role by altering the way people make their choices about personal behaviors, which exacerbates NCD prevalence, and hence it makes an even important case for the Governments to act on these social determinants. The UNGAS political declaration recognizes that "...the conditions in which people live and their lifestyles influence the health and quality of life, and that poverty, uneven distribution of wealth, lack of education, rapid urbanization and population ageing..." are important determinants and contributing factors to rising burden of NCDs.

### Microeconomic, Health System and Macroeconomic Impact of NCDs in India

Health care in India is highly privatized, both in terms of financing and delivery. More than 80% of outpatient and 40% of inpatient care is sourced from private sector.<sup>(25)</sup> India spends about 4.2% of its GDP on health care, with about 30% of this total health expenditure (THE) is contributed by the public sector.<sup>(26)</sup> With only about 10% of the total population under cover of any form of

health insurance, nearly 90% of the total private health expenditure is borne out-of-pocket by the households in 2000, which has reduced to 86.4% in 2009 and is still very high.<sup>(26)</sup>

### Financing for NCD

The five major NCDs (cardiovascular diseases (CVD); endocrine and metabolic diseases: neoplasm; respiratory infections; mental and neurological disorders account for almost 39% of total health expenditures in 2004. CVD account for the highest share in THE at 15.6% followed by 9% for respiratory diseases.<sup>(27)</sup> Mahal *et al* 2010 found that between two study periods (1995–96 and 2004), the share of NCDs in total out-of-pocket health expenditures in India increased from 31.6% to 47.3%, (or over 9 billion USD) of total OOP expenditures, suggesting a growing importance of NCDs in terms of their financial impact on households.<sup>(3)</sup> The average out-of-pocket expense per stay for inpatient treatment for NCDs is almost two times than for non-NCDs whether the treatment is in public or private facilities. The differential is insignificant for outpatient treatment per visit for NCDs and non-NCDs. Expense per day as inpatient for NCDs is 2–4 times (public vs. private) the expense for OP visit. The largest OOP expense as inpatient is for CVD and cancers and largest outpatient expense is for kidney and urinary diseases. It is possible that early detection and treatment of NCDs at outpatient centers can substantially reduce

the visits for inpatient care and reduce the cost of treatment for NCDs. Expenditures on medicines (45% of total OOP expenditures) continue to constitute the largest percentage of OOP expenditures spent on health care. For hypertension, OOP expenditure on medicines is highest at 64% of total hypertension expenditures.<sup>(3)</sup>

High costs of health care lead to financial barriers to access health care. The use of advanced technology in treatment and rising knowledge and expectations of the population regarding the therapeutic procedures has also led to an increase in the cost of treatment. Moreover, with the chronic nature of disease requiring prolonged treatments, financial implications for households are significant. The NSSO survey found that among those who did not seek health care for a medical illness in the past 15 days, nearly 30% rural and 20% urban respondents cited financial reasons.<sup>(25)</sup> In case of NCD treatment, the figures are likely to be still higher. This is inefficient as the patients are not treated early in the course of illness, and are rather treated late when treatment costs are higher and effectiveness of treatment lower.

### Financial impact of NCDs on households

The impact of NCDs on the household economy has been studied by estimating financial protection of households against healthcare expenditure. One measure is prevalence of catastrophic healthcare expenditures, i.e. any healthcare expenditure which amounts to more than 40% of total non-food consumption expenditure.<sup>(28)</sup> Mahal *et al.* 2010 found that 25% of families with a member with CVD experience catastrophic expenditure. The situation is much worse with cancer, where almost 50% of households with a member with cancer experience catastrophic spending and 25% are driven to poverty by healthcare expenses. The odds of incurring catastrophic hospitalization expenditures are nearly 160% higher with cancer and 30% higher for CVD and injuries, than the odds of incurring catastrophic spending when hospitalization is due to a communicable condition.<sup>(3)</sup> An estimated 1.4 million to 2 million Indian experienced catastrophic spending in 2004 and 600,000 to 800,000 people were impoverished by the cost of caring for CVDs and cancer. Living much closer to poverty line, these households face much higher risk of falling into poverty trap if treatment is sought and expenditure is incurred.<sup>(25,29)</sup> These studies show that poverty is closely linked with NCDs and the rapid rise in NCDs is predicted to impede poverty reduction initiatives in India. Overall, NCDs are linked closely with MDG 2, 4, 5, 6 and 8e, so managing NCDs is of central importance to progress toward achievement of these goals. By taking away a significant portion of household's capacity to pay, NCDs leave little to be spent on education especially female education. Some of major NCD risk factors such

as obesity have started to affect the children, especially among the rich affluent in the cities. Smoking which results in low-birth weight babies is a known risk factor for NCDs in adulthood.<sup>(6)</sup> Diabetes and hypertension are important risk factors for maternal death in pregnancy. Finally, low-cost generic medicines for NCDs remain inaccessible to most of the poor patients thus resulting in poor outcomes.

Further 'inequity-enhancing' effect of out-of-pocket payments made for NCD treatment in the NSS data (which shows a progressive pattern of health spending) hides the inequitably lower utilization treatment rates for poor who face financial barriers to care. Appropriately, recently there have been calls for making methodological improvements in how we measure the inequities in healthcare payments by adjusting for the inequities in access and utilization of care.<sup>(30,31)</sup>

NCD treatment also leads to significant income loss for the households. This is especially true for inpatient treatment. Forty-five percent of OOP expenditures for NCD inpatient care come from household income or savings, 33% from borrowing and 12% from friends and family. Assuming that all caregivers and sick individuals above the age of 15 years were productive yielded an annual income loss from NCDs of one trillion rupees in 2004. Much of this was in the form of income losses arising from days spent ill and in care-giving effort. Even if it is assumed that the workforce participation rate according to NSSO is 47%, the annual income losses to households associated with NCDs is roughly INR 280 billion (USD 6222 million).<sup>(3)</sup>

### Impact of NCDs on health system

Increased prevalence of NCDs has also led to increased pressures on the health systems. In an analysis of the Indian National Sample Survey data for 1995-96 and 2004-05 rounds, Mahal *et al.* 2010 found nearly 2.5 billion outpatient visits in the year 2004, the share of visits linked to NCDs were 35% (increasing from 22% of all outpatient visits in 1995-96). Hospital stays for NCDs were 40% of 30.6 million hospital stays in 2004 increasing from 32% in 1995.<sup>(3)</sup>

As the prevalence of NCDs rises, there will be greater demand for NCD-related healthcare services, including diagnosis and treatment. In a situation where the ratio of health workers per 10,000 population is less than 0.5, the human resource challenge for effectively addressing NCDs is immense.<sup>(32)</sup> What makes the situation further grim is the inequitable distribution of doctors and other paramedical workforce in urban and rural areas. Health and wealth reinforce each other and health systems are a catalyst for both,<sup>(33)</sup> so strengthening health system is crucial to address the challenge of NCDs. India

**Table 1: Summary of selected studies which have documented micro and macroeconomic impact of NCDs in India**

Study	NCD	Geographic area	Methods	Findings
Gupta <i>et al.</i> (2006) <sup>(36)</sup>	CVD	Kerala	Direct and indirect cost of illness	Economic burden amounts to 20% of state domestic product
Leeder <i>et al.</i> (2004) <sup>(37)</sup>	CVD	Brazil, India, China, Russia and South Africa	Used WHO Burden of disease data to estimate economic burden	CVD losses amount to USD 30 billion per year
Popkin <i>et al.</i> (2001) <sup>(38)</sup>	CVD, cancer and diabetes	India	Used NSSO (1995) and Mahal <i>et al.</i> (2002) data	Health care costs for three conditions amount to USD 13.9 billion in 1995-96, or 0.4% of GDP
Abegunde <i>et al.</i> (2007) <sup>(39)</sup>	CVD, diabetes, cancer and respiratory diseases	India	RGI mortality statistics and Mathers and Loncar (2006) projections	GDP loss amounting to USD 1.35 billion in 2006; cumulative loss of USD 17 billion by 2015
EIU (2007) <sup>(40)</sup>	Diabetes	India, US, UK and Denmark	Direct medical costs and productivity loss	GDP lost as a result of diabetes amounting to 2.1% in India, 1.2% in USA, 0.4% and 0.6% for UK and Denmark, respectively
Shobhana <i>et al.</i> (2000) <sup>(41)</sup>	Diabetes	Chennai, Tamil Nadu	Primary OOP analysis of 600 patients	Hospitalization expenditure per case of INR 5300
Grover <i>et al.</i> (2005) <sup>(42)</sup>	Diabetes	North India	Primary analysis of 50 patients	INR 10 000 is the average cost of care for a patient
Murthy <i>et al.</i> (2005) <sup>(43)</sup>	COPD	Hyderabad, Andhra Pradesh	Large-scale community study	Treatment costs for a severe COPD case was INR 33,000 in 2001; overall COPD leads to aggregate national health care costs of INR 169 billion in 2001
Mohan (2004) <sup>(44)</sup>	Road traffic injuries	India	Adjusting previous estimates for undercount of burden	Economic effects of RTI amount to 3.2% of GDP
Gumber (1995) <sup>(45)</sup>	Road traffic injuries	Five Indian states	NSSO (1986–87) data	Average OOP cost per hospitalization range from INR 621 to INR 1740
Thomas <i>et al.</i> (2004) <sup>(3)</sup>	Road traffic injuries	Bangalore, Karnataka	Household survey	Average expenditure/loss of earnings per case of INR 18 000
Mohanan (2008) <sup>(46)</sup>	Road traffic injuries	Karnataka	Secondary data analysis	Households cut on other consumption and education spending

Authors' analysis

has a reasonable primary health care system but is ill equipped to deal with NCD epidemic. Governance, capacity building of existing staff, additional staff for NCD programs, provision of essential drugs and technology and well-functioning information system is required. Some models for service delivery from India have shown that the health workers can be used for NCD risk assessment and management.<sup>(34,35)</sup> Screening for risk factor and counseling and advice for prevention of NCDs could be part of the health workers' schedule. Without an effective horizontal integration of the India's chronic disease program (National Program for Prevention of Cancer, CVD, Diabetes and Stroke), patients in advanced stage would continue to inefficiently bleed the already overstretched healthcare delivery system. Overall, an effective public health response to the NCD epidemic can no longer be ignored.

### Impact of NCDs on gross domestic product

A number of studies have attempted to quantify the macroeconomic impact of NCDs on India's economic growth. Mahal *et al.* 2010 concluded that in the event of elimination of NCDs in 2004, India's per capita GDP would be higher than its 2004 value (USD 562) by 5–10%.<sup>(3)</sup> From 2005 to 2015, India is projected to lose

international \$237 billion (1.5% of GDP) as a result of heart disease, stroke and diabetes.<sup>(9)</sup> Gupta *et al.* 2006 found in their analysis of NCD burden in Kerala state that the economic burden of CVD in Kerala amounts to 20% of the state domestic product [Table 1].<sup>(36)</sup> Leeder *et al.* 2004 in their multi-country analysis, which includes India estimated that the total loss as a result of CVDs in India was close to USD 30 billion.<sup>(37)</sup> Recently, Abegunde *et al.* 2007 estimated the combined impact of major chronic conditions (CVD, diabetes, cancers and respiratory conditions) on current and future national output. They found the loss in GDP due to chronic conditions to be of the order of USD 1.35 billion in 2006 and amounting cumulatively to a total of USD 17 billion by the year 2015.<sup>(39)</sup>

### How to Act Against the NCD Emergency?

Standard efficiency-based economic arguments hold true for making a case for strong Government action in controlling NCDs. Considering widespread empirical evidence of asymmetry of information-related health effects of risk factors for NCDs such as tobacco, alcohol, diet and physical inactivity, Government action in the form of provision (and production) of health information is in principle justifiable as information

**Table 2: 'Best buys' for NCD prevention and control**

Risk factor/Disease	Intervention
Tobacco	Tax increase Smoke-free indoor home, workplace and public place Adequate health information and warnings Ban on tobacco advertising, promotion and sponsorship
Harmful alcohol use	Tax increase Restricted access to retail alcohol Ban on alcohol advertising
Unhealthy diet and physical inactivity	Enforcement of norms for reduced salt intake in food Replacement of trans fat with polyunsaturated fat Public awareness through mass media on diet and physical activity
Cardiovascular disease and diabetes	Counseling and multi-drug therapy for people with high risk of developing health attacks and stroke (including those with established CVD) Treatment of heart attacks with aspirin
Cancer	Hepatitis B immunization to prevent liver cancer Screening and treatment of pre-cancerous lesions to prevent cervical cancer

Source: Global status report of NCDs, 2010<sup>9</sup>

will be undersupplied relative to social optimum if left to the market. Surveillance for NCDs is poor in India. Second, there are obvious 'externalities' associated with risk factors for NCDs such as passive smoking, alcohol-induced traffic fatalities. Lastly, a completely rational behavior would mean that individuals would weigh the costs and benefits of practice such as smoking. However, it has been found that individuals, especially children and adolescents, engage in risky behavior despite the knowledge of costs and benefits of smoking. Moreover, such irrational behavior is not always driven by individual choice, but significantly shaped by the prevailing environment where media and advertisements play a major role. In view of such irrational behavior choices, which are influenced by environment and media, Governments need to undertake action. Moreover, Government action is justified in order to reduce inequalities.<sup>(47)</sup> From the discussion so far on the economic consequences of expenditures related to NCD care, It is clear that 'treating our way-out' of this NCD epidemic may not be the only choice but should also be supplemented by strong population services focused on health promotion through action on social determinants of health and addressing the demand and supply-side of this epidemic. Realizing the gravity of situation, Ministry of Health and Family Welfare, Government of India has initiated National Programme for prevention and control of cancer, diabetes, cardiovascular diseases and stroke (NPCDCS) in 2010 covering 100 districts during 11<sup>th</sup> plan and expanding the same to whole country during 12<sup>th</sup> five year plan. National Programme for health care of elderly has also been initiated in 2010.

### Acting against the social determinants or risk factors for NCD

Taxes on tobacco are the single-most effective intervention to reduce the demand for tobacco [Table 2]. A price increase of 10% would reduce smoking by about 4% in high-income countries and by about 8% in low- and middle-income countries.<sup>(48)</sup> Use of smokeless tobacco and bidis is common in India; however, they are poorly taxed.<sup>(49)</sup> Public policies that raise the price of alcohol are an effective means to reduce the harmful use of alcohol. Alcohol and tobacco taxes also contribute to government revenue. An extensive literature documents the effectiveness of taxation in reducing drinking and drinking-related harm. A World Bank analysis found the cost of implementing tobacco control to cost USD 14 to USD 374 per DALY averted.<sup>(50)</sup> An analysis by Asaria *et al* (2007) has shown that a 26% increase in price of tobacco could result in 10% decrease in smoking prevalence.<sup>(51)</sup>

Agricultural production, trade, manufacturing and retail of food determine the types of food people buy. The impact on NCDs stems not only from the raw ingredients produced, but also how they are transformed, distributed and marketed. Policies such as reducing subsidies on meat production can help. Governments can set targets for the substitution of, for example, high energy-dense, salt and trans fats by less energy-dense, more nutritious, healthier options by retail outlets. Salt consumption is very high in some SEAR countries including India and strategies to reduce salt in the diet are very cost-effective and need to be implemented. Pricing strategies, either through taxes or by the food industry, can be effective in encouraging consumers to eat more healthily.<sup>(21)</sup> Asaria *et al.* 2007 found that a 15% reduction in salt intake could result in an average lowering of blood pressure between 1.6 to 3.8 mm Hg among males aged 30 years and 80 years, respectively.<sup>(51)</sup>

Evidence shows that there is extensive advertising and other forms of food marketing to children all around the world.<sup>(52)</sup> Most of this marketing is for foods high in fat, sugar or salt. Systematic reviews show that there is strong evidence that television advertising of foods high in fat, sugar or salt influences children's food preferences, purchase requests and consumption patterns. There is also strong evidence that exposure to television advertising is associated with obesity in children. Furthermore, there is evidence that a wide array of other forms of marketing are used to target foods high in fat, sugar or salt to children. There is a need for Government to promote responsible marketing including the development of a set of recommendations on the marketing of foods and non-alcoholic beverages to children, in order to reduce the impact of foods high in saturated fats, trans-fatty acids, free sugars or salt. This should be done in dialogue with all relevant

stakeholders, including private-sector parties, while ensuring avoidance of potential conflict of interest.<sup>(53)</sup>

### Strengthening health systems to reduce supply side inefficiencies for NCDs

Microeconomic interventions need to be drawn up which aim at providing financial protection to households from the impoverishing effects of high OOP on account of NCD treatment. This could range from promoting micro-insurance initiatives for NCD care in the short-run, and ultimately driving towards a universal health entitlement benefit package which includes essential NCD care based on primary healthcare approach. Regulation of pharmaceutical sector and promotion of research and procurement of generic medicines for treatment of NCDs should be urgently pursued, as evidence shows that 64% and 58% of total OOP spending on hypertension and diabetes, respectively, is on purchase of medicines alone. Unnecessary spending on medicines can be reduced through optimal use of generics, better information on prices, stronger procurement systems and improved prescriber incentives and promotion practices.

While achieving equity and increasing coverage for NCD treatment is paramount, reducing inefficiencies through better purchase and delivery of services is critically important to achieve better value for money. For human resources, it is important to promote needs-based training and performance-related payment system. Fee-for-service system (commonly used for paying private providers in India) not only imposes financial hardship on people, but also encourages over servicing. Countries have successfully used a mix of capitation, case-based payments and salaries for both hospitals and individual service providers to achieve greater efficiency. Hospital costs accentuated by inappropriate hospital admissions and length of stay can be reduced through alternative care practices for NCDs such as day care for certain procedures; services delivery models for long-term patient-centered care and emphasis on primary prevention. Modern medical technology, though crucial for providing good health services, are major contributor to increasing costs. A significant proportion of tests are medically unnecessary and repeated too often; marketing pressures from manufacturers lead to unnecessary purchase and use of equipment; and quite often trained staff is not available.<sup>(54)</sup>

### Conclusions

Overall, noncommunicable diseases (NCD) account for 62% of the total disease burden in India and have shown a significant rising trend both in terms of their contribution to the overall mortality and morbidity. Going by the current trends, this burden is likely to increase in the years to come. Secondly, due to the chronic nature of

the disease and technological advancements in care, cost of treatment are high which either leads to barriers to access, or catastrophic expenditures for those who undergo treatment. Moreover, there is evidence of reversal in social gradient of risk factors of NCDs and greater financial implications for the poorer households. Most of the estimates suggest that the NCDs in India account for an economic burden in the range of 5–10% of GDP which is significant.

In view of this situation, a strong multi-sectoral Government action is strongly warranted both on grounds of economic arguments and social justice. Action needs to be focused on addressing the social determinants of NCDs for its prevention, provision of individual services for those who are suffering from disease and strengthening of health systems to meet the challenge. Interventions against NCDs have been found to be cost effective and have been projected to have significant implications in terms of reduction in amenable mortality and morbidity. Tax increase on tobacco and alcohol, restriction of salt intake, promotion of physical activity and availability of low-cost generic medicines for NCD treatment are some of the available options for Government action. Although action on social determinants has been shown to have immense implementation challenge,<sup>(55)</sup> however, the current political and social developments provide a window of opportunity for a renewed commitment for action against NCDs. A framework for monitoring, reporting, and accountability is essential to ensure that the returns on investments in NCDs meet the targets and expectations set in our national plans.

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