THOUGHT ARBITRAGE
Bridging the thought divide

Health Card of India

A STUDY OF BURDEN OF DISEASES

2015

THOUGHT ARBITRAGE

Thought Arbitrage Research Institute
C-16, Qutab Institutional Area
New Delhi-110016
Tel: 011-41022447; 41022448
Website: www.tari.co.in

About this Report

This report has been prepared by Thought Arbitrage Research Institute (TARI)

About Thought Arbitrage Research Institute (TARI)

TARI is a not-for-profit organisation set up under Section 25 of the Indian Companies Act, 1956, to bridge the gap between policy initiatives and common perception through evidence-based research and comprehensive data-based reasoning. TARI is a privately-funded, independent, non-partisan Indian think-tank and works with government, industry, civil society and other stakeholders on:

- Corporate Governance
- Sustainability
- Economics
- Public Policy

Research Team at TARI

Principal Author
Ms Kshama V Kaushik

Research Conceptualisation
Mr Kaushik Dutta

Research Support and Contributing Authors
Ms Jyoti Khetarpal
Mr Vitul Gupta

Foreword

As many matured economies have shown, the long term challenges to provide sustainable employment and inclusive growth can be met through health and wellbeing of its citizens. India has, over the past decade, registered a growth rate of over 8% in economic terms but in human development indicators, including health, its growth has been marginal. This has created a society with high inequities. India's health outlay in terms of GDP is lower than even some of its poorer neighbours, making better health outcomes an imperative. In that sense, the Universal Health Coverage (UHC) initiative is a paradigm shift in India's developmental reforms and strategy and is, in many ways, transformational.

However, the challenges are many and very basic in nature starting with poor availability, quality and affordability of health services to issues of nutrition, water and sanitation, environmental pollution and multiplicity of health schemes and programmes etc. These challenges calls for a multi-sectoral approach, evidence-based policy making and prioritisation of focus areas. It was with these objectives that Thought Arbitrage Research Institute took up the challenge of preparing a Health Card of India a study which focuses on the current and future burden of diseases in India.

We are happy to present the findings of this study which takes a holistic view of India's health sector its strengths, challenges, direction of the policy formulations and outlay and suggests how policy interventions and resource allocations could be aligned with the demands of the present and future burden of diseases.

We would like to thank some of the leading health experts, social thinkers, government officials and businesses who have helped us in putting together this Health Card and suggestions for improving the delivery of quality healthcare.

Kaushik Dutta
Director, Thought Arbitrage Research Institute

Introduction

India is often characterised by multifarious contradictions and various divideseconomic, social or otherwise.

These divides tend to significantly melt away when it comes to health matters, especially during an outbreak of communicable diseases, which affect people across all sorts of divides. However, the divide becomes sharper when it comes to access to quality healthcare where money can almost certainly buy good health.

Then again, as India goes through rapid changes in its quest to become an economically prosperous nation, there is a clear epidemiological transition (a phrase coined to describe the long-term change in the leading causes of death, from infectious and acute to chronic and degenerative conditions), blurring several divides of rich and poor, rural and urban, male and female, etc.

In yet another contradiction, though the public healthcare infrastructure in India depicts a rather dismal story, India is fast becoming one of the most favoured medical tourism destinations in Asia due to low treatment cost, highly educated doctors, and best in class private infrastructural facilities.

This study examines several of these contradictions, their effect on public health policy, challenges in getting citizens to make right lifestyle choices and the role of technology in the well-being of citizens, among other things. It suggests how to combat several challenges in India's health ecosystem which would reduce inequities.

In the final analysis, how well India handles its dual burden of diseases (communicable as well as non-communicable) could determine its economic growth trajectory and the quality of life of its citizens.

Kshama V Kaushik
Director, Thought Arbitrage Research Institute

Contents

Executive Summary

Strengthening the health care system is a key priority for any nation to improve the overall well-being of its citizens. In 2000, 189 nations, including India, made a promise to free people from extreme poverty and multiple deprivations. This pledge became the Millennium Development Goals (MDG). MDGs which include eight goals, to be achieved by 2015, were framed to address the world's major development challenges with health and its related areas as the prime focus.

In India, health is a state subject; the Central Government supplements the efforts of the State Governments for improving healthcare including services for prevention, diagnosis and treatment of various diseases. India's health care system consists of a mix of public and private sector providers of health services, with private sector vastly exceeding public healthcare; the public sector accounts for only 26% while the private sector is very high at 71%. Most of India's estimated 1.2 billion people have to pay for medical treatment out of their own pockets. The estimated share of household out-of-pocket expenses in total health spending is one of the highest in the world, with more than US$40 billion spent.[1]

Indian health system is characterized by understaffed, underfunded and poorly managed facilities. The better ones tend to be overcrowded. A severe shortage of doctors, nurses and midwives is made that much worse by large geographical gaps in availability. Rural areas are especially poorly served. Complaints are common about distant locations, inconvenient hours, high staff absenteeism and the insensitivity of many health workers.

Burden of Disease

Burden of disease describes the total, cumulative consequences of a defined disease or a range of harmful diseases with respect to health loss that remains after treatment, rehabilitation or prevention efforts.

The causes of death due to diseases that is, the overall burden of diseases, are categorised into three types by WHO:

- Communicable Diseases (CDs)
- Non-Communicable Diseases (NCDs)
- Injuries

While CDs accounted for 37% in 2010 and 28% in 2012 of all deaths, all NCDs put together are the leading cause of deaths globally and also account for 53% and 60% respectively of all deaths in India. Injury has also shown an upward trend from 10% in 2010 to 12% in 2012.

India accounts for 21% of the world's burden of disease. Impressive advances have occurred in addressing communicable diseases, but the emergence of non-communicable diseases, which are already responsible for two-thirds of the total morbidity burden is a worrying trend.[2]

Cost of Healthcare

The human and economic toll of leading chronic diseases on patients' families and society is enormous. Key channels through which disease or injury can impact macroeconomic performance or output include increased health expenditures, labour and productivity losses, and reduced investment in human and physical capital formation.

[1] Bulletin of the World Health Organization, 2010
[2] WHO country profile 2010 and 2012 refer annexure III & IV.

Cost of healthcare is calculated over two components namely, (i) **Direct Household Cost**; and (ii) **Government Cost**.

Direct household costs comprise **all expenditures** on healthcare by a household, including expenditure on non-working members such as children and old people. Thus, the dependence ratio is factored in the total direct costs.

The direct household expenditure of **Rs.1,08,220.97** crores is on all diseases category including Cds, NCDs, other NCDs and Injuries.

The total government revenue expenditure on health is estimated to be **Rs.77,631.87** crores for the year 2011-12 out of which the central government spent Rs. 26,101.87 crores and all state governments together spent **Rs.51,530** crores during the year 2011-12.

Particulars	Healthcare cost (in ₹ Crore)	Share in total healthcare cost (%)
Household Out-of-Pocket Expenditure	1,08,220.97	58%
Public Revenue Expenditure:		
Central Government	26,101.87	14%
State Governments	51,530.00	28%
Total Healthcare Cost for 2011-12	1,85,852.84	100%

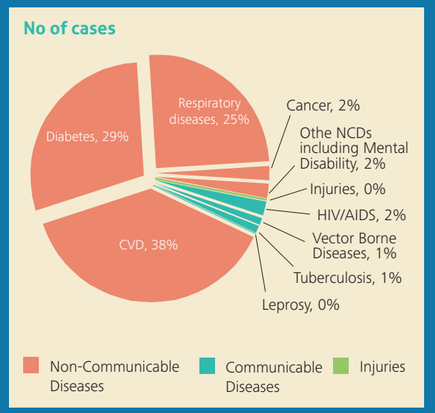
Risk Factors of Diseases

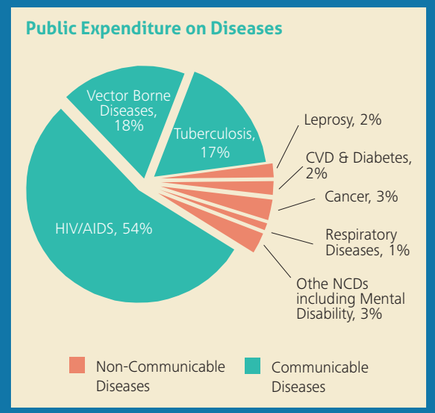
There are several risk factors that expose people to diseases; some of these are known and preventable while some may not be clearly known. Some communicable diseases are transmitted through contaminated water and food and lack of sanitation such as cholera, jaundice, malaria or chikunguniya. Unsanitary living conditions and over-crowding are recognised as contributing to both CDs and NCDs such as tuberculosis, hypertension, and respiratory diseases. Some of the risk factors are modifiable while some are non-modifiable that include ageing, genetic factors, race, ethnicity and gender.

Mitigation of most risk factors for communicable diseases involves administration efforts such as providing clean drinking water, spraying pesticides and insecticides, safe disposal of solid waste and garbage, cleanliness of public spaces, etc. Risk factors for non-communicable diseases arise largely on account of life style choices of individuals which can be mitigated through efforts of individuals themselves while administration must play a role in raising awareness among people to adopt healthier practices.

Health Expenditure Pattern in India

The Indian healthcare system and policy development face immense challenges because of the huge population size and the varied nature of national health concerns. Despite impressive gains in some areas, a lot more needs to be done to deliver quality healthcare to citizens.





A simple comparison of average recorded incidents of CDs and NCDs in 2012 indicates a proportion of 6:94 (6% incidents for CDs and 94% incidents for NCDs); while same comparison for average public expenditure on CDs and NCDs shows a ratio of 91:9 (91% on CDs and 9% on NCDs), thus demonstrating a mismatch of incident vs. expenditure. This could also indicate that expenditure in earlier years is showing results in the form of lower incidents in later years. For example public expenditure on HIV/AIDS accounted for 54% of budget, while the number of cases were just 2% of all diseases put together. A direct correlation between amount spent and number of cases may sometimes be erroneous since control or eradication of diseases requires different approaches, each approach costing varying sums of money. However, constant vigilance is needed to ensure that health expenditure is in tandem with trends of the burden of disease.

Key Challenges and Risks

One of the most significant trends in the overall burden of disease is the shift in morbidity and mortality from communicable to non-communicable diseases.

Impact of NCDs on the Economy: NCDs impact the economy by increasing public health expenditures for treatment and reducing the amount of household taxable income by pushing ill people out of the workforce, further reducing the net availability of government resources. Reaping the demographic dividend is expected to provide India with higher economic output per capita, which allows greater wealth generation and more resources to be channelled into savings and productive investments. However, this pre-supposes a healthy population working at optimum productivity with few disruptions due to diseases and ill health.

Universal Health Coverage and Infrastructure: Until the goal of universal healthcare is translated into action, citizens have to access healthcare through the existing facilities. Public infrastructure, however, is woefully inadequate to handle the increasing burden of diseases particularly the non-communicable diseases. In the absence of adequate numbers of trained personnel and physical infrastructure, the private sector attracts the best talent, further eroding the capacity of the public health system. The lop-sided supply side may be somewhat rectified by co-opting the private healthcare system into the total national infrastructure in a formal manner–a Public-Private-Partnership in healthcare–so that an 'either/or' unhealthy competition between public and private sector is converted into 'win-win'.

Mortality Data Collection: A sound health database provides a good platform for effective healthcare planning of a country. In India quality of mortality data collection varies from state to state and even among cities of the state. Death registries are the primary data source of mortality data.

As per report by "Office of The Registrar General, Ministry of Home Affairs, India" ***only 66.9% deaths are registered with various municipal corporation.*** These registries are maintained by municipal corporations and data collection formats are not standardised. Many corporations also do not record information related to cause of death.

Medical certification of cause of death is another source of collection for determining the cause of deaths. However, this is only required to be submitted by a medical practitioner or hospital authorities to the registrar if they attend to the deceased.

As per MCCD Report 2011, only 20% registered deaths are medically certified.

In absence of accurate data of causes of death, the government may find it difficult to plan its expenditure as per requirements; misallocation of funds can further affect the health issues of a country adversely.

Urbanization: The effect on health of urbanisation is two-edged. On the one hand, there are the benefits of ready access to healthcare, sanitation, and secure nutrition, whilst on the other there are the evils of overcrowding, pollution, social deprivation, crime, and stress-related illnesses. All cities and even towns of India have large slums where migrating rural populations typically reside where there is no sanitation, piped water, or rubbish disposal. This calls for major investments in infrastructure and health personnel, currently well beyond the resources of most municipalities.

Globalisation: Globalisation enables fast global response to medical crises but can itself make transmitting of diseases across the globe easier. Outbreak of diseases pose unexpected and unplanned stress on health infrastructure and the already stressed health systems tend to exacerbate such incidences into epidemics of communicable diseases. The burden of diseases is also determined by exposure of population to risk factors, especially for NCDs indirectly, as exemplified by international free trade agreements, called FTA. Trade liberalization can work for or against health. On the one hand, it can promote the transfer of goods, services, investments and technologies that promote health directly, for example through expanding access to nutritious foods and essential medicines, or indirectly by stimulating economic growth and employment. On the downside, it could lead to disparities in trade and investment related economic growth between countries, exacerbate income inequalities within countries, heighten economic and food insecurity which may exacerbate risks of non-communicable diseases, and impact production and sale of patented or generic drugs.

Demography Changes: A critical aspect of demographic trends is ageing with the share of older individuals living in a country increasing over time. WHO

classifies age as a non-modifiable risk factor of NCDs (along with gender, race and family history)[3]; that is, as a person ages, her/his chances of contracting an NCD increase.

In 2050, more than three-quarters of 1 billion people aged 60 and older will live in China and India, constituting 38% of the world's 60-plus population (UN, 2011a). Traditionally, India's elderly have been cared for by families, ensuring a reasonable degree of physical care in the form of medical intervention and a fair degree of emotional support. With the rise in the number of nuclear families this familial support base is eroded while the health care infrastructure in India has not yet matured to replace the role of families, exacerbating the health problems for the aged.

The Way Ahead

India is faced with a double disease burden, resulting out of high incidence of communicable diseases as also greater incidence of deaths due to non-communicable diseases. The key to lasting solutions for both CDs and NCDs lies in prevention of underlying causes. Advocacy issues would need to be worked out in partnership with all stakeholders such as consumer groups, health professionals, industry groups and regulators so that no one interest group wins at the expense of other stakeholders.

Low-cost solutions should aim to reduce the common modifiable risk factors while high impact essential NCD interventions can be delivered through a primary health-care approach to strengthen early detection and timely treatment to save on huge costs of treatment once the disease progresses. India needs to further strengthen its healthcare system by promoting an integrated approach including predictive medicine allowing targeted treatment along with preventive medicine to manage the threat posed by the double disease burden.

However, despite intensifying efforts, the conventional practice of medicine will not be adequate to treat diseases since it requires large outlay of resources in terms of physical infrastructure and health professionals. In several countries predictive and preventive approach of health care is gaining importance to ensure a targeted approach in health policies and practices. Predictive medicine through genomic screening, identifying high risk groups and delivering preventive medicine including advising specific life style changes, customised exercise program, periodicity of screenings or tests would help to deliver better and more specifically targeted health care.

Medical science is now undergoing a major revolution that will transform the nature of healthcare from reactive to proactive. India will require a concerted effort, besides targeted investment, to keep pace with the latest trends in both medical education and medical service delivery.

To conclude, India must step up efforts to combat non-communicable diseases while remaining constantly vigilant towards containing communicable diseases. In other words, India needs a life-course approach to handling and resolving public health issues to ensure healthy and productive citizens. India has already demonstrated its ability to combat certain CDs through a co-ordinated and concerted effort as evidenced by eradication of polio and small pox. The same co-ordinated approach needs to be deployed towards NCDs to ensure healthy citizens.

[3] http://www.who.int/pmnch/knowledge/publications/summaries/ks15/en/

1. Introduction

Introduction

Strengthening health care system is a key priority for any nation to improve the overall well-being of its citizens.

The Government of India steers the health care system through policy oversight, technical assistance, actual implementation, planning, funding and monitoring, regulations and national disease control programmes.

MoHFW provides financial and technical assistance to State/UT Governments under National Health Mission (NHM) for strengthening of primary and secondary health care facilities to effectively respond to health care needs including health problems arising from consumption of contaminated drinking water, the source of several communicable diseases. *Please refer Annexure I for department wise framework for disease control and prevention under various schemes by related Ministry in India.*

Under the Indian Constitutional framework, 'improvement of public health' is one of the primary responsibilities of the State. The Central Government supplements the efforts of the State Governments for improving healthcare including services for prevention, diagnosis and treatment of various diseases. Improvement with respect to healthcare indicators is dependent on the performance of the States as well as the Centre.

India's health care system consists of a mix of public and private sector providers of health services.

Networks of health care facilities at the primary, secondary and tertiary level, run mainly by State Governments, provide free or low cost medical services.[4]

However, the private medical sector remains the primary source of healthcare for the majority of households in both urban and rural areas, because of better infrastructure and improved services.

Private health services have grown by default, without adequate checks on cost and quality, escalating private out-of-pocket health expenditures and exacerbating health inequity.[5]

Medical loans are quite prevalent in urban as well as rural households in India. These households are driven to loans because of certain medical exigencies.

Most of India's estimated 1.2 billion people have to pay for medical treatment out of their own pockets. The estimated share of household out-of-pocket expenses in total health spending is one of the highest in the world, with more than US$40 billion spent.[6]

The low share of public expenditure on healthcare has led to greater burden of diseases on households. Further reasons of worry are the health status of disadvantaged groups which is even worse in India leading to impoverishment.

Low public spending on health (1% of GDP), high out-of-pocket payments (71%) leading to impoverishment, high levels of anaemia (56% among ever-married women aged 15-45 years) reflect in high levels of malnutrition among children leading to high infant mortality (47/1000 live births) and maternal mortality (212 per 1 lakh live births).[7]

Indian health system is characterized with understaffed, underfunded and poorly managed facilities. The better ones tend to be overcrowded. A severe shortage of doctors, nurses and midwives is made that much worse by large geographical gaps in availability. Rural areas are especially poorly served. Complaints are common about distant locations, inconvenient hours, high staff absenteeism and the insensitivity of many health workers.[8]

[4] https://nagahistory.wordpress.com/2014/03/12/indian-health-care-system/
[5] http://orfonline.org/cms/export/orfonline/modules/orfseminarseries/attachments/seminarseriesissue12_1378805959342.pdf
[6] Bulletin of the World Health Organization, 2010
[7] http://planningcommission.nic.in/sectors/health.php?sectors=hea

Indian health system is characterized with understaffed, underfunded and poorly managed facilities. The better ones tend to be overcrowded. A severe shortage of doctors, nurses and midwives is made that much worse by large geographical gaps in availability. Rural areas are especially poorly served.

Thus the most striking features of the Indian health care system are:

- **Low levels of public spending**
- **Poor quality of health status and services**
- **Insufficient public health mechanism**
- **Lack of forums for health education and awareness**

Millennium Development Goals (MDG)

In 2000, 189 nations, including India, made a promise to free people from extreme poverty and multiple deprivations. This pledge became the Millennium Development Goals (MDG).

MDGs which include eight goals, to be achieved by 2015, were framed to address the world's major development challenges with health and its related areas as the prime focus.

1	Eradicate Extreme Poverty & Hunger
2	Achieve Universal Primary Education
3	Promote Gender Equality & Empower Women
4	Reduce Child Mortality
5	Improve Maternal Health
6	Combat HIV/AIDS, Malaria and Other Diseases
7	Ensure Environmental Sustainability
8	Global Partnership for Development

MDG Health Targets

The millennium declaration adopted eight development goals, three among which catered to the healthcare standards:

MDG 4: Reduce Child Mortality – Reduce by two-thirds, between 1990 and 2015, the Under-5 Mortality Rate

- Under-five Mortality Rate
- Infant Mortality Rate
- Proportion of one year old children immunised against measles

MDG 5: Improve Maternal Health – Reduce by three quarters between 1990 and 2015, the Maternal Mortality Rate

- Maternal Mortality Rate
- Proportion of births attended by skilled health personnel

[8] http://www.livemint.com/Opinion/pl58bANi9zaF0AR2MkUYuN/Fixing-Indias-healthcare-system.html

MDG 6: Combat HIV/AIDS, Malaria and Other Diseases

- Target: Halt by 2015 and begin to reverse the spread of HIV/AIDS
- Target: Halt by 2015 and begin to reverse the incidence of Malaria and other major diseases (including tuberculosis)

Performance against the MDGs

At the time the Millennium Declaration was adopted, India was in its Ninth Five Year Plan (1997-2002). India has, since then, set its own healthcare targets under the existing Twelfth Five Year Plan period (2012-2017).

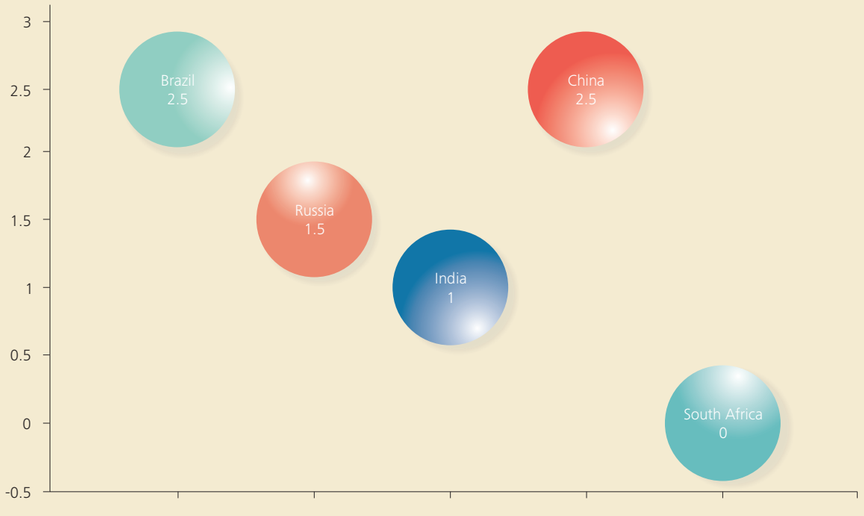
While the MDGs had set forth assessment indicators, this assessment of India's commitment to MDGs should be read in conjunction with the Five Year Plan targets.

Improvement in terms of the health indicators has registered a slow progress especially related to mortality, morbidity and various environmental factors contributing to poor health conditions.

Even though the government, both at the Central level and in the States, has implemented a wide array of programs, policies and various schemes to combat these health challenges, India still lags in terms of the health indicators as adopted under the Millennium Declaration.

India has made moderate progress on MDGs 4 and 5. However it has performed poorly on MDG 6.

Performance of BRICS countries: MDGs 4, 5 & 6



Source: Authors- http://www.ab.gov.tr/files/ardb/evt/1_avrupa_birligi/1_9_politikalar/1_9_8_dis_politika/The_role_of_BRICS_in_the_developing_world.pdf

Health Ecosystem in India

A health system is the sum total of all the organizations, institutions and resources whose primary purpose is to improve health.[9] It was under the 11th Five Year Plan that healthcare priorities gained prominence with time-bound goals set against identified healthcare targets. Under the 11th and 12th Five Year Plans, healthcare targets were fixed and made measurable. A decentralised approach under these plans has called for raising the public expenditure on healthcare.

While Health is a State subject, the Central Government supplements the efforts of the State Governments for improving healthcare.

Ministry of Health and Family Welfare (MoHFW) provides financial and technical assistance to State/UT Governments under National Health Mission (NHM) for strengthening of primary and secondary health care facilities to effectively respond to health care needs including health problems arising from consumption of contaminated drinking water, the source of several communicable diseases. The financial assistance for this purpose is provided under NHM Mission Flexipool as per the needs of States/UTs which are reflected in their annual Programme Implementation Plans (PIPs).

State Program Implementation Plans (State's PIP) is made by the Executive Committee (EC) of the State Health Society and approved by the State Government/ Governing Board. The EC of the State Health Society implements the approved plan, with governance and oversight exercised by the Governing Board and the State Health Mission.

On an average, public sector health expenditure accounts for only 26% while the private sector is high at 71%.

The State PIP is appraised by the National Programme Coordination Committee (NPCC), chaired by the Mission Director with representatives of MOHFW and the states participating. National technical assistance and support agencies providing support to the respective states provide their inputs to the Mission Directorate and the NPCC.[10]

There are other independent departments such as AYUSH, AIDS Control and Health Research, Drinking Water and Sanitation, School Education and the Women and Child Department which operate independently within the Ministry.

National technical assistance and support agencies carry out investigation of outbreaks of diseases under Integrated Disease Surveillance Project (IDSP). Secretary, Health and Family Welfare, who is also the Chairperson of Empowered Programme Committee (EPC), approves NPPC recommendations.

At present, India's health care system is a mix of public and private sector providers of health services. Networks of health care facilities at the primary, secondary and tertiary level, run mainly by State Governments, provide free or low cost medical services.

Alongside, there is a thriving private health care industry comprising of private hospitals, clinics and independent medical practitioners.

Despite the priority status of healthcare, healthcare infrastructure has been poor, largely resulting from low share of public expenditure on healthcare. This has led to greater burden on households to spend money on healthcare.

On an average, public sector health expenditure accounts for only 26% while the private sector is high at 71%. The growing reliance on private providers, which service 78% of outpatients and 60% of in-patients, is worrying.[11]

[9] http://www.who.int/healthsystems/about/en/
[10] http://nrhm.gov.in/nrhm-in-state/state-program-implementation-plans-pips.html
[11] http://planningcommission.nic.in/aboutus/committee/strgrp12/str_health0203.pdf

For those who are dependent of the public healthcare system and can ill afford private services, any illness translates into high out-of-pocket expenditure as a proportion of their total household expenditure.

Further reasons of worry include large variations within the country suggesting that the health status of disadvantaged groups is even worse. For those who are dependent of the public healthcare system and can ill afford private services, any illness translates into high out-of-pocket expenditure as a proportion of their total household expenditure.

While the system has evolved in India over the past 50-60 years, the coverage and service levels of the entire public health ecosystem remains inadequate. Indian healthcare system continues to suffer from underfunding and poor governance which have created significant inequities in providing basic health care.[12] The three striking features of the Indian health care system are[13]:

- **Low levels of public spending -** Between 1996-97 and 2005-06, total government spending on health was stagnant at about 1% of GDP, and the public expenditure elasticity with respect to GDP was at 0.94, lower than the average for low-income countries (1.16) for the same period.

Despite efforts to increase public spending after 2005-06 including the adoption of NRHM, the expenditure increased only marginally to 1.2% of GDP in 2009-2010.

According to a 2013 publication by Health Ministry, India spends around 4% of GDP on Healthcare with Government contribution estimated to be at 1.4%, rest being private expenditure.

- **Poor quality of health status and services -** Low public spending has a resultant poor quality of preventative care and hence poor health status of the population

- **Insufficient public health mechanism -** The inadequate level of public health provision has forced the population to seek private health providers resulting in high out of pocket (OOP) spending.

[12] http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture-Delivering-eHealth-India-Analysis-Recommendations.pdf
[13] http://www.nipfp.org.in/media/medialibrary/2013/04/wp_2012_100.pdf

2. Burden of Diseases and India's performance over the years

Burden of Diseases and India's performance over the years

Burden of disease describes the total, cumulative consequences of a defined disease or a range of harmful diseases with respect to health loss that remains after treatment, rehabilitation or prevention efforts.

India accounts for 21% of the world's burden of disease, according to a WHO's country report.

The WHO report went on saying that India is home to the greatest burden of maternal, new-born and child deaths in the world. While impressive advances have occurred in addressing communicable diseases, the emergence of non-communicable diseases, which are already responsible for two-thirds of the total morbidity burden and about 53% of total deaths (up from 40.4% in 1990 and expected to increase to 59% by 2015)[14] is a troubling feature.

India faces threat from communicable and non-communicable diseases. One of the enduring challenges of the health status of India is the duality of the burden from both communicable and non-communicable diseases.

The causes of death due to diseases, the overall burden of diseases, have been categorised into three types by WHO:

- Communicable Diseases (CDs)
- Non-Communicable Diseases (NCDs)
- Injuries

For this study, we have looked at the disease burden for leading diseases in relation to the manner in which various health programmes are structured in India, dividing diseases into CDs, NCDs, Other NCDs (including Mental illness & retardation), and Injuries. *Refer Annexure II for various programmes under the Ministry of Health and Family Welfare as depicted on its website.*

Communicable Diseases

Under the category of communicable diseases, we have considered four programmes:

- National Vector Borne Disease Control Programme **(NVBDCP)**
- Revised National TB Control Programme **(RNTCP)**
- National Leprosy Eradication Programme **(NLEP)**
- National AIDS Control Programme IV **(NACP)**

Communicable diseases represent a wide range of ailments caused due to a specific infectious agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal or from the environment (through air, dust, soil, water, food, etc.) to man or animal.

India faces threat from communicable and non-communicable diseases. One of the enduring challenges of the health status of India is the duality of the burden from both communicable and non-communicable diseases.

[14] http://www.who.int/countryfocus/cooperation

In this study we have focussed on programme- based interventions of Ministry of Health and Family Welfare, that is **Vector Borne Diseases** under National Vector Borne Disease Control Programme (NVBDCP); **Tuberculosis** under Revised National TB Control Programme (RNTCP) and **Leprosy** under National Leprosy Eradication Programme (NLEP).

Provision of safe drinking water is the main strategy to reduce the number of water-borne diseases. Ministry of Drinking Water and Sanitation supplements efforts of the States by providing technical and financial assistance under the centrally sponsored National Rural Drinking Water Programme (NRDWP) for providing safe and adequate drinking water supply facilities in rural areas of the country.[15] Therefore water borne diseases are not part of this study.

Integrated Disease Surveillance Project **(IDSP)** was launched with World Bank assistance in November 2004 to detect and respond to disease outbreaks quickly for a period up to March 2010. The Project then extended for two years up to March 2012 by Government of India. The project aimed to establish a decentralized state based system of surveillance for communicable and non-communicable diseases; and to improve the efficiency of the existing surveillance activities of disease control programs.

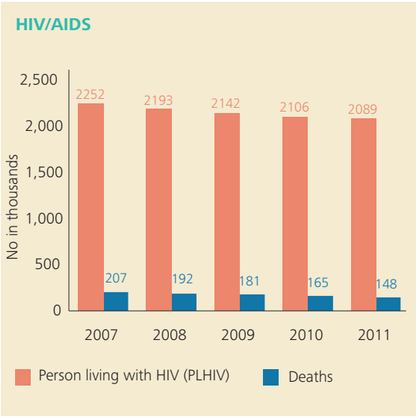
Since IDSP did not belong to any specific disease, we have not considered it in the study.

HIV / AIDS

India is stated to be home to the third-highest number of people living with HIV in the world with 2.1 million Indians accounting for about 4 out of 10 people infected with the deadly virus in the Asia-Pacific region, according to a UN report. HIV treatment coverage is only 36% in India and 51% of AIDS-related deaths in Asia happen in India.[16] NACO reported 164,625 deaths during 2010-11. *Refer Annexure-V for number of deaths of leading diseases in India considered in this study.*

The HIV targets the immune system and weakens people's surveillance and defence systems against infections and some types of cancer. As the virus destroys and impairs the function of immune cells, it results in increased susceptibility to a wide range of infections and diseases.[17]

An analysis of data published by NACO on HIV prevalence rate and death has been depicted below:



A decreasing trend in HIV prevalence cases and deaths has been noted during 2007 to 2011. As per NACO estimates, number of person living with HIV has been reduced from 2,252,253 in 2007 to 2,088,642 in 2011. And number of deaths due to HIV has fallen from 206,669 to 147,331 during the same period.

The Human Immunodeficiency Virus is the cause of AIDS. The virus spreads through blood, using shared needles and sexual contact. In addition, infected pregnant women can pass HIV to their baby during pregnancy or delivery, as well as through breast-feeding.

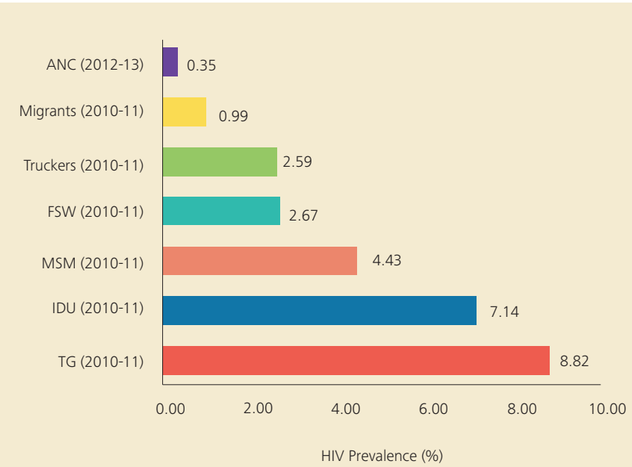
[15] http://pib.nic.in/newsite/PrintRelease.aspx?relid=106612
[16] http://www.unaids.org/sites/default/files/media_asset/UNAIDS_Gap_report_en.pdf
[17] http://www.who.int/mediacentre/factsheets/fs360/en/

HIV infection is a major risk factor for acquiring TB infection and its progression to active TB. HIV/TB together is a fatal combination with extremely high death rates (15 to 18%) reported among HIV-infected TB cases. Overall, TB is estimated to cause about 25% of all deaths among PLHIV in India.[18]

The key risk groups for HIV identified by NACO are Migrants; Truckers; Female Sex Workers (FSW); Men who have sex with men (MSM); Injecting Drug User (IDU); and Transgender (TG). At the national level, the prevalence of HIV for general population (ANC attendees i.e. people attending Antenatal Clinics) in 2012-2013 and among different risk groups in 2010-2011 are shown in Figure below.

According to NACO, all the high prevalence states in India show a declining trend in adult HIV prevalence; however low prevalence states have started showing rising trends in the past four years.

There are fewer new HIV infections cases leading to a downward trend of prevalence and case fatality rate. India's success in reducing new HIV infections was the result of not only the government's healthcare system but also the HIV programme supported by civil society organisations and corporate entities who have carried out and supported HIV/AIDS prevention programs.



Source: http://www.naco.gov.in/upload/2014%20mslns/NACO_English%202013-14.pdf

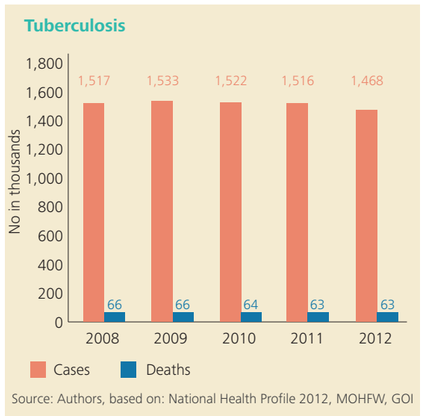
[18] http://naco.gov.in/upload/NACP%20-%20IV/18022014%20BSD/National%20Framework%20for%20Joint%20HIV%20TB%20Collaborative%20Activities%20November%20%202....pdf

Tuberculosis

India has one of the highest burden of Tuberculosis globally. About one fourth of world's TB incidents occur in India annually. Reducing incidence of tuberculosis is a specific goal under MDG 6 other diseases. The Revised National TB Control Programme (RNTCP) widely known as DOTS, which is WHO recommended strategy, is being implemented as a 100% Centrally Sponsored Scheme in the entire country. Under the programme, diagnosis and treatment facilities including a supply of anti TB drugs are provided free of cost to all TB patients.

For quality diagnosis, designated microscopy centres have been established for every one lakh population in the general areas and for every 50,000 population in the tribal, hilly and difficult areas. National Health Profile 2011 has reported 63,781 deaths due to tuberculosis in 2010-11. These figures do not include co-mortality of TB/HIV.

Periodic analysis of tuberculosis patient diagnosed and registered for treatment and deaths is depicted in graph below:



Source: Authors, based on: National Health Profile 2012, MOHFW, GOI

Tuberculosis is an infectious disease caused by a bacterium called mycobacterium tuberculosis. TB is spread through air by a person suffering from TB. A single person can infect 10 or more people in a year. As per WHO risk of developing tuberculosis (TB) is estimated to be between 26 and 31 times greater in people living with HIV than among those without HIV infection. TB is estimated to cause about 25% of all deaths among PLHIV in India.

The reduction in number of cases declared and registered for DOTS in the last 5 years can be considered as a success of Revised National Tuberculosis Control Program (RNTCP). In 2012, 1,467,585 cases were registered for DOTS treatment as comparison to 1,517,333 cases in 2008. Deaths reported are also reduced from 66,204 in 2008 to 63,261 in 2012.

TB is the most common opportunistic infection in people living with HIV virus. As the HIV breaks down the immune system, HIV- infected people are at greatly increased risk of TB. Without HIV, the lifetime risk of developing TB in TB-infected people is 10%, compared to at least 50% in HIV co-infected. HIV is also the most powerful risk factor for progression from TB infection to TB disease. TB in turn accelerates the progression of HIV to AIDS and shortens the survival of patients with HIV infection. Thus, TB and HIV are closely interlinked.[19]

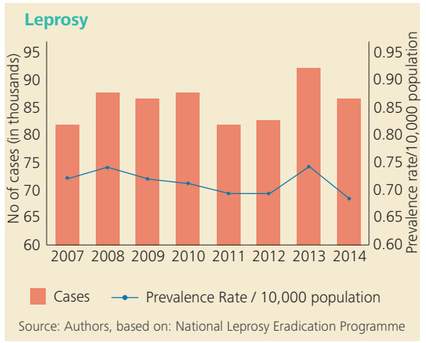
Leprosy

More than 200,000 new cases of leprosy are registered worldwide annually, with 60% in India.[20] In part due to the inherent difficulty of measuring phenomena such as impairment, activities of daily living, stigma, social participation and quality of life[21], the burden of leprosy is difficult to establish.

Increase in Leprosy cases and the extent of prevalence today calls for greater efforts to control the burden of the disease. An analysis of data published by National

[19] http://www.tbcindia.nic.in/rntcp.html
[20] http://indianexpress.com/article/india/india-others/new-study-reveals-crippling-financial-burden-of-leprosy/
[21] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3734677/

Leprosy Eradication Programme (NLEP) is represented in below graph:



Source: Authors, based on: National Leprosy Eradication Programme

Prevalence rate of leprosy has gone down in 2014 after a steep rise in 2013. In 2014 only 86,147 persons were infected with leprosy whereas 91,963 persons were in 2013. A reduction to about 68 persons per lakh in 2014 from 74 persons per lakh in 2013 has been observed. Annual New Case Detection Rate (ANCDR) is also decreased by 7.4% in 2014. No death cases were reported due to leprosy in India.

Leprosy is a leading cause of permanent physical disability. It is a chronic infectious disease caused by Mycobacterium leprae that usually affects the skin and peripheral nerves, but has a wide range of clinical manifestations. The disease is characterized by long incubation period generally 5-7 years and is classified as paucibacillary or multibacillary, depending on the bacillary load. Timely diagnosis and treatment of cases, before nerve damage has occurred, is the most effective way of preventing disability due to leprosy.

The National Leprosy Eradication Programme (NLEP) sponsored by Ministry of Health and Family Welfare, Govt. of India is working toward reducing burden of leprosy in India from 1954. Lower prevalence rate and high cured cases are result of great effort of NLEP. The strategy of this programme under 11th Plan included (i) provision of high quality leprosy services for all persons affected by leprosy, through general health care system including referral services for complications and chronic care, (ii) involvement of ASHA (Accredited Social Health Activist) under NRHM for leprosy work, (iii) enhanced Disability Prevention and Medical Rehabilitation (DPMR) services for deformity in leprosy affected persons, (iv) enhanced advocacy to reduce stigma and to stop discrimination against leprosy affected persons and their families, (v) capacity building among health personnel in integrated setting both for rural and urban areas and (vi) strengthening of monitoring and supervision. [22]

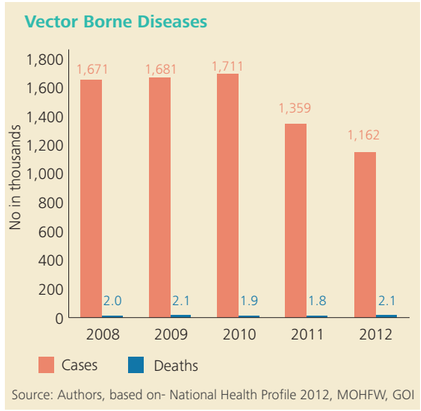
Vector Borne Disease

Every year there are more than one billion cases and over one million deaths from vector-borne diseases such as malaria, dengue, schistosomiasis, human African trypanosomiasis, leishmaniasis, Chagas disease, yellow fever, Japanese encephalitis and onchocerciasis, globally. Malaria causes the most number of deaths among the vector-borne diseases.[23]

Under the National Vector Borne Disease Control Programme **(NVBDCP)**, the prevention and control of six vector borne diseases (Malaria, Kala-Azar, Dengue Fever, Filaria, Chikungunya, and Japanese Encephalitis including cases of Acute Encephalitis Syndrome) are covered.

A significant portion of total mortality under the Communicable Diseases is covered under NVBDCP, though the impacts of the diseases are not uniform across all states. While not all vector borne diseases are fatal, the increasing trend in terms of the fatality rate reflects the burden it has on households. An analysis of Vector Borne Diseases is represented in below graph:

[22] http://planningcommission.gov.in/aboutus/committee/wrkgrp12/health/WG_3_1communicable.pdf
[23] World Health Organization. Vector-borne diseases. Fact sheet N°387, March 2014.



Source: Authors, based on- National Health Profile 2012, MOHFW, GOI

There is a significant decrease in number of cases reported annually after 2010. In 2012, 1,162,088 cases were reported for vector borne diseases as comparison of 1,671,299 cases in 2008 with a decline of 30% from 2008. About 2,060 deaths were reported in 2012 as against 1,970 deaths in 2008.

In recent years, the number of deaths has particularly been high for Japanese Encephalitis with malaria remaining the one which has a significant burden.

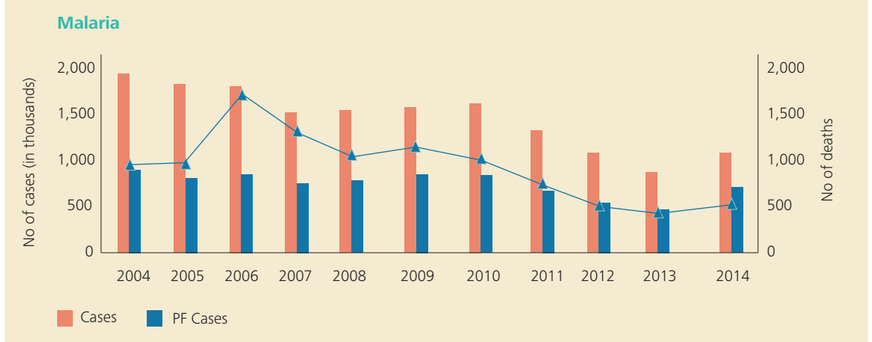
Vector-borne diseases are caused by pathogens and parasites in humans. Vector-borne diseases account for over 17% of all infectious diseases. Distribution of these diseases is determined by a complex dynamic of environmental and social factors. Changes in agricultural practices due to variation in temperature and rainfall can affect the transmission of vector-borne diseases. Access to water and sanitation is a very important factor in control and elimination of vector borne diseases.[24]

Reducing incidence of Malaria is a specific goal under MDG 6.

Malaria

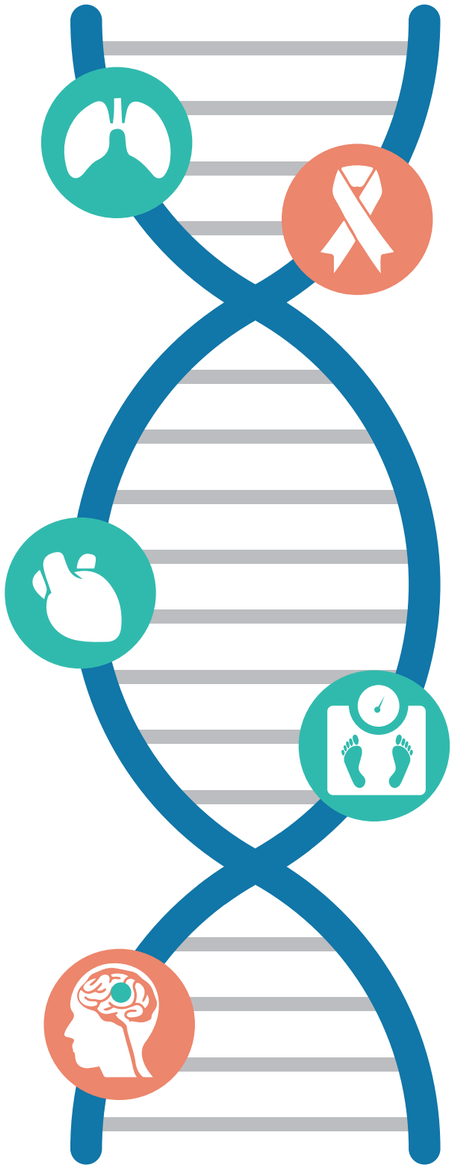
India contributes about 70% of Malaria in the South East Asian Region of WHO.[25] India is stated to have performed poorly on MDG 6 (Combatting HIV/AIDS, Malaria and other diseases) according to the Centre for Global Development publication an annual Commitment to Development Index.

Drug resistance, insecticide resistance and lack of knowledge of complete disease burden of Malaria pose a challenge for malaria control in the country. However prevalence and mortality relating to malaria has shown a downtrend over the years.



Source: Authors, based on National Vector Borne Disease Control Programme

[24] http://www.who.int/mediacentre/factsheets/fs387/en/
[25] http://www.ias.ac.in/jbiosci/nov2008/583.pdf



The epidemiological status of Malaria has altered over the years.

There has been a continuous decrease in the incidence cases for Malaria as well as PF till 2013. In 2014, there is a slight increase in cases and deaths due to Malaria. Malarial PF cases have also increased to 7,03,587 in 2014 from 4,63,846 in 2013 about 50% rise in 2014 as compared to 2013. Total cases of Malaria rose to 10,70,513 in 2014 from 8,81,730 in 2013. In similar manner number of deaths reported as 535 in 2014 from 440 in 2013 as per data published by NVBDCP.

Malaria is a potentially life threatening parasitic disease caused by parasites known as Plasmodium viviax (P.vivax), Plasmodium falciparum (P.falciparum), Plasmodium malariae (P.malariae) and Plasmodium ovale (P.ovale). It is transmitted by the infective bite of Anopheles mosquito.[26]

Use of Indoor Residual Spray (IRS) with insecticides, chemical larvicides, Malathion fogging, larvivorous fish in ornamental tanks, fountains etc. are the chemical and biological preventive measures recommended to control malaria. Further use of mosquito repellent creams, liquids, coils, mats, screening of the houses with wire mesh, use of bed nets treated with insecticide and wearing clothes that cover maximum surface area of the body are the control measures that individuals can take up.

Non-Communicable Diseases

Non-Communicable Diseases are defined as diseases of long duration and generally slow progression; they are the major cause of adult mortality and morbidity worldwide. Under the category of Non Communicable diseases, we have considered four programmes for this study relating to leading chronic diseases:

- National Programme for prevention and Control of Cancer, Diabetes, Cardiovascular diseases and Stroke **(NPCDCS)**
- National Mental Health Programme **(NMHP)**
- National Tobacco Control Programme **(NTCP)**
- Other New Initiative under Non-Communicable Disease Injuries and Trauma

According to WHO, India ranks very high amongst the nations struck by the rising wave of "premature deaths" caused by non-communicable diseases, mainly heart and blood ailments.

Cardiovascular diseases, cancer, chronic respiratory problems, blood pressure and diabetes are an offshoot of growing affluence of the middle classes as well as worsening health conditions among people below poverty line.[27] Four main diseases considered by WHO to be dominant in NCD mortality and morbidity are **Cardiovascular diseases** (including heart disease and stroke); **Diabetes; Cancer; and Chronic respiratory diseases** (including chronic obstructive pulmonary disease and asthma).

For the purpose of this study, Non-communicable diseases include:

- Cardiovascular diseases (CHD and Stroke)
- Respiratory Diseases
- Cancer
- Diabetes Mellitus

Impact of NCDs

NCDs not only affect health, but also productivity and economic growth. Losses due to premature deaths due to heart disease, stroke and diabetes are projected to increase cumulatively, and a Planning Commission estimate suggests that India stands to lose US$237 billion (Rs.14,22,000 crore) during the decade 2005-2015.[28]

Cardiovascular Diseases (CVDs)

Cardiovascular diseases are the number one cause of death world-wide. According to WHO, an estimated 17.3 million people died from CVDs in 2008 accounting

[26] http://www.nvbdcp.gov.in/malaria.html
[27] http://www.healthissuesindia.com/noncommunicable-diseases/
[28] http://planningcommission.nic.in/aboutus/committee/wrkgrp12/health/WG_3_2non_communicable.pdf

for 30% of all global deaths. By 2030, CVD deaths are estimated to rise to 23 million per year. About 80% of CVD deaths take place in low and middle income countries, such as India, occurring almost equally in men and women.[29] About 2.6 million pre-matured deaths were estimated by WHO in 2010-11 due to cardiovascular diseases in India.

CVDs include all diseases and conditions of the heart and blood vessels. Coronary heart disease (CHD), rheumatic heart disease (RHD), congenital heart disease and stroke are the major contributor in Cardiovascular Diseases mortality and disability.

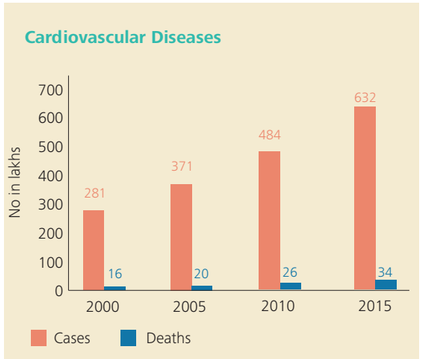
Coronary heart disease is the predominant CVD. CHD includes conditions such as cardiomyopathies, acute MI, angina pectoris, congestive heart failure and inflammatory heart disease (these are not necessarily mutually exclusive terms).

RHD is a condition of permanent damage to the heart valves, caused by rheumatic fever, mainly exists in children below age of 16. RHD is not considered for analysis in this study.

Congenital Heart Disease is a category of heart disease that includes abnormalities in cardiovascular structures that occur before birth; prevalence of Congenital Heart Disease is very low.

A stroke is caused by interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue. Stoke is a major contributor to CVD mortality.

An analysis of cases and mortality related to CVDs is depicted in below graph:



Source: Authors- based on http://origin.searo.who.int/india/topics/cardiovascular_diseases/Commision_on_Macroeconomic_and_Health_Bg_P2_Forecasting_vascular_disease_cases_and_associated_mortality_in_India.pdf

An increasing trend of prevalence of CVDs in India has been observed. Number of patients of CVDs are expected to reach at 63 million in 2015 as compare to 48 million in 2010. Mortality is expected to touch 3.4 million per year. Deaths due to CHD contribute about 80% in total CVD deaths. However, case fatality ratio (CFR) of stroke is much higher (25%) than CHD (5%).

As per Centre of Chronic Disease Control, much of this enormous burden is already evident in urban as well as semi-urban and slum dwellings across India, where increasing lifespan and rapid acquisition of adverse lifestyles related to demographic transition are thought to have contributed to rising prevalence of chronic disease determinants like physical inactivity, improper diet, harmful use of alcohol and tobacco, stress etc.[30]

[29] http://www.who.int/mediacentre/factsheets/fs317/en/
[30] http://www.ccdcindia.org/pdfs/CVD_profile_corrected.pdf

Several cross-sectional studies were initiated to obtain CVD risk factor prevalence among South Asians. The absolute risk for South Asians may be higher due to the higher propensity to develop diabetes and metabolic syndrome at lower body weights and abdominal obesity levels as compared to the western counterparts. Combined with the higher risk for death and morbidity following an acute event, and inadequate availability of appropriate therapy for these individuals with heart disease, the social and economic burden imposed by CVDs will be enormous for the Indian society.

Respiratory Diseases

WHO defines respiratory diseases as a combination of chronic obstructive pulmonary disease (COPD), asthma and others including Allergic rhinitis and sinusitis, bronchiectasis, obstructive sleep apnoea syndrome and pulmonary hypertension.

It is estimated that there are around 1.49 crore chronic cases of COPD in India in the age group of 30 years and above, and these are projected to increase by nearly 50% by the year 2016. It is also estimated that there were roughly 2.5 crore cases of asthma in 2001 which may increase by nearly 50% by 2016.[31] About 6 lakh deaths were estimated due to respiratory diseases in India for the period 2010-11.

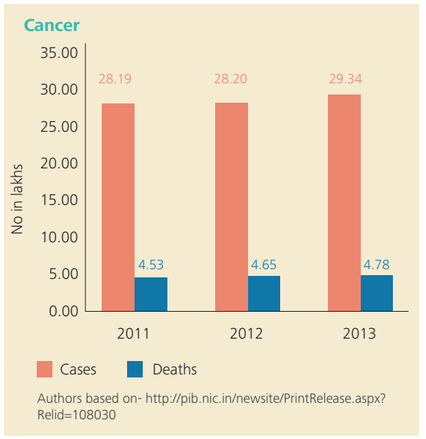
A study on respiratory disease burden in rural India shows that poverty and unhealthy environment with exposure to indoor pollution, solid-cooking fuels, poor housing, low nutritional status and unsanitary conditions are strongly related to respiratory disorders.[32]

In urban India lower socioeconomic status, history of asthma in a first degree relative and all forms of tobacco smoking are associated with respiratory diseases.

Cancer

Cancer is a major public health concern in India and has become one of the ten leading causes of death in the country. It is estimated that there are on an average about 28 lakh cases of cancer at any particular point of time with 10 lakh new cases occurring every year. About 5 lakh deaths on an average occur annually in the country due to cancer.[33]

An analysis of Cancer cases and deaths estimated for three years by National Cancer Registry Program of ICMR-- Indian Council of Medical Research has been depicted in the below graph.



Authors based on- http://pib.nic.in/newsite/PrintRelease.aspx?Relid=108030

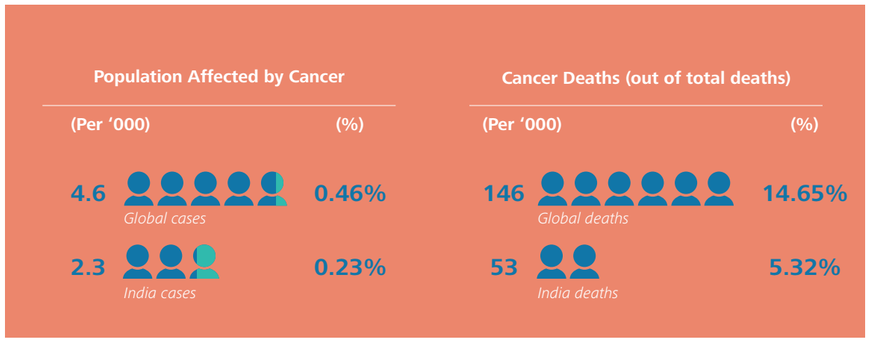
The number of Cancer cases prevailing in 2011 were 28,19,457 while 4,52,541 deaths were reported due to cancer in the same year. There was a slight increase in prevalence in 2012 of 722 cases and 12,628 deaths. In 2013 prevalent cases of Cancer has been estimated at 29,34,341 showing an increase of 1,14,135 cases, and reported deaths for the year due to Cancer were 4,78,180.

The number of cancer cases in India is increasing every year. According to WHO, lung, oral, lip, throat and neck cancers are the most common among men while women suffer more from cervix, breast and ovarian cancers.

[31] http://www.who.int/macrohealth/action/NCMH_Burden%20of%20disease_(29%20Sep%202005).pdf
[32] https://ispub.com/IJE/2/2/4032
[33] National Cancer Registry Program of ICMR

Cancer is one of the leading causes of death worldwide. In India cancer is closely monitored through setting up of registries across the country, which collects credible statistics and other information to help in public health management of cancer. According to the GLOBOCAN Project of the International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, there were 14.1 million new cancer cases, 8.2 million cancer deaths and 32.6 million people living with cancer (within 5 years of diagnosis) in 2012 worldwide.

The below graph depicts an analysis of population affected by cancer and associated deaths in India and globally:



Cancer may occur in all living cells in the body and different cancer types may have different natural history. A few epidemiological studies worldwide have shown that 90 to 95% of all cancers are environmental and lifestyle[34] related. Lifestyle related factors are the most important and preventable among the environmental exposures.

There are numerous causes of cancer which may develop into different types often known as sites of cancer. More than 70 sites of Cancer have been identified by various national and international organizations which can be grouped into 15 body systems.

[34] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2515569/

An analysis of types of cancers and associated risk factors is depicted in the table below:

Top 10 Cancer Sites – Deaths – India & Global

#	Sites	Risks/Causes	India		Global*	
			Death %	Rank	Death %	Rank
1	Other and Unspecified neoplasm and sites	Human papilloma virus, Ultraviolet (UV) light, Poor nutrition, Weakened immune system, Tobacco use, Graft-versus-host disease, Genetic syndromes, Lichen planus, Alcohol Use, Poor nutrition, Genetic syndromes, Workplace exposures, Gastroesophageal reflux disease	15.56%	1	3%	13
2	Trachea, Bronchus and Lung	Smoking, Radon, Asbestos, Air Pollution, Radiation Therapy, Arsenic in drinking water, Family history of lung cancer, certain dietary supplements	10.07%	2	21%	1
3	Lip, Oral cavity and Pharynx	Human papilloma virus, Ultraviolet (UV) light, Poor nutrition, Weakened immune system, Tobacco use, Graft-versus-host disease, Genetic syndromes, Lichen planus, Alcohol Use, Poor nutrition, Genetic syndromes, Workplace exposures, Gastroesophageal reflux disease	8.91%	3	4%	8
4	Leukaemia	Certain chemical exposures, Certain chemotherapy drugs, Radiation exposure, Certain blood disorders, Smoking, Genetic syndromes, Family History, Certain viral infections	7.94%	4	4%	12
5	Breast	High fat diet, lack of physical activity, alcohol abuse, cigarette smoking, socio-economic status, environmental exposures to pollutants, pesticides, electromagnetic field and ionizing radiations and Presence of strong family history	6.05%	5	7%	5
6	Liver and Intrahepatic bile ducts	Chronic viral hepatitis, Cirrhosis, Heavy alcohol use, Obesity, Type 2 diabetes, Inherited metabolic diseases, Aflatoxins, Vinyl chloride and thorium dioxide, Anabolic steroids, Arsenic, Infection with parasites, Tobacco use	4.70%	6	10%	3
7	Stomach	Helicobacter pylori infection, Stomach lymphoma, Diet, Tobacco Use, Being overweight or obese, Pernicious anemia, Menetrier disease, Hereditary diffuse gastric cancer, Hereditary non-polyposis colorectal cancer, Familial adenomatous polyposis, Li-Fraumeni syndrome, Peutz-Jeghers syndrome, Epstein-Barr virus, Common variable immune deficiency	4.70%	7	11%	2
8	Oesophagus	Gastroesophageal reflux disease, Barrett's esophagus, Tobacco and alcohol, Obesity, Diet, Achalasia, Tylosis, Plummer-Vinson syndrome, Workplace exposures, Human papilloma virus	4.26%	8	6%	6
9	Carcinoma in situ	High fat diet, lack of physical activity, alcohol abuse, cigarette smoking, socio-economic status, environmental exposures to pollutants, pesticides, electromagnetic field and ionizing radiations and Presence of strong family history	3.38%	9	-	-
10	Cervix uteri	Human papilloma virus, Chlamydia trachomatis	2.84%	10	4%	9

Source: Authors: MCCD (Medically Certified Causes of Deaths), 2011, and http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/

* Refer Annexure VI for global ranking.

Top 10 Cancer Sites – Prevalence – India

#	Site	Prevalence (%)	Associated Risk Factors
1	Others	16.4%	-
2	Cervix	11.5%	Human papilloma virus, Chlamydia trachomatis
3	Breast	10.8%	High fat diet, Lack of physical activity, Alcohol abuse, Cigarette smoking, Socio-economic status, Environmental exposures to pollutants, Pesticides, Electromagnetic field and ionizing radiations, and Presence of strong family history
4	Lung	6.4%	Smoking, Radon, Asbestos, Air Pollution, Radiation Therapy, Arsenic in drinking water, Family history of lung cancer, certain dietary supplements
5	Mouth	5.6%	Human papilloma virus, Ultraviolet (UV) light, Poor nutrition, Weakened immune system, Tobacco use, Graft-versus-host disease, Genetic syndromes, Lichen planus
6	Oesophagus	4.3%	Gastroesophageal reflux disease, Barrett's esophagus, Tobacco and alcohol, Obesity, Diet, Achalasia, Tylosis, Plummer-Vinson syndrome, Workplace exposures, Human papilloma virus
7	Stomach	4.3%	Helicobacter pylori infection, Stomach lymphoma, Diet, Tobacco Use, Being overweight or obese, Pernicious anemia, Menetrier disease, Hereditary diffuse gastric cancer, Hereditary non-polyposis colorectal cancer, Familial adenomatous polyposis, Li-Fraumeni syndrome, Peutz-Jeghers syndrome, Epstein-Barr virus, Common variable immune deficiency
8	Tongue	3.6%	Tobacco use, Human papilloma virus, Ultraviolet (UV) light, Poor nutrition, Weakened immune system, Graft-versus-host disease, Genetic syndromes, Lichen planus
9	Non Hodgkin Lymphoma tissues related to spleen and bone marrow	3.6%	Exposure to certain chemicals, Radiation exposure, Immune system deficiency, Autoimmune diseases, Body weight and diet, Certain infections
10	Ovary	3.4%	Gynaecologic surgery, Fertility drugs, Androgens, Estrogen therapy and hormone therapy,Family history, Hereditary breast and ovarian cancer syndrome, PTEN tumor hamartoma syndrome, Hereditary nonpolyposis colon cancer, Peutz-Jeghers syndrome, MUTYH-associated polyposis, Diet, Analgesics

Source: Authors: National Health Profile, 2012

Cancer includes many diseases, and the question often arises which exposures are associated with cancer of a specific organ or site. This information is important for rational planning of cancer control programs.[35]

The causes of Cancer may range from exposure to certain chemicals such as asbestos, benzene, arsenic and diesel exhaust; exposure to carcinogenic foods such as pickled, smoked, high salted, and seared food; dietary habits including over consumption of animal fats; smoking and alcohol; over exposure to ultraviolet sun rays, radiation or estrogen.

In addition, cancer is often called a disease of the genome, that is, genetic make-up of an individual plays an important role in developing different types of cancer.

(Several agencies are working) to generate massive data on most cancers at genomic, epi-genomic, proteomic, pharmacogenomics, and metabolomics, etc. levels to integrate it into a meaningful (form) in order to win… battles against cancer in near future.[36]

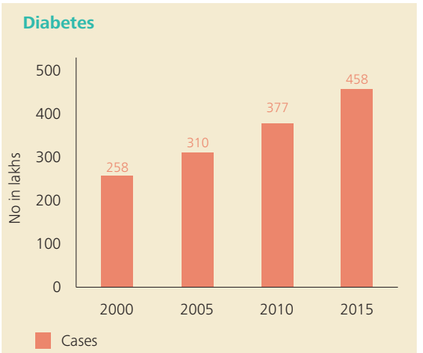
A Lancet study published in April 2014 further indicates that fewer than 30% of Indian patients with Cancer survive five years or longer after diagnosis and the key reason for poor cancer survival is delayed diagnoses and inadequate, incorrect, or sub-optimum treatment. It has drawn attention to poor infrastructure and treatment facilities for cancer patients in India, which is leading to high cancer mortality.

Diabetes

Diabetes, which is associated with an increased risk for cardio-vascular diseases, has emerged as a serious health challenge for India. Diabetes is fast gaining the status of a potential epidemic in India with more than 65 million diabetic individuals currently diagnosed with the disease.[37] In 2010-11 about 3 lakhs deaths due to diabetes were estimated in India.

Diabetes is stated to triple the risk of developing active TB and is also a risk factor for adverse TB treatment outcomes. In 1998, while accounting for less than 1% of the disease burden, its prevalence has risen over the years. This is largely due to the demographic transition coupled with life-style habits.

An analysis of prevalence of diabetes in India is shown in below graph:



Source: Authors based on- http://origin.searo.who.int/india/topics/cardiovascular_diseases/Commision_on_ Macroeconomic_and_Health_ Bg _P2_Forecasting_vascular_disease_cases_and_associated_ mortality_ in_India.pdf

Cases of diabetes are expected to nearly double in 2015 as compared to 2000. Diabetic patients are expected to be about 45 million in 2015. Prevalence rate in urban area is four times of rural India. Prevalence rate in Indian males above age 70 is 215 per 1,000 where in rural area it is 54 in the same age group. Females are affected slightly more than males with prevalence rate of 221 per 1,000 for urban females in the same age group.

Diabetes (also called non-insulin-dependent or adult-onset) results from the body's ineffective use of insulin and is largely the result of excess body weight and physical inactivity.

Indians develop diabetes at a very young age as compared to the western population. An early occurrence of diabetes gives ample time for development of chronic complications of diabetes.

[35] http://jnci.oxfordjournals.org/content/early/2011/12/11/jnci.djr483.full

[36] JCDR-14-e104.pdf

[37] http://www.idf.org/sites/default/files/EN_6E_Atlas_Full_0.pdf

Physical inactivity, sedentary living, insulin resistance, urbanisation, stress are the main risk factors in India for development of diabetes.[38]

Indians seem to be at higher risk for diabetes. Apart from the conventional risk factors propelled by urbanization, industrialization, globalization and aging, other factors may also contribute to the risk of developing diabetes. It has been proposed that obesity, regional adiposity, higher percentage body fat, early life influences including foetal programming and genetic factors contribute to increased risk.[39]

The risk factors associated with high prevalence of diabetes in India including both Type 1 and Type 2 diabetes are listed as:

- Economic Status
- Education Level
- Eating Habits
- Physical Type / Exercise
- Other Factors
- Family History
- Hypertension
- Alcohol Consumption / Smoking / Both

Diabetes mellitus is reaching potentially epidemic proportions in India. The level of morbidity and mortality due to diabetes and its potential complications are enormous, and pose significant healthcare burdens on both families and society. Worryingly, diabetes is now being shown to be associated with a spectrum of complications and to be occurring at a relatively younger age within the country. In India, the steady migration of people from rural to urban areas, the economic boom, and corresponding change in life-style are all affecting the level of diabetes.[40]

Mental Disability

The World Health Organization defines mental health as 'a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community'.[41]

WHO has predicted that about 22% of individuals will develop one or more mental or behavioural disorders in their lifetime in India by 2020. A Journal on stigma on Mental illness states that currently India has only 3,500 psychiatrists for the 20 million Indians suffering from mental illness.[42]

In 2010, led by the Ministry of Health and Family Welfare and in consultation with many civil society organizations, a collaborative process to draft a new Mental Health Act was initiated to replace the 1987 Mental Health Act (MHA).

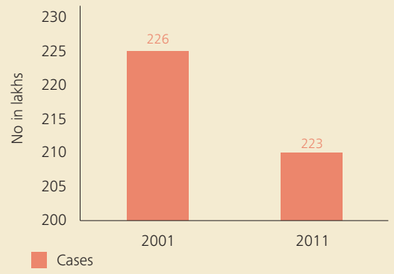
In October 2014, India has formulated its first-ever Mental Health Policy.

The emphasis of the new policy is on the rights of the mentally ill while distinguishing attempted suicide. The policy also draws attention to the need to support care givers, who are almost always family members in India. The policy recognizes that a care giver should receive monetary and tax benefits. In another clause, the policy also calls for compassion and responsibility instead of the social stigmatization of the mentally ill.[43]

The policy is backed up by the "Mental Health Action Plan 365" which spells out specific roles for the Centre, States, local bodies and civil society organisations. In 2014 the central government has decided to decriminalise attempt to suicide by deleting Section 309 of Indian Penal Code.

[38] http://shodhganga.inflibnet.ac.in/bitstream/10603/5258/11/11_chapter%202.pdf
[39] http://www.diapedia.org/introduction-to-diabetes-mellitus/the-burden-of-diabetes-in-india
[40] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3920109/
[41] http://www.who.int/mediacentre/factsheets/fs220/en/
[42] http://www.irjcjournals.org/ijmssr/Feb2014/7.pdf
[43] http://blogs.wsj.com/indiarealtime/2014/10/14/indias-new-mental-health-policy-radical-but-tough-to-implement/

Mental Disability : 2001 vs 2011



Source: Authors, based on:-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Status%20Indicators-2013.pdf

A declining trend has been noticed in Mental Disability data collected during Census 2001 and 2011. However, this appears to be due to lesser recognition and acceptance of the core problem due to its social stigma and hence lower reporting rather than a real fall in the number of cases.

Injuries

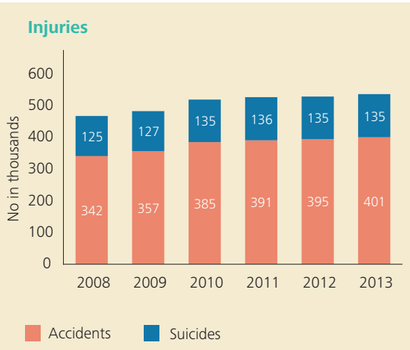
The National Crime Records Bureau (NCRB) is the principal nodal agency under the Ministry of Home Affairs, Government of India which is responsible for the collection, compilation, analysis and dissemination of injury-related information.

It is estimated by WHO that around 9% of the global mortality and 12% of the global disease burden is due to injuries, intentional or unintentional. Unintentional injuries include road traffic injuries, poisoning, drowning, falls, etc.; whereas intentional injuries include suicide, homicide and war-related violence.

It is estimated that the number of deaths from accidents and injuries in 2005 would range from 730,000 to 985,000 with projections that deaths from injuries will increase by as much as 25% over the next decade. The injury mortality estimates for the year 2000 suggest that about 9% of all deaths in India were accounted for by injuries, a share similar to the global share of deaths due to injuries (WHO 2004).[44]

An analysis of deaths due to accidents and suicides recorded by NCRB are depicted below:

Injuries



Source: Authors, based on- http://ncrb.gov.in/adsi2013/ADSI-2013.pdf

Injuries include un-natural deaths due to accidents and suicides. About 4 lakh accidental deaths were recorded during 2013 with an increase of 17% from 2008. Road accident is the main reason of accidental deaths that constituted about 34% of overall accidental deaths in 2013. Every year over 1 lakh people die by committing suicide in India. On an average 15 suicide attempts take place every one hour in India and one suicide out of every 6 suicides is committed by a housewife.

[44] http://www.who.int/macrohealth/action/NCMH_Burden%20of%20disease_(29%20Sep%202005).pdf

Injuries including suicide burden has been increasing over the years. An increasing trend can be derived from the table below.

#	Year	Accident	Suicides	Total Deaths
1	2004	277,263	113,697	390,960
2	2005	294,175	113,914	408,089
3	2006	314,704	118,112	432,816
4	2007	340,794	122,637	463,431
5	2008	342,309	125,017	467,326
6	2009	357,021	127,151	484,172
7	2010	384,649	134,599	519,248
8	2011	390,884	135,585	526,469
9	2012	394,982	135,445	530,427
10	2013	400,517	134,799	535,316

Source: Authors, based on- http://ncrb.gov.in/adsi2013/ADSI-2013.pdf

3.
Cost of Healthcare

Cost of Healthcare

The human and economic toll of leading chronic diseases on patients' families and society is enormous. Key channels through which disease or injury can impact on macroeconomic performance or output include increased health expenditures, labour and productivity losses, and reduced investment in human and physical capital formation.

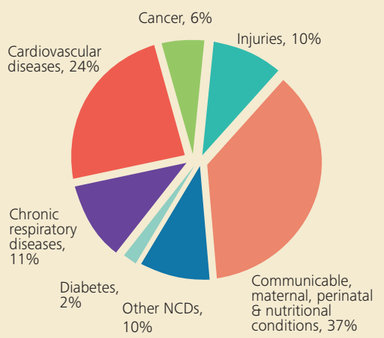
This section estimates the Cost of healthcare to understand the cost imposed by the burden diseases in India and their underlying ascribes. It analyses out of pocket expenditure of household and government revenue expenditure on health and family welfare (Central and States Governments).

WHO country profile 2010 and 2012, provides the number of deaths caused by CDs, NCDs and Injuries in India. While CDs accounted for 37% in 2010 and 28% in 2012 of all deaths, NCDs are the leading cause of deaths globally and also account for 53% and 60% respectively of all deaths in India. Injury has also shown an upward trend from 10% in 2010 to 12% in 2012.

Independent studies estimate that this ratio will rise in the coming years.

Proportional mortality (% of total death, all ages)

2010



2012

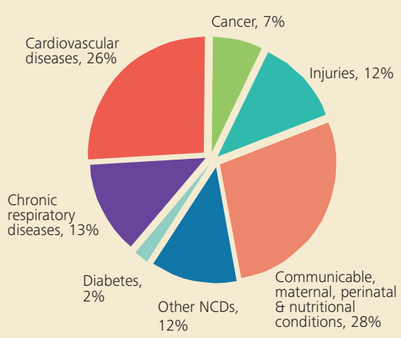
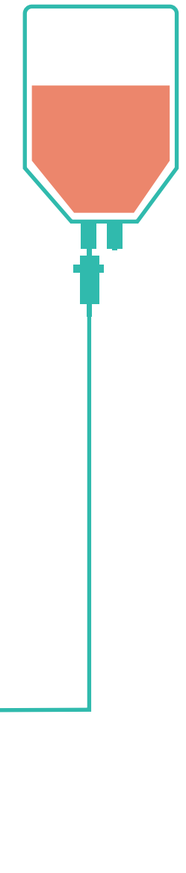
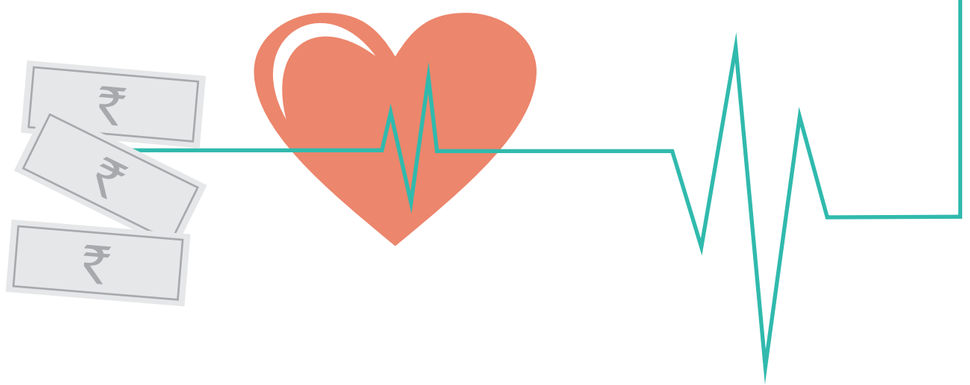


Table: WHO country health profile - India 2010 and 2012
Refer Annexure III and IV

While CDs accounted for 37% in 2010 and 28% in 2012 of all deaths, NCDs are the leading cause of deaths globally and also account for 53% and 60% respectively of all deaths in India.





Health information data in India often lacks a sound epidemiological basis; besides, data is scattered across different ministries, government agencies and organizations which makes collection and collation of authentic data rather challenging. It is imperative that India maintains a real-time heath information system at a centralized level so that the burden of diseases scenario can be appropriately measured.

Methodology

The cost of healthcare is calculated over two components namely, (i) **Direct Household Cost**; and (ii) **Government Expenditure.**

Direct Household Cost

The cost is based on actual annual household consumption expenditure on healthcare in India for the year 2011-2012. The total household consumption expenditure for 365 days has been computed for each of these codes after giving the multiplier effect suggested by NSSO.

Direct health costs comprise all expenditures on healthcare by a household, including expenditure on non-working members such as children and old people. Thus, the dependence ratio is factored in the total direct cost.

To compute the annual household consumption expenditure on healthcare in India, we have used National Sample Survey (NSS) 68th Round data published by the Ministry of Statistics and Programme Implementation (MoSPI), Government of India. NSS 68th round data captures information on healthcare related expenditure under the following blocks and item codes for the last 365 days:

NSSO - Blocks and Item Codes

Block in NSS Questionnaire	Item Code	Description	Direct Cost (Crores)	% of Total
[9] Expenditure on education and medical (institutional) goods and services	410	Medicine	3,243.84	3.00%
	411	X-ray, ECG, pathological test, etc.	732.82	0.68%
	412	Doctor's/surgeon's fee	764.33	0.71%
	413	Hospital & nursing home charges	1,836.33	1.70%
	414	Other medical expenses	1,251.11	1.16%
[10] Expenditure on miscellaneous goods and services including medical (non-institutional), rents and taxes during the last 30 days ended on …..	420	Medicine	78,489.50	72.53%
	421	X-ray, ECG, pathological test, etc.	6,157.50	5.69%
	422	Doctor's/ surgeon's fee	12,557.67	11.60%
	423	Family planning devices	332.07	0.31%
	424	Other medical expenses	2,757.35	2.55%
[11] Expenditure for purchase and construction (including repair and maintenance) of durable goods for domestic use	610	Contact lenses, hearing aids & orthopaedic equipment	79.06	0.07%
	611	Other medical equipment	19.39	0.02%
Total			**1,08,220.97**	

Health information data in India often lacks a sound epidemiological basis; besides, data is scattered across different ministries, government agencies and organizations which makes collection and collation of authentic data rather challenging.

The total household consumption expenditure on healthcare identified from NSS 68th Round has been estimated to be Rs.1,08,220.97 crores for the year 2011-12.

The direct expenditure of Rs.1,08,220.97 crores is on all diseases category including CDs, NCDs, Other NCDs and Injuries.

Government Expenditure

This cost is based on revenue expenditure of states and central government on various programme of health and family welfare. This includes expenditure on direction and administration, national medical library, hospitals and dispensaries, medical education training and research, health education and awareness and various programmes of central and state governments.

The government spending on healthcare is derived from both the union budget and states budget.

The central government expenditure is derived from revenue expenditure of Ministry of Health and Family Welfare. It includes revenue expenditure of all four departments viz. Department of Health and Family Welfare, Department of Health Research, Department of AYUSH and Department of AIDS Control.

Revenue expenditure of states government for the year 2011-12 are taken from 'RBI State Finances- A Study of Budgets'[45].

The total government expenditure on health is estimated to be Rs. 77,631.87 crores for the year 2011-12. The central government spent Rs. 26,101.87 crores and states government spent Rs. 51,530 crores during the year 2011-12.

Results and Findings

Particulars	Healthcare cost (in ₹ Crore)	Share in total healthcare cost (%)
Household Out-of-Pocket Expenditure	**1,08,220.97**	**58%**
Public Revenue Expenditure:		
Central Government	26,101.87	14%
State Governments	51,530.00	28%
Total Healthcare Cost for 2011-12	**1,85,852.84**	**100%**

[45] https://rbi.org.in/Scripts/AnnualPublications.aspx?head=State+Finances+%3a+A+Study+of+Budgets

4. Shift of Burden from Cds to NCDs

Shift of Burden from Cds to NCDs

India has the dubious distinction of having the highest burden of communicable diseases in the world, with Malaria and Tuberculosis among the leading causes of death. However, the past decade has seen a decline in disability-adjusted life years (DALYs) contributed by communicable diseases. This is a testimony to the concerted efforts of the government on several fronts to achieve these impressive gains.

However, India is witnessing an increase in chronic disease related morbidity and mortality due to which non-communicable diseases have emerged as a potent threat.

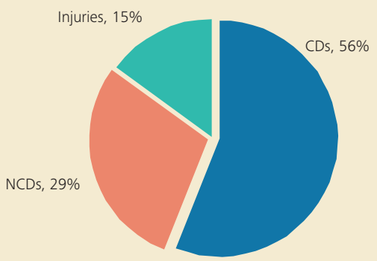
In addition to life style changes and degradation in terms of environmental and other factors including level of physical activity, food habits, consumption of alcohol and tobacco, etc.; the demographic transition that India is going through is also one of the major reasons responsible for the tilt towards the non-communicable diseases.

A publication on burden of disease by Ministry of Women and Child Development indicates a major shift from CDs to NCDs over the years. The study has considered 2020 projected figures.

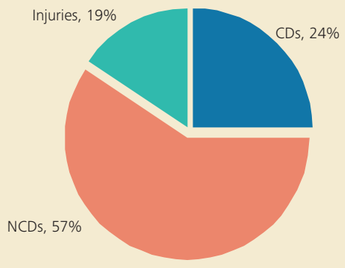
A shift to NCDs from CDs has made it imperative to focus attention towards NCDs prevention and control which include identifying and dealing with associated risk factors.

Disease burden estimates: India

1990



2020



Source: Authors, based on-
http://wcd.nic.in/research/nti1947/8%20Health%20transition.pdf

India has the dubious distinction of having the highest burden of communicable diseases in the world, with Malaria and Tuberculosis among the leading causes of death.

Risk Factors of Diseases

There are several risk factors that expose people to diseases; some of these are known and preventable while some may not be clearly known. For instance, natural or even man-made disasters can unleash several diseases, the effect of which may be felt for several years (as in the case of Bhopal gas leak incident).

Some communicable diseases are transmitted through contaminated water and food and lack of sanitation such as cholera, jaundice, malaria or chikunguniya. Unsanitary living conditions and over-crowding are recognised as contributing to both CDs and NCDs such as tuberculosis, hypertension, and respiratory diseases.
Some of the risk factors are modifiable while some are non-modifiable that include ageing, genetic factors, race, ethnicity and gender. Mitigation for most risk factors for communicable diseases involve administration efforts such as providing clean drinking water, spraying pesticides and insecticides, safe disposal of solid waste and garbage, cleanliness of public spaces, etc.

Risk factors for non-communicable diseases arise largely on account of life style choices of individuals while administration plays a role mainly in raising awareness among people to adopt healthier practices.

Non-communicable diseases are driven by several forces that include ageing, rapid unplanned urbanization, indoor and outdoor pollution and the globalization of unhealthy lifestyles which translate in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, overweight and obesity. Several of these risk factors can be mitigated by individuals themselves, through making informed lifestyle choices.

Raised cholesterol increases the risks of heart disease and stroke. Globally, a third of ischaemic heart disease is attributable to high cholesterol. Overall, raised cholesterol is estimated to cause 2.6 million deaths globally. A study found that the prevalence of raised total cholesterol increased noticeably according to the

Some of the risk factors are modifiable while some are non-modifiable that include ageing, genetic factors, race, ethnicity and gender.

income level of the country. In low income countries around a quarter of adults had raised total cholesterol, in lower middle income countries this rose to around a third of the population for both sexes. In high-income countries, over 50% of adults had raised total cholesterol; more than double the level of the low-income countries.[46]

Raised blood pressure is a major risk factor for coronary heart disease and ischemic as well as hemorrhagic stroke. Raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. Across the income groups of countries, the prevalence of raised blood pressure is consistently high, with low, lower middle and upper middle countries all having rates of around 40%. The prevalence in high income countries was lower, at 35%.[47]

Tobacco use increases the risk of cardiovascular diseases (coronary heart disease and ischemic), lung cancer and diseases of respiratory system. An estimated 6 million people die from tobacco use and exposure to tobacco smoke. The use of tobacco among adults in developing countries is increasing and now has surpassed that of industrialized countries where prevalence of tobacco use has begun to decline.[48]

According to WHO reports, people who are insufficiently physically active have a 20% to 30% increased risk of all-cause mortality compared to those who engage in at least 30 minutes of moderate intensity physical activity

[46] http://www.who.int/gho/ncd/risk_factors/cholesterol_prevalence/en/
[47] http://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence/en/
[48] http://www.who.int/gho/tobacco/en/

most days of the week. Approximately 3.2 million deaths each year are attributable to insufficient physical activity. The prevalence of insufficient physical activity rose according to the level of income. High income countries had more than double the prevalence compared to low income countries.[49]

Overweight and obesity lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Risks of coronary heart disease, ischemic heart, stroke and type 2 diabetes mellitus increase steadily with increasing body mass index (BMI), a measure of weight relative to height. Worldwide, at least 2.8 million people die each year as a result of being overweight or obese. The prevalence of raised body mass index increases with income level of countries up to upper middle income levels. The prevalence of overweight in high income and upper middle income countries was more than double that of low and lower middle income countries.[50]

Impaired glucose tolerance and impaired fasting glycaemia are risk categories for future development of diabetes and cardiovascular disease. In some age groups, people with diabetes have a twofold increase in the risk of stroke. Diabetes is the leading cause of renal failure in many populations in both developed and developing countries. Raised blood glucose was estimated to result in 3.4 million deaths in 2004, latest data is not available. The prevalence of diabetes was relatively consistent across the income groupings of countries.[51]

Analysis

CDs are persistent and major public-health problems all over the world. Although some infectious diseases have been eradicated, many diseases persist with little or no hope of getting them under control. In addition, new infectious diseases are emerging and old ones that were thought to be under control are regaining lost ground. The economic costs of infectious diseasesespecially HIV/AIDS and malariaare significant. Their increasing toll on productivity owing to deaths and chronic debilitating illnesses, reduced profitability and decreased foreign investment, has had a serious effect on the economic growth of some poor countries.[52]

NCDs affect economies, health systems, and households and individuals through a range of drivers such as reduced labour productivity, higher medical treatment costs, and lost savings. These drivers aggregate into significant socioeconomic impacts, including in the areas of: country productivity and competitiveness; fiscal pressures; health outcomes; and poverty, inequity and opportunity loss.[53]

From an economic development perspective, the rise of NCDs is cause for particular concern because it will diminish the ability of the country to capitalize on the opportunities that would otherwise be provided by the demographic dividend – that is, the economic benefits generated during the period when a relatively larger portion of the population is of working age.

Reaping the demographic dividend is expected to provide India with higher economic output per capita, which allows greater wealth generation and more resources to be channelled into savings and productive investments. However, existing dependency ratio (ratio of dependents to working age population) and social welfare system challenges accentuates the NCD burden in India. The significance of missing out on the demographic dividend will become even more acute when India faces aging of its population, estimated to be in 25 years' time.

India needs to adopt a multi-sectoral strategy on several fronts to tackle the immense challenge posed by rising incidents of NCDs.

Measures such as mid-day meal schemes for school children help to raise the nutrition level at a crucial stage of mental and physical development and ensure healthy citizens and therefore a healthier workforce. Improving

[49] http://www.who.int/gho/ncd/risk_factors/physical_activity/en/
[50] http://www.who.int/gho/ncd/risk_factors/overweight/en/
[51] http://www.who.int/gho/ncd/risk_factors/blood_glucose/en/
[52] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3327542/
[53] Chronic Emergency: Why NCDs Matter Irina A. Nikolic, Anderson E. Stanciole, Mikhail Zaydman, July 2011, Health, Nutrition, and Population Family (HNP) of the World Bank's Human Development Network (HDN)

healthcare infrastructure is important for both prevention and treatment of diseases, both CD & NCD. At the same time, care must be taken not to lose focus on continued defence against communicable diseases. Abatement of identified risk factors of NCD also requires a multi-sectoral approach which requires involvement and commitment of all constituents.

Improving healthcare infrastructure is important for both prevention and treatment of diseases, both CD & NCD.

5.
Health Expenditure Pattern in India

Health Expenditure Pattern in India

According to World Bank, the total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.[54]

For this section we have only considered programme wise expenditure of the central government. Amounts spent by state governments on diseases are not analysed in this section.

Healthcare Financing

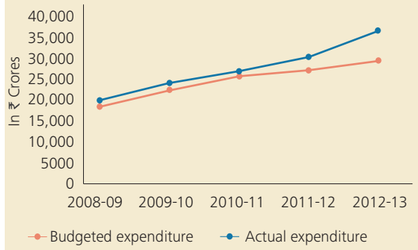
The healthcare expenditure is finance by National Health Mission via The National Rural Health Mission **(NRHM)**, introduced in 2005, and the National Urban Health Mission **(NUHM)** approved by the Cabinet on 1st May 2013. The mission prioritizes states on the basis of their health status.

The Ministry of Health and Family Welfare comprises of four departments; viz., Department of Health & Family Welfare, Department of AYUSH, Department of Health Research and Department of AIDS Control.

Where is India Spending?

According to the Economic Survey 2013, India spends around 4.1% of GDP on health, which is the lowest spend on health in BRICS group. India trails behind even sub-Saharan Africa, Bangladesh and Nepal on numerous health fronts.[55]

Expenditure - Ministry of Health and Family Welfare



Source: Authors, based on- https://nrhm-mis.nic.in/PubFWStatistics%202013/Section%20H%20-%20Outlay%20and%20Expenditure%20on%20Health%20and%20Family%20Welfare.pdf

With Government expenditure on Healthcare being 1.4% of GDP and 2.7% of GDP by private sector, Indian healthcare expenditure convergence with requirement has to go long way.[56]

Often States under financial constraints cut expenditure on health. As an example, allocation of Rs.33,700 crore (US$5.4 billion) to healthcare in the FY201415 finance budget, down by 9.7% in comparison to Fy201314.

Expenditure on Health Infrastructure

Health infrastructure includes: hospitals, doctors, nurses, other paramedical professionals, beds, equipment required in hospitals and a well-developed pharmaceuticals industry.

[54] http://data.worldbank.org/indicator/SH.XPD.PUBL
[55] http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2013/05/09/000445729_20130509120612/Rendered/PDF/774610PUB0EPI00LIC00PUB0DATE0502013.pdf
[56] http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2013/05/09/000445729_20130509120612/Rendered/PDF/774610PUB0EPI00LIC00PUB0DATE0502013.pdf

The health care infrastructure in rural areas is developed as a three-tier system: Sub-Centres, Primary Health Centres, and Community Health Centres.

Creation of infrastructure forms a major part of health expenditure for any country.

One of the stated objectives under National Rural Health Mission (NRHM) is creation of new infrastructure/ buildings for health centres and strengthening of the existing ones for improving accessibility and quality of healthcare delivery services. Health infrastructure forms a significant block of activity on which improvements should be measured.

In India we have Three Tier System of Health Infrastructure divided into Primary Health Care; Secondary Health Care and Tertiary Health Care.

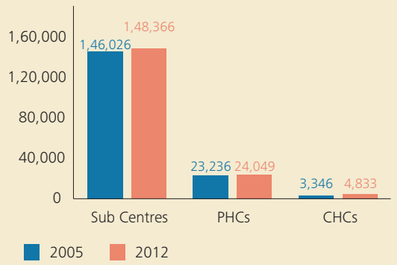
Existing infrastructure for healthcare needs to be strengthened. Health should be perceived as an investment into future economic prosperity and receive greater budgetary allocation.

The health care infrastructure in rural areas is developed as a three-tier system: Sub-Centres, Primary Health Centres, and Community Health Centres.

The overall number of beds, physicians and nurses is low compared to other developing countries and international averages. The situation is worse in the case of tertiary beds and specialist physicians.

Based on analysis of data available for 2005 and 2012, while number of doctors has increased, vacant positions has also risen at an alarming rate due to increase in total requirement for the qualified doctors in India.

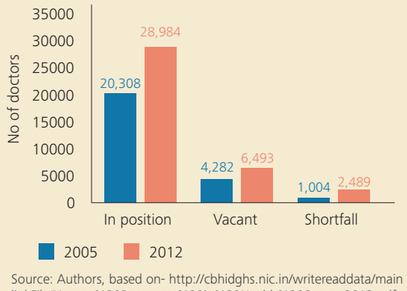
Health infrastrucure: India (Rural) (2005 vs 2012)



Source: Authors, based on- http://cbhidghs.nic.in/writereaddata/mainlinkFile/Human%20Resources%20in%20Health%20Sector-2013.pdf

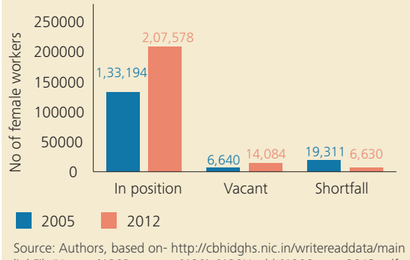
In India there is no significant increase in sub centres, CHCs and PHCs over a period of seven years from 2005 to 2012, though the shortfall for health workers has slightly declined.

Health Infrastructure: Doctors



Source: Authors, based on- http://cbhidghs.nic.in/writereaddata/mainlinkFile/Human%20Resources%20in%20Health%20Sector-2013.pdf

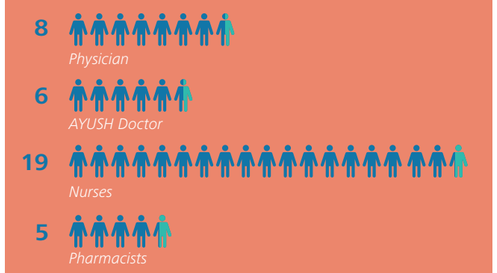
Health Infrastructure: Health Worker (Female) Sub centre & PHCs



Source: Authors, based on- http://cbhidghs.nic.in/writereaddata/mainlinkFile/Human%20Resources%20in%20Health%20Sector-2013.pdf

Another constraint faced by Indian health ecosystem is scarcity of qualified human resources.

Health Human Resource Per 10,000



Source: Authors, based on- http://cbhidghs.nic.in/writereaddata/mainlinkFile/Human%20Resources%20in%20Health%20Sector-2013.pdf

India has only 8 physicians per 10,000 population much less than global average of 13.9. India is also far behind in midwives and nurses density (19 per 10,000) as comparison to global average (29[57] per 10,000).

Efforts have been made recently by Medical Council of India (MCI) by restoring scrapped medical seats and in the 2014 budget proposing opening up of 4 additional AIIMS and 12 government medical colleges to bridge this gap.

India has only 8 physicians per 10,000 population much less than global average of 13.9. India is also far behind in midwives and nurses density (19 per 10,000) as compared to global average (29 per 10,000).

[57] http://www.who.int/gho/publications/world_health_statistics/EN_WHS2013_Full.pdf

Department Wise Expenditure

Prior to August 7, 2014 the Ministry of Health and Family Welfare had four Departments, each of which is headed by a secretary to the government of India:

- Departments of Health & Family Welfare
- Department of AYUSH
- Department of Health Research
- Department of AIDS Control

Budget Support for Departments of MoHFW in Twelfth Plan (201217) (Figures are in Rs. Crores)

Department	Eleventh Plan Expenditure	Twelfth Plan Outlay	% increase
Department of Health and Family Welfare	83,407	268,551	322%
Department of AYUSH	2,994	10,044	335%
Department of Health Research	1,870	10,029	536%
AIDS Control	1,305	11,394	873%
Total	**89,576**	**300,018**	**335%**

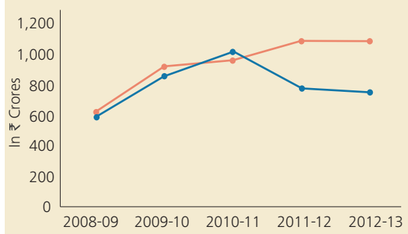
Effective August 7, 2014, the Department of AIDS Control has been merged with Department of Health & Family Welfare and Department of AYUSH has been made Ministry of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy (AYUSH).

The Department of AYUSH

AYUSH - Ayurveda, Unani, Yoga and Naturopathy, Siddha and Homoeopathy was set up in March 1995.

An analysis of actual expenditure over 5 financial years of AYUSH has shown underspending over budgeted expenditure. In the budget estimates for 2013-14, the Department of AYUSH was allocated Rs.1,259 crore.

Expenditure: Department of AYUSH

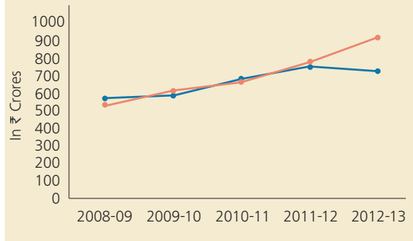


Source: Authors, based on- https://nrhm-mis.nic.in/PubFWStatistics%202013/Section%20H%20-%20Outlay%20and%20Expenditure%20on%20Health%20and%20Family%20Welfare.pdf

The Department of Health Research

The Department of Health Research (DHR) was formally established 5th October, 2007. The Department aims at bringing modern health technology related to diagnostics, treatment and prevention.

Expenditure - Department of Health Research



Source: Authors, based on- https://nrhm-mis.nic.in/PubFWStatistics%202013/Section%20H%20-%20Outlay%20and%20Expenditure%20on%20Health%20and%20Family%20Welfare.pdf

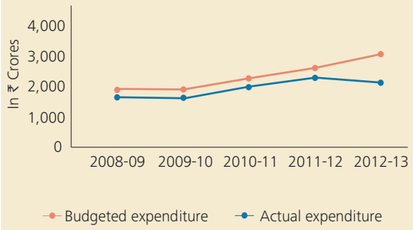
An actual expenditure analysis versus budgeted expenditure indicates that though budgeted allocation for the department is increasing over the years, actual expenditure is lagging behind. In the budget estimates for 2013-14, the department of Health Research was allocated Rs.1,008 crore.

The Department of Health and family Welfare

The department has many programmes, offices, bureaus, and divisions under it. Programmes relating to Communicable diseases and Non-Communicable diseases fall under this department.

Expenditure on Communicable Diseases

Communicable Diseases - Budgeted vs Actual Expenditure

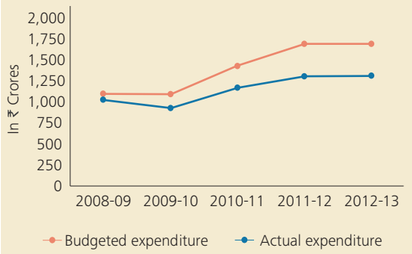


Source: Authors, based on- http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf
*Expenditure includes spent under NVBDCP, RNTCP, NLEP and NACO programmes

Funds are disbursed by the department to the States as per their requirements, as requested in the Programme Implementation Plans (PIPs).

HIV / AIDS

HIV/AIDS- Budgeted vs Actual Expenditure



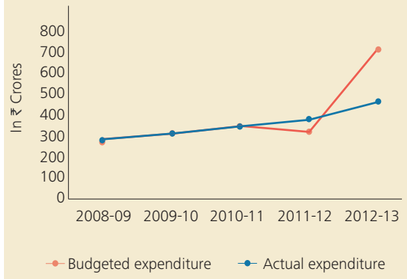
Source: Authors, based on- Ministry of Health and Family Welfare

Budgeted expenditure on HIV / AIDS have shown steep trend. While actual expenditure is following the same trend, it is still not meeting the given targets.

Tuberculosis

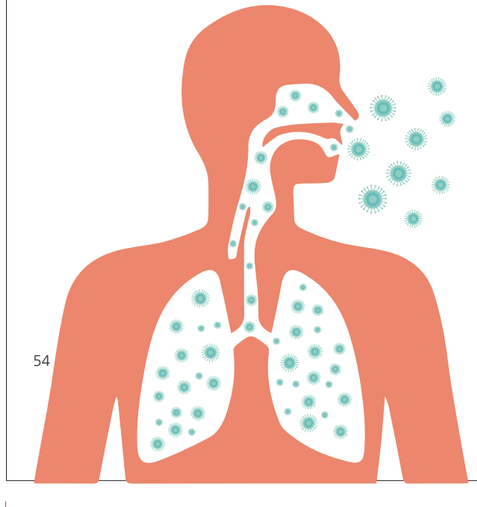
The budgeted expenditure and actual expenditure for TB have been found in synchronization over the years till 2010-11. However after a little over spent in 2011-12, the actual expenditure started lagging behind the budgetary allocations.

RNTCP - Budgeted vs Actual Expenditure



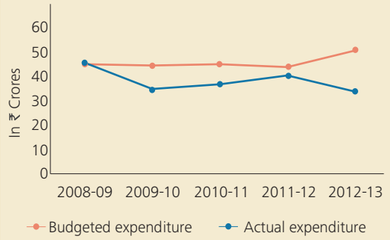
Source: Authors, based on-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

The recently announced India's TB Mission-2020 has called for interventions like roping in the private sector's financial and logistical support for improving infrastructure and delivery of the public health system in the form of corporate funding under Corporate Social Responsibility initiatives, and forging alliances with the private sector both as a resource and providers of products and services.



Leprosy

NLEP - Budgeted vs Actual Expenditure



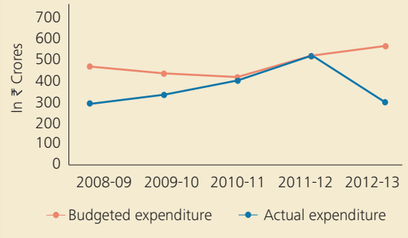
Source: Authors, based on-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

While the prevalence of disease has risen despite a decline in the incidence of Leprosy cases, the actual expenditure is far behind the budgeted allocation.

Vector Borne Disease

The financing of NVBDCP is done centrally; detailed breakup of the utilisation of funds towards each of the diseases covered is not available.

NVBDCP - Budgeted vs Actual Expenditure



Source: Authors, based on-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

Under the 12th Five Year Plan period (2012 - 2017), an amount of Rs.10,693 crore is proposed under the NVBDCP.

Based on the analysis of the expenditure pattern and increase in fatality rate, it is seen that while allocation has been stepped up with respect to the vector borne diseases, the results in terms of the prevalence of the disease outbreaks does not meet the end objectives i.e. Case Fatality Rate (CFR) has shown an upward trend for Vector Borne Diseases.

Expenditure on Non-Communicable Diseases

The public expenditure on health over non-communicable diseases is spread over centrally sponsored 8 schemes as stated in the previous section.

There has been integration of healthcare programmes in the 12th Five Year Plan period. For instance, the National Programme for Prevention and Control of Cancer, Diabetes, CVD and Stroke which was launched in 2010-11 was integrated with the National Cancer Control Program in 2010-11.

Therefore to draw a comparison between the burden of diseases and allocations made towards their control over the period covered under the 11th and the 12th Five Year Plan, the study has clubbed the various programmes relevant to cancer control to draw up the cumulative trends of expenditure for the period for analysis.

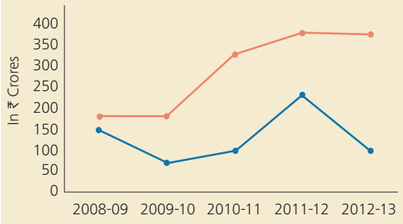
For calculating public expenditure on NCDs, the allocation and expenditure pattern at the Central level has covered the following diseases:

- NCDs including Cancer, Diabetes, Cardio-vascular disease and stroke
- Mental Illness & Retardation

Expenditure on other NCDs

Expenditure for NCDs include expenditure for NPCDCS, National Cancer Control Programme, Tobacco Control Programme, National Programme of Diabetes, Cardiovascular Disease and Stroke.

Non Communicable Diseases - Budgeted vs Actual Expenditure

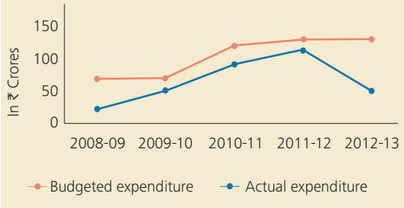


Source: Authors, based on-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

The upward trend of budgeted expenditure is undermined by underspend on actual expenditure for NCDs even though NCDs account for maximum burden of diseases in India.

Mental Disability

National Mental Health Programme - Budgeted vs Actual Expenditure



Source: Authors, based on -http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

Is increased budget allocation the only solution to the problem? The question that needs to be answered is, do higher allocations help in improving health outcomes?

Expenditure on Mental disability has increased over the years after recognition of this illness as an important part of overall human well-being. However, actual expenditure is still much lower than budgeted allocation.

Is India spending enough?

"India is not spending enough on healthcare and the country needs to set tall targets on financial inclusion" Nachiket Mor, Chairman of the board of Care India and a member of the central board of the Reserve Bank of India.[58]

The Indian healthcare system and policy development are unique particularly because of the massive population size and the nature of national health problems. With so many people to take care of, India's national healthcare has to be extensive and all-inclusive.

Many medical professionals, however, feel that Budget allocations are not enough.

Is increased budget allocation the only solution to the problem? The question that needs to be answered is, do higher allocations help in improving health outcomes?

Based on our analysis of available data in the previous section the actual expenditure has been almost always lower than the allocated budgeted expenditure.

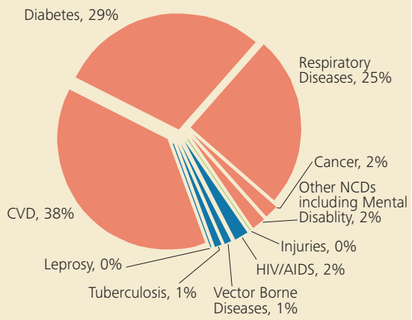
The gravity of situation is even worse when we analyse the focus area of actual expenditure.

The two questions that should be addressed are:

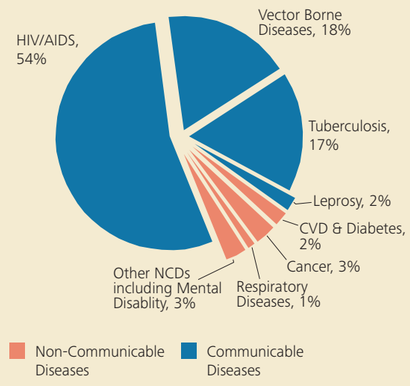
- **Are we even spending what is being allocated?**
- **Are we spending where we need to spend?**

The following charts explain the dilemma well:

No of cases



Public expenditure on diseases



Source: Authors, based on-http://cbhidghs.nic.in/writeread data/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

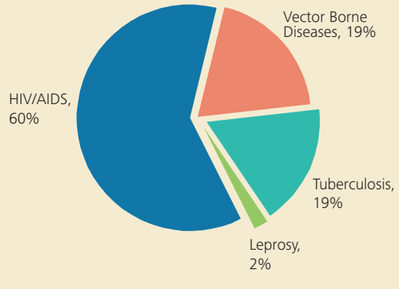
[58] http://www.business-standard.com/article/economy-policy/govt-should-spend-more-on-health-care-nachiket-mor-114031101009_1.html

A simple comparison of average recorded cases of CDs and NCDs for the period under study indicate a proportion of 6:94 (6% incidents for CDs and 94% incidents for NCDs); while same comparison for average public expenditure on CDs and NCDs shows a ratio of 91:9 (91% on CDs and 9% on NCDs), thus demonstrating a mismatch of incident vs. expenditure. This could also indicate that expenditure in earlier years is showing results in the form of lower incidents in later years.

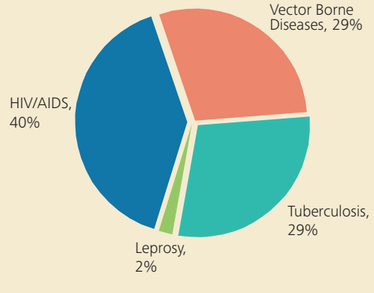
For example public expenditure on HIV/AIDS accounted for 54% of budget, while the number of cases were just 2% of all diseases put together. A direct correlation between amount spent and number of cases may sometimes be erroneous since control or eradication of diseases requires different approaches, each approach costing varying sums of money. However, constant vigilance is needed to ensure that health expenditure is in tandem with trends of the burden of disease.

Communicable Diseases

Communicable Diseases: Expenditure Pattern



Communicable Diseases: Incidents Pattern



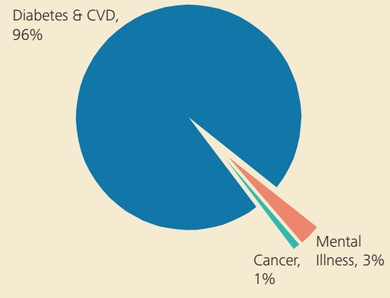
Source: Authors-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf & http://www.naco.gov.in/upload/Surveillance/Reports%20&%20Publication/Technical%20Report%20-%20India%20HIV%20Estimates%202012.pdf

Except Leprosy average public expenditure on all other CDs under study are not in synchronization with incident pattern.

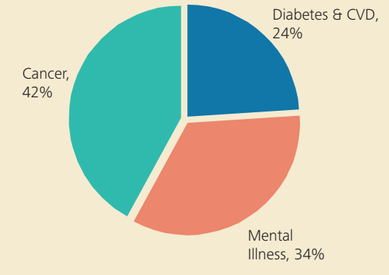
Communicable Diseases		
Diseases	**Incident**	**Expenditure**
HIV/AIDS	40%	60%
Vector Borne Diseases	29%	19%
Tuberculosis	29%	19%
Leprosy	2%	2%

Non-Communicable Diseases

Non-communicable Diseases: Incidents Pattern



Non-communicable Diseases: Expenditure Pattern



Source: Authors-http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Finance%20Indicators-2013.pdf

In NCDs we observed a huge mismatch between incident pattern and public expenditure pattern.

Non-Communicable Diseases		
Diseases	**Incident**	**Expenditure**
Diabetes and CVD	96%	24%
Mental disability	3%	34%
Cancer	1%	42%

Methodology: *These charts are based on average expenditure on CDs and NCDs over 2008-09 and 2011-12 national programme wise. NCDs included are: Cancer, Diabetes, Cardiovascular, Stroke and Mental disability. The CDs include HIV, Malaria, T.B., KalaAzar, Leprosy, Chikungunya, Dengue, Japanese Encephalitis and Acute Encephalitis Syndrome.*

Policy documents like the Approach Paper to the Twelfth Five Year Plan (2012 to 2017), the High Level Expert Group for Universal Health Coverage (HLEG), the Programme Implementation Framework of the National Rural Health Mission (NRHM) and the Report of the National Commission on Macroeconomics and Health (NCMH) have all endorsed the need to raise the level of public spending on health in India[59] from around 1% to 2%-3% of GDP.

[59] http://www.who.int/gho/ncd/risk_factors/overweight/en/

6. Key Challenges and Risks

Key Challenges and Risks

One of the most significant trends in the overall burden of disease is the shift in morbidity and mortality from communicable to non-communicable diseases. The transition from infectious disease to NCDs as the dominant cause of mortality is usually regarded as a result of successful infectious disease control and greater longevity.

While communicable diseases should and ought to continue to receive focus, a concerted and co-ordinated approach to tackle the growing burden of NCDs is urgently required. The rationale for this has wider ramifications in prosperity and growth of the nation.

Impact of NCDs on the Economy

Economists are increasingly expressing concern that NCDs will result in long-term macroeconomic impacts on labour supply, capital accumulation and GDP worldwide with the consequences most severe in developing countries.[60]

The global burden of non-communicable diseases is expected to increase as a result of two related demographic phenomena (Bloom, et al., 2011a, 2011b), first the rise in global population, and second the growth of the older population. This is particularly the case for certain emerging nations, such as **China** and **India**.

In a paper titled, "The Economic Impact of Non-Communicable Disease in China and India: Estimates, Projections and Comparisons' (David E. Bloom, et al., 2013) estimated the economic impact of NCDs in China and India for the period 2012-2030, using WHO's EPIC model of economic growth that focuses on the negative effects of NCDs on labour supply and capital accumulation. It states that **by increasing public health expenditures to treat NCDs and reducing the amount of household taxable income by pushing ill people out of the workforce, NCDs may reduce the net availability of government resources.**[61]

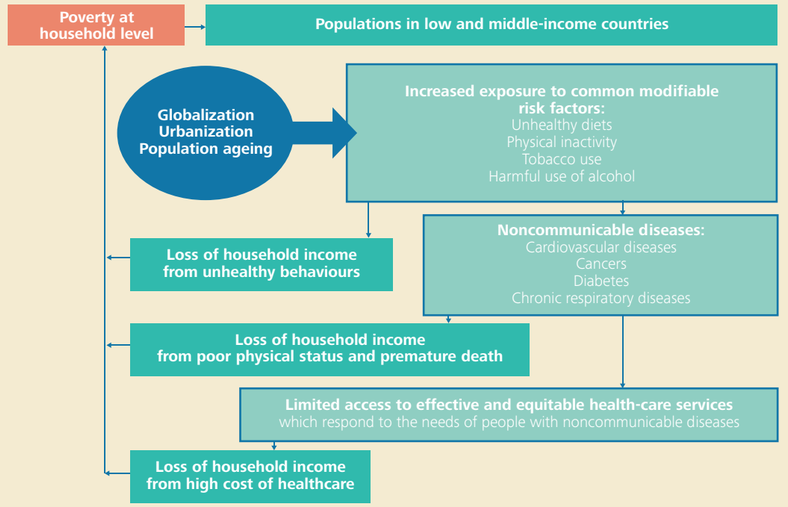
At the household level, unhealthy behaviours, poor physical status, and the high cost of NCD-related health care, lead to loss of household income. People often become trapped in a dangerous cycle where poverty and NCDs continually reinforce one another.[62]

The World Health Report 2010[63] 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.

While communicable diseases should and ought to continue to receive focus, a concerted and co-ordinated approach to tackle the growing burden of NCDs is urgently required.

[60] Abegunde & Stanciole, 2006; Abegunde et al., 2007; Mayer-Foulkes, 2011; Nikolic, Stanciole, & Zaydman, 2011; Suhrcke, Nugent, Stuckler, & Rocco, 2006
[61] http://www.nber.org/papers/w19335.pdf
[62] http://www.who.int/nmh/publications/ncd_report_chapter2.pdf
[63] The world health report 2010Health Systems financing: the path to universal coverage. Geneva, World Health Organization, 2010

WHO: Poverty Contributes to NCD and NCDs Contribute to Poverty[64]



NCDs' negative impact on national economies also means fewer jobs and therefore fewer people escaping poverty. The magnitude of the effect of health on economic growth is huge.

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.[65]

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.[66]

Presently India is trying to find ways of providing jobs and livelihood opportunities for its vast population of young people below the age of 35 years; the challenge being to convert the demographic burden to demographic dividend. Reaping the demographic dividend is expected to provide India with higher economic output per capita, which allows greater wealth generation and more resources to be channelled into savings and productive investments. However, this pre-supposes a healthy population working at optimum productivity with few disruptions due to diseases and ill health.

[64] Global status report on non-communicable diseases 2010, Description of the global burden of NCDs, their risk factors and determinants, Chapter 2, Fig 1, page 3
[65] Global risks 2010: a Global risk network report. Geneva, World Economic Forum, 2010
[66] http://www.who.int/nmh/publications/ncd_report_chapter2.pdf

Universal Health Coverage and Infrastructure

India's move towards universal healthcare began in the early years after independence but has faltered due to several factors over the years, such as financing constraints, regulatory weakness over medical practitioners and a lack of focus on outcomes. The current Indian healthcare system is characterised by health disparities and inequities.

The vision of Universal Health Coverage for the government is that every citizen is entitled to essential primary, secondary and tertiary health care services that will be guaranteed by the central government.[67] The plan envisages that health care services to all citizens covered under UHC will be made available through the public sector and contracted-in private facilities.

A National Health Assurance Mission, expected to roll out in April 2015 and cover the entire country by 2019 plans to provide citizens with free drugs and diagnostic treatment as well as insurance cover for serious ailments. The entire set of services, when covered for all citizens, is expected to cost US$11.4 billion annually.[68]

However, until this vision is translated into action, citizens have to access healthcare through the existing facilities. As mentioned in an earlier section, public infrastructure is woefully inadequate to handle the increasing burden of diseases particularly the non-communicable diseases. Further, an Ernst & Young study finds inequitable distribution of infrastructure in that although rural India bears three-fourths of the ailment burden, it has only one-ninth of the total number of beds and one-fourth of the number of human resource for health.[69]

After the health sector was opened to private sector, there has been a steep increase in private expenditure on health care. While this is a good opportunity for India to develop the so-called 'medical tourism', it comes at a steep cost. In the absence of adequate numbers of trained personnel and physical infrastructure, the private sector attracts the best talent, further eroding the capacity of the public health system. Further, in an atmosphere of weak regulatory framework, private health care providers may tend to over-diagnose and over-treat – with diagnostic tests, medicines and medical devices – with a strong commercial focus rather than keeping the interests of the patient paramount.

India does not have wide coverage of affordable health insurance either, which compounds the problem of access to quality healthcare. Lack of a comprehensive health insurance system coupled with inadequate public health institutions leads to greater expenditure out of total family income. This is due to either or both a) loss of productive ability due to inadequate medical treatment and b) accessing expensive private healthcare due to lack of free or subsidized public health systems. Compulsory insurance, funded through general taxation and utilising common risk compensation tools and a choice of insurance products are known paths taken by some developed countries and which can be replicated to suit Indian conditions.

One of the ways to resolve the lop-sided supply side is to co-opt the private healthcare system into the total national infrastructure in a formal manner – a Public-Private-Partnership in healthcare – so that an 'either/or' unhealthy competition between public and private sector is converted into 'win-win'. Such collaborations are already taking place such as empanelment of private service providers for public sector and government employees; a more robust system of compensation, etc. will contribute towards strengthening the healthcare system in India.

Mortality Data Collection

A sound health database provides a good platform for effective healthcare planning of a country. In India quality of mortality data collection varies from state to state and even among cities of the state. Death registries are the primary data source of mortality data.

[67] High Level Expert Group Report on Universal Health Coverage for India: Instituted by the Planning Commission of India, 2011
[68] C.K.Misra, Additional Secretary, Ministry of Health, GOI, quoted in Reuters, http://in.reuters.com/article/2014/10/30/uk-india-health-idINKBN0IJ0VN20141030
[69] Universal health cover for India: Case for UHC and global experiences, Ernst & Young

As per report by "Office of The Registrar General, Ministry of Home Affairs, India" ***only 66.9% deaths are registered with various municipal corporation***. These registries are maintained by municipal corporations and data collection formats are not standardised. Many corporations also do not record information related to cause of death.

Medical certification of cause of death is another source of collection for determining the cause of deaths. However, this is only required to be submitted by a medical practitioner or hospital authorities to the registrar if they attend to the deceased.

As per MCCD Report 2011, only 20% registered deaths are medically certified.

In absence of accurate data of causes of death, the government may find it difficult to plan its expenditure as per requirements; misallocation of funds can further affect the health issues of a country adversely.

Urbanization

The world is urbanizing at a rapid pace and it is estimated that by 2050 seven out of 10 people will live in cities.[70] India is poised to experience significant urban growth over the next 35 years (UN, 2012).[71]

As cities in India develop and offer more opportunities for employment, and agriculture becomes gradually less labour-intensive, people move in large numbers into the cities. This phenomenon results in the mushrooming of urban slums and sharp changes in the lifestyles and diets of the erstwhile rural people.[72] Health problems associated with urbanisation depend on the drivers causing people to migrate to towns, the economic background, and the adequacy of the urban infrastructure to cater for increased numbers.[73]

Between 30% and 60% of people in the large cities of most poor countries live in conditions of abject poverty in slums, without access to piped water or adequate sanitation. The effect on health of urbanisation is two-edged. On the one hand, there are the benefits of ready access to healthcare, sanitation, and secure nutrition, whilst on the other there are the evils of overcrowding, pollution, social deprivation, crime, and stress-related illnesses. In less developed countries (like India), urbanisation also opens the door to 'western' diseases, including hypertension, heart disease, obesity, diabetes and asthma.[74]

Therefore, more Indians will encounter urban risk factors of NCDs.

One of the known risk factors is increased intake of high calorie food and processed food.

Urbanization encourages individuals to forego traditional cooking and turn to prepared and heavily processed convenience foods that are often high in sugar, salt, saturated and trans-fats leading to an increase in CVD (cardio-vascular disease) risk. Gaining calories from sugar and fats has become cheaper and more accessible than fruit, vegetables, grains, beans or lentils. Worldwide, poor communities are often hurt most by unhealthy diets:

- 35 million overweight children are living in developing countries
- 8 million overweight children are living in developed countries

Thus, India faces a dual nutrition burden – the problem of under-nutrition and over-nutrition or obesity. Exposure to under-nutrition during infancy, childhood and adolescence may negatively affect cardiovascular health in adult life.[75]

Accumulated biomarker data on the "Asian Indian phenotype" identify central obesity, which occurs at a lower body mass index (BMI), as a particularly potent risk factor in Asian Indians.

[70] http://www.world-heart-federation.org/press/fact-sheets/urbanization-and-cardiovascular-disease/
[71] http://www3.weforum.org/docs/WEF_EconomicNonCommunicableDiseasesIndia_ExecutiveSummary_2014.pdf
[72] http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818608/
[73] Http://www.clinmed.rcpjournal.org/content/5/2/137.full.pdf
[74] Urbanisation and Health, Richard Godfrey and Marlene Julien, Clinical Medicine; Volume 5, No.2, Mar-Apr 2005, 137-41
[75] http://www.world-heart-federation.org/press/fact-sheets/urbanization-and-cardiovascular-disease/

A revised WHO case definition for obesity in India [BMI (in kg/m2) >25] has identified an obesity epidemic that exceeds 30% in some cities and rivals that in Western nations. This review summarizes 2 key lines of evidence: 1) the emergence of an obesity epidemic in urban and rural India and its contribution to the NCD burden and 2) the role of a "nutrition transition" in decreasing the whole plant food content of diets in India and increasing risk of obesity and NCDs.[76]

The packaged food market in India, according to CRISIL ratings of September 2014, stands at 1.2 trillion (1.2 lakh crores).[77] The packaged food segment is expected to grow at 9% annually to become a $ 100 billion (6 lakh crore) industry by 2030, dominated by milk, sweet and savoury snacks and processed poultry, according to a CII-McKinsey report. It predicts India to become an agriculture and high-value food powerhouse by 2030. Thus, nutrition transition from fresh, home cooked food to packaged food is well and truly established in India.

Increasing air pollution in urban clusters will also lead to greater incidences of respiratory diseases, in turn leading to reduced productivity. Global Burden of Disease (GBD) report has shown air pollution as one of the top 10 killers in the world.

In South Asia, air pollution ranked as the sixth most dangerous killer. Estimates of the burden in India show approximately 1.04 million premature deaths resulting from solid cooking fuels, and 627,000 premature deaths to be attributable to ambient air pollution (AAP) in the form of fine particulate matter ≤2.5 μm in aero dynamic diameter (PM 2.5). HAP and AAP account for 6% and 3%, respectively, of the total national burden of disease, and together they exceed the burden from any other risk factor.[78]

The Indian capital of New Delhi recently passed Beijing, China, for the dubious distinction of having the world's most polluted air. At least 3,000 people die prematurely every year in Delhi because of high exposure to air pollution, according to a joint study by the Boston-based Health Effects Institute and Delhi's Energy Resources Institute.[79]

Environment Ministry is planning to publish air quality data for 10 cities in India initially which will be expanded to 66 cities eventually, amidst growing public concern over the impact of air pollution on the health of India's population. Air pollution in India is primarily due to fuelwood and biomass burning, fuel adulteration, vehicle emission and traffic congestion. Air pollution may lead to respiratory and CVD including asthma, bronchitis, lung cancer and heart attacks.

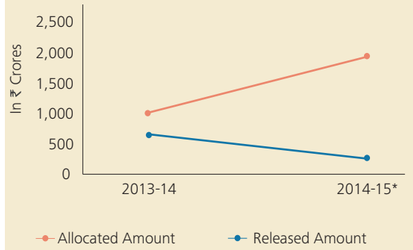
All cities and even towns of India have large slums where migrating rural populations typically reside where there is no sanitation, piped water, or rubbish disposal; the situation is usually one of unplanned expansion and chaos. Improved urban health in the rapidly growing cities of developing countries requires major investment in infrastructure and health personnel, currently well beyond the resources of most municipalities.[80]

The central government has proposed the National Urban Health Mission (NUHM) scheme to improve the affordability and accessibility of healthcare services for the urban poor with a focus on slum dwellers and other vulnerable groups. Several central sponsored as well as state sponsored health insurance schemes have also been introduced for the economically backward in urban areas.[81] However, an integrated plan that adequately addresses all risk factors arising from a rapidly urbanising population and which includes multiple agencies including municipalities, medical professionals and activists for raising awareness is yet to find a common platform.

Till now certain fund allocations and releases have been made to test check this scheme, which will later take care of entire burden of diseases for urban population.

[76] Global epidemiology of obesity, vegetarian dietary patterns, and non-communicable disease in Asian Indians Singh PN, Arthur KN, Orlich MJ, James W, Purty A, Job JS, Rajaram S, Sabaté J.
[77] http://www.crisil.com/pdf/ratings/In-food-and-beverages-tier-2-players-rising-fast.pdf
[78] Addressing the Burden of Disease Attributable to Air Pollution in India: The Need to Integrate across Household and Ambient Air Pollution Exposures, Kalpana Balakrishnan, Aaron 79 Cohen, Kirk R.Smith Environmental Health Perspectives volume 122 number 1 January 2014
[79] http://www.ndtv.com/india-news/india-to-measure-air-quality-in-worlds-most-polluted-capital-752562
[80] http://www.clinmed.rcpjournal.org/content/5/2/137.full.pdf
[81] http://www.pwc.in/en_IN/in/assets/pdfs/publications-2012/healthcare_financing_report_print.pdf

National Urban Health Mission- Allocation vs Release



Source: Authors, based on- http://pib.nic.in/newsite/PrintRelease.aspx?relid=107491
*Release amount is up to 25th July 2014 Expenditure data is not available for either year.

Globalisation

Globalisation is an exciting concept in human interconnectedness, indicative of one big global village; where ideas, knowledge and finance are shared across national borders. Globalisation enables fast global response to medical crises such as sharing of doctors, medicines and medical equipment.

Globalisation has also made transmitting of diseases across the globe easier, such as various forms of 'flu (swine flu, bird flu, etc) and more recently 'Ebola'. Most attention has been to the threat of communicable diseases and national security concerns especially as communicable diseases pose unexpected and unplanned stress on health infrastructure of countries. In less-developed countries like India, the already stressed health systems tend to exacerbate such incidences into epidemics.

However, as seen in earlier sections of this report, the global pattern of deaths will be increasingly dominated by **non-communicable diseases**. The burden of non-communicable disease results from past and cumulative risks; the future burden will, therefore, be determined by current population ***exposures to risk factors***.

Indirect effects of global trade on non-communicable diseases is exemplified by international free trade agreements, called FTA.

Trade agreements can hold significant benefits such as increasing exports to foreign markets, attracting foreign investment and reducing the price of imported goods. These benefits can lead to higher living standards and better health. However, trade agreements can also present risks to health unless the possible health implications are taken into account in their design and negotiation.

Trade liberalization can work for or against health. On the one hand, it can promote the transfer of goods, services, investments and technologies that promote health directly, for example through expanding access to nutritious foods and essential medicines, or indirectly by stimulating economic growth and employment. On the other, the benefits for health remain contested with demonstrated disparities in trade and investment related economic growth between countries, exacerbated income inequalities within countries, and heightened economic and food insecurity. In the absence of public health protections, trade liberalization is also an important 'upstream' determinant of NCDs.[82]

Some implications of trade agreements are:

- If such agreements are adverse to the interests of low or middle income countries (such as India), it has a direct bearing on government revenues from tariffs and therefore on the gross national income, thus undermining national budgets for health and health-related outcomes.
- Trade agreements in goods can flood a country with products (especially food, medicines and medical devices) that are detrimental to general standards and health goals of that country. This is known as global diffusion of risk commodities

[82] Trade and investment liberalization and Asia's non-communicable disease epidemic: a synthesis of data and existing literature. Phillip Baker, Adrian Kay and Helen Walls, http://www.globalizationandhealth.com/content/10/1/66

(including tobacco, alcohol and non-alcoholic drinks and ultra-processed foods).

- Trade agreements to lower trade barriers make it easier for trans-national companies to enter global markets and drive the nutrition transition towards diets with a high proportion of saturated fat and sugars. Besides, modern information and communication systems, including the ubiquitous Internet (including Internet commerce), makes advertising of products and lifestyles easy and which can slip under the bar of advertising rules for products in different countries. FDI-inflows are positively correlated with risk commodity consumption rates and the prevalence of NCDs in L-MICs and U-MICs[83] *(The food processing industries in India attracted foreign direct investments (FDI) worth $1,811 million during the period April 2000 to March 2013, as per data published by the Department of Industrial Policy and Promotion (DIPP).)*

- Trade agreements to open multi-brand retail may lead to 'super marketization' of India, with easy and increased availability of processed foods.

- Trade agreements in services, such as for medical insurance can open the door to large multi-national insurance companies with deep pockets to invest long-term capital into the insurance sector. India has, in 2014, decided to increase the FDI cap to 49% in the insurance sector. While FDI in insurance can bring in much-needed private investment to service India's vastly under-insured citizens, there could be a danger that huge trans-national insurance companies can reduce space for government in regulating quality, access and efficiency of health care.

- Trade agreements in intellectual property rights have a significant impact on pharmaceutical products. Agreements favouring trans-national corporations lead to putting several patented drugs as well as medical technology to treat NCDs out of reach of people living in developing countries. It can also lead to blocking production of generic drugs by developing countries. For instance, generic competition, primarily from Indian pharmaceutical manufacturers, has been one of the key factors in the dramatic decrease in prices of first generation antiretroviral (ARV) medicines for HIV treatment and which has been instrumental in the significant scaling up of the international response to HIV over the past decade.[84]

More research is needed to understand the inter-connected processes of trade liberalisation policies, trade of goods and services across borders, activities of trans-national companies, risk-commodity consumption and access to patented NCD prevention/control drugs and medical devices.

Demographic Changes

India is currently grappling with converting its demographic profile into demographic dividend by harnessing its young, under 30 population. However, a critical aspect of demographic trends is ageing and this implies that the share of older individuals living in a country increases over time. The dependency ratio increases, whereby the proportion of elderly in the total population increases as a proportion to the working population.

The rate of growth is rapid with both overall numbers and proportions of older people compared to younger people rising rapidly. The number of older people worldwide is expected to exceed the number of children by the year 2045.[85] Consequently, this implies that the economy's capacity to sustain the elderly would decline over the period.

[83] Trade and investment liberalization and Asia's non-communicable disease epidemic: a synthesis of data and existing literature. Phillip Baker, Adrian Kay and Helen Walls, http://www.globalizationandhealth.com/content/10/1/66
[85] The Potential Impact Of Free Trade Agreements On Public Health, Undp, Unaids Issue Brief | 2012

Traditionally, India's elderly have been cared for by families, ensuring a reasonable degree of physical care in the form of medical intervention and a fair degree of emotional support. Increasing urbanisation and rise of nuclear families have broken down this safety net.

WHO classifies age as a non-modifiable risk factor of NCDs (along with gender, race and family history)[86]; that is as a person ages, her/his chances of contracting an NCD increase.

Because susceptibility to NCDs increases with age, populations with older age structures tend to experience a greater share of deaths due to NCDs compared to populations with very young age structures where communicable diseases such as pneumonia and diarrhoeal diseases disproportionately affect children and produce a large burden of mortality.[87]

India's life expectancy at birth has risen to approximately 66 years[88] (64 years for men and 68 years for women) and is projected to be 74 years by 2050. While this is good progress for a young nation, the worrying factor is the rising incidence of NCDs in the older population. In 2050, more than three-quarters of 1 billion people aged 60 and older will live in China and India, constituting 38% of the world's 60-plus population (UN, 2011a). Further, the gap in health-related outcomes between the rich and the poor is widening.

It is estimated that by 2050, over 33%, or roughly 536 million people, will be aged 50 or over in India; the share of those aged 65 and over will increase from 5% to 14%; and the share of those aged 80 and over will rise from 1% to 3%.[89]

The elderly experience a greater burden of ailments compared to other age groups across genders and residential locations. The elderly most frequently suffer from cardiovascular illness, circulatory diseases, and cancers.[90]

A study (World Health Organization's (WHO) Study on Global Ageing and Adult Health (SAGE) Wave 1)[91] of ageing population of India (and China) revealed the following major causes of morbidity in the elder population:

Diseases	Men	Women
Angina	12.30%	20.40%
Arthritis	19.50%	28.40%
Asthma	16.90%	11.10%
Diabetes	8.80%	5.50%
Depression	21.20%	25.30%

Although ageing is a non-modifiable risk factor of several NCDs, its impact can be mitigated to some extent by suitable awareness programs for all ages. As India's population moves in large numbers into middle class, with access to 'modern' foods and beverages coupled with declining physical activity, some of the modifiable risk factors can be addressed through education and awareness. To address those risks, the United Nations General Assembly in its 2011 *Political Declaration on the Prevention and Control of NCDs* advocated a multi-sectoral approach that places prevention as the cornerstone of a global response to the growing challenges posed by the NCDs.

Traditionally, India's elderly have been cared for by families, ensuring a reasonable degree of physical care in the form of medical intervention and a fair degree of emotional support. Increasing urbanisation and rise of nuclear families have broken down this safety net. The health care infrastructure in India has not yet matured to replace the role of families, exacerbating the health problems for the aged.

[86] http://www.who.int/pmnch/knowledge/publications/summaries/ks15/en/
[87] Population Facts, United Nations, No. 2012/1
[88] http://www.who.int/countries/ind/en/
[89] http://southasiainstitute.harvard.edu/website/wp-content/uploads/2012/08/Bloom_PopulationdynamicsIndia.pdf
[90] http://www.ncbi.nlm.nih.gov/books/NBK109208/
[91] Aging, Health, and Chronic Conditions in China and India: Results from the Multinational Study on Global AGEing and Adult Health (SAGE)1, Paul Kowal, Sharon Williams, Yong Jiang, Wu Fan, P. Arokiasamy, and Somnath Chatterji.

7. The Way Ahead

The Way Ahead

The burden of infectious disease remains high in India, with communicable, maternal, perinatal, and nutritional conditions accounting for 28% of all mortality.

India's healthcare system in many respects is itself on life support. The country trails behind sub-Saharan Africa, Bangladesh and Nepal on numerous health fronts, despite improved per-capita income and economic growth. Growth in national income by itself is not enough, if the benefits do not manifest themselves in the form of more nutritious food, better living conditions and access to health and education.

A staggering 70% of the population still lives in rural areas and has no or limited access to hospitals and clinics. Besides the rural-urban divide, another key driver of India's healthcare landscape is the high out-of-pocket expenditure.[92]

India is faced with a double disease burden, resulting out of high incidence of communicable diseases as also greater incidence of deaths due to non-communicable diseases. NCDs are on the rise in India, accounting for around half of all deaths.

Although the **epidemiological transition** (a phrase coined to describe the long-term change in leading causes of death, from infectious and acute to chronic and degenerative conditions) is well advanced in India, the institutional response to disease prevention and control is still based on the infectious disease paradigm.

In India, epidemiological changes have traversed in a shorter time in comparison to other countries, primarily because of the rapid pace of economic development. As an outcome, CVD has emerged as the leading cause of death with CAD (coronary artery disease) affecting Indians the most.

Although the epidemiological transition (a phrase coined to describe the long-term change in leading causes of death, from infectious and acute to chronic and degenerative conditions) is well advanced in India, the institutional response to disease prevention and control is still based on the infectious disease paradigm.

A study titled 'Understanding epidemiological transition in India' by International Institute for Population Sciences, Mumbai based on NSSO data stated that "The burden of NCDs has been increasing in old age without replacing the burden of communicable diseases. The manifold rise of chronic diseases in recent decades justifies the death toll and is responsible for transformation in the age pattern of morbidity..... Continued progress in the pattern of diseases and mortality transition..... unravels a compelling variation in advances found so far in epidemiological transition witnessed by the developed nations, with similar matrices for India."[93]

[92] http://forbesindia.com/blog/health/5-things-to-know-about-the-indias-healthcare-system/
[93] http://www.globalhealthaction.net/index.php/gha/article/view/23248

An ICMR report states that "over the past several decades, India has been seeing an increasing population, literacy, urbanization, consumption of fat in food items, physical inactivity, rise in heart diseases, diabetes and other major Non-communicable diseases in adulthood, and concomitant with declining energy intake, stunting and underweight in children"....research is needed for "Identification of simple and valid indicators for tracking epidemiological transition: anthropometry, nutrition profiling, socio-economic parameters etc... Correlate these changes to Non-communicable diseases morbidity and mortality patterns so as to understand the consequences of this transition."

At 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. This calls for greater public expenditure on Non-communicable diseases, which are broadly a result of life style changes and demographic changes and cannot be mitigated by time-bound interventions as with communicable diseases. The national (and even global) response to combating NCDs is woefully inadequate and few countries have conceptualised, let alone implemented, comprehensive prevention and control policies.

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. 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. That is, it is not only the adult lifestyle that determines the risk level of chronic diseases. Diet and nutrition throughout the life cycle affects later health outcomes. There is evidence that childhood socioeconomic status is associated with type 2 diabetes and obesity in later life.[94]

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.

This requires building up of an enabling environment that enables greater impetus on healthcare preventive measures.

The research points out that while increasing the public expenditure on healthcare may be necessary, what is equally important is to ensure plugging existing gaps with respect to utilisation of funds allocated under various disease control programmes as well as improving upon the gaps with respect to healthcare infrastructure, especially in rural India.

In the developed world, the model of care for individuals in the moderate to severe stages of mental disability such as Alzheimer's or dementia is often based on long-term care in institutions. In India, whatever care is given to mental disable patients is from family members, with little public health infrastructure support. This calls for immediate policy interventions to ensure adequate trained professionals besides creating the infrastructure to handle these cases.

India has a huge demographic potential in the form of a young population. This advantage must be leveraged by investing in awareness education including nutrition education, household access to nutritious diets, sanitary environment and a health-promoting lifestyle. This requires co-operation from all the stakeholders, including governments, non-government organizations, scientists and the people at large.[95]

[94] http://www.who.int/nmh/publications/ncd_report_chapter2.pdf, page 2
[95] *The changing nutrition scenario*, C.Gopalan, Indian J Med Res. Sep 2013; 138(3): 392397.

India is also going to face an adverse dependence ratio in the coming decades with the number of dependents increasing as today's under 35 segment of population grows older. Ageing is a major non-modifiable risk factor for increasing NCDs. At this point of time, health infrastructure in India is simply not geared to handle high incidences of palliative care, let alone preventive care.

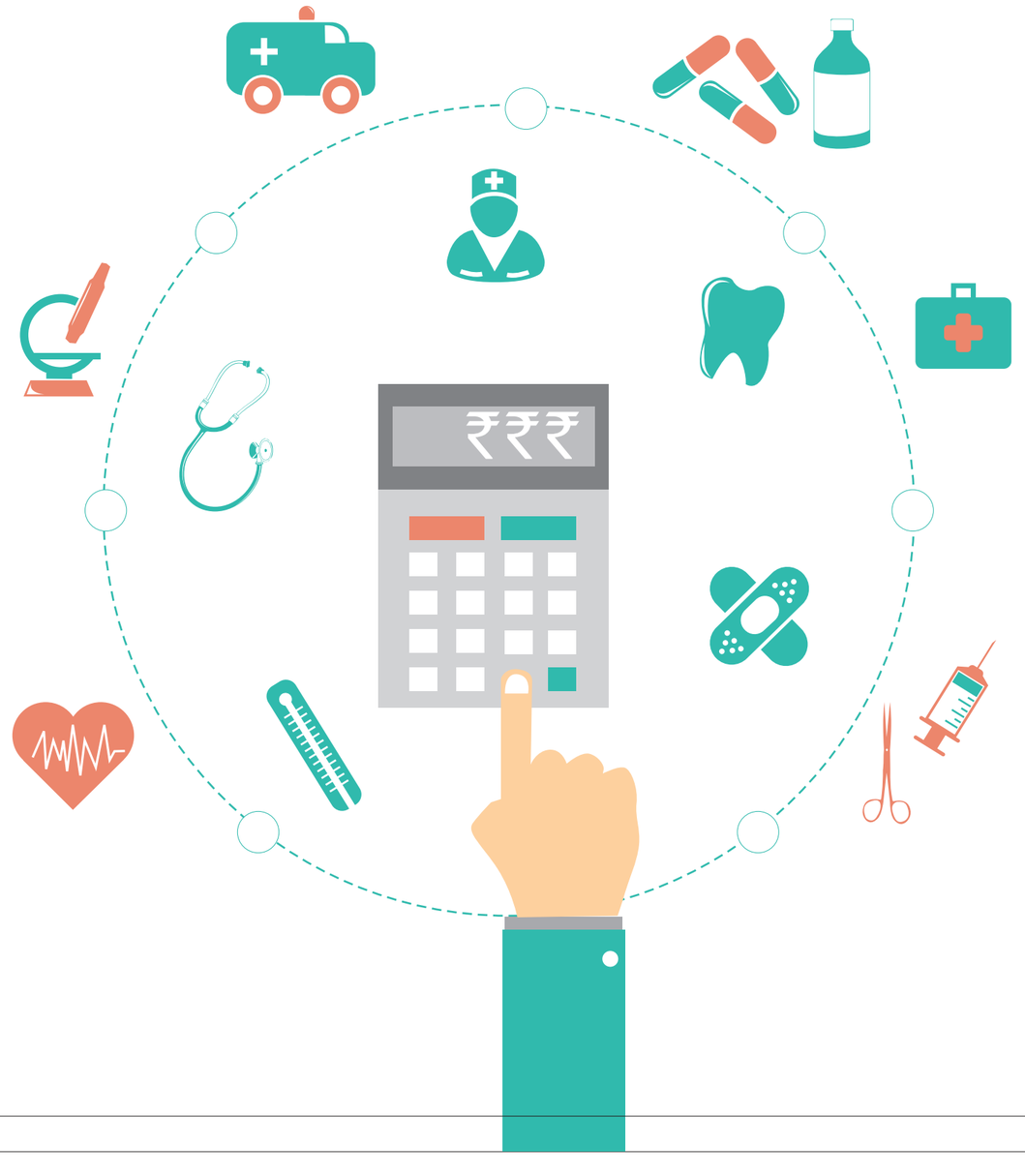
The key to lasting solutions for both CDs and NCDs lies in prevention of underlying causes. Advocacy issues would need to be worked out in partnership with all stakeholders such as consumer groups, health professional, industry groups and regulators so that no one interest group wins at the expense of other stakeholders.

Low-cost solutions should aim to reduce the common modifiable risk factors while high impact essential NCD interventions can be delivered through a primary health-care approach to strengthen early detection and timely treatment to save on huge costs of treatment once the disease progresses. There is sufficient medical and academic evidence to prove the inextricable linkage between maternal, perinatal, infant, childhood factors and adult lifestyle factors that accumulate and contribute to the risk of developing NCDs later in life. It is also recognised that some non-communicable diseases are linked to communicable disease and some have genetic predisposing factors.[96]

The following are some of the key focus areas that may help in resolving the problems faced by India's healthcare system:

- Uniform access to affordable healthcare services
- Reduce the 'Out Of Pocket' (OOP) expenditure on healthcare and lessen the probability of any financial impoverishment while meeting healthcare needs.
- Improve methods of mortality data collection to accurately target government intervention on public health.
- Budgetary allocations on various programs must be increased, while ensuring complete utilisation of allocated amounts .
- Information systems (hospitals, private practitioners and municipalities) and digitisation of records including a national initiative on health information technology, strategy and standards to help manage better data collection, information and services.
- Strong healthcare commitment and effective stewardship to define and achieve health outcomes on various programs.
- Co-ordination among health departments and agencies is needed to reduce disease burden in India.
- Improve standards of medical education, especially in areas of research; create an efficient accreditation system; promote an equitable distribution of resources, redesign curricula with improved assessment methodologies; integrate the concept of holistic well-ness by critically examining traditional cures, all of which will generate efficient medical graduates and consequently better health care delivery, and resulting in desired change within the system.[97]
- Lack of health related education and awareness is a cause of concern in India. It is stated to be more significant than the problem of affordability. Significant percentage of Indians are diabetic or hypertensive however only few of them are on treatment because many hardly bother to go for a medical check-up. Many diseases are entirely avoidable or treatable with existing medicines or

[96] http://www.wun.ac.uk/wun/globalchallenges/view/public-health-non-communicable-disease
[97] Adapted from : http://www.ncbi.nlm.nih.gov/pubmed/25189276



However, despite intensifying efforts, the conventional practice of medicine will not be adequate to treat diseases since it requires large outlay of resources in terms of physical infrastructure and health professionals.

interventions by spreading awareness about health and diseases prevention and cure. Government's role is important by becoming the healthcare promoter than a healthcare provider.

However, despite intensifying efforts, the conventional practice of medicine will not be adequate to treat diseases since it requires large outlay of resources in terms of physical infrastructure and health professionals. In several countries predictive and preventive approach of health care is gaining importance to ensure a targeted approach in health policies and practices. Predictive medicine through genomic screening, identifying high risk groups and delivering preventive medicine including advising specific life style changes, customised exercise program, periodicity of screenings or tests would help to deliver better and more specifically targeted health care.

Medical science is now undergoing a major revolution that will transform the nature of healthcare from reactive to proactive.

Medical science is now undergoing a major revolution that will transform the nature of healthcare from reactive to proactive. The convergence of system biology approaches to disease, new technologies and new computational & mathematical tools can be expected to allow our current, reactive medicine, where we wait until the patient is sick, to be replaced over the next 10 to 20 years by a P4 medicine that will be cost effective and increasingly focused on wellness through prediction, prevention, down staging & early treatment.[98]

The following are some of the measures that can form part of integrated approach; this requires effective education and raising awareness at various levels:

- Control adulteration of food & drink (safe/healthy food & drink)
- Control use of preservatives
- Control use of plastics
- Control pollution resulting from automobiles and industries
- Control industrial waste disposal
- Control radiation exposure from household electronic gadgets
- Control use of pesticides
- Encourage physical activity
- Encourage good/balanced diet with control on fast and junk foods & drinks
- Forums for health education and awareness

Further, keeping health infrastructural deficiencies and a growing Indian population in mind, telemedicine is another essential product of healthcare system. The combination of decreasing supply, increasing demand, and rising costs create a “perfect storm” of challenges in healthcare. As a key solution for weathering this perfect storm, tele-health is critical to the future of healthcare.[99]

Telemedicine is an upcoming and important tool of any country's healthcare system more so for a country like India where a majority of its population lives in rural areas with inefficient and inadequate health facilities.

In a sharp and sometimes ironical contrast, though the healthcare infrastructure in India depicts a rather dismal story, Indian medical tourism is fast becoming one of the most favoured medical tourism destination in Asia due to low treatment cost, highly educated doctors, and improving private infrastructural facilities. While this is a matter of national pride, care must be taken not to let medical tourism flourish at the cost of delivering quality healthcare to Indian citizens.

[98] www.cra.org/ccc/files/docs/init/P4_Medicine.pdf
[99] http://www.handsontelehealth.com/past-issues/74-why-is-telehealth-a-driving-force-in-healthcare

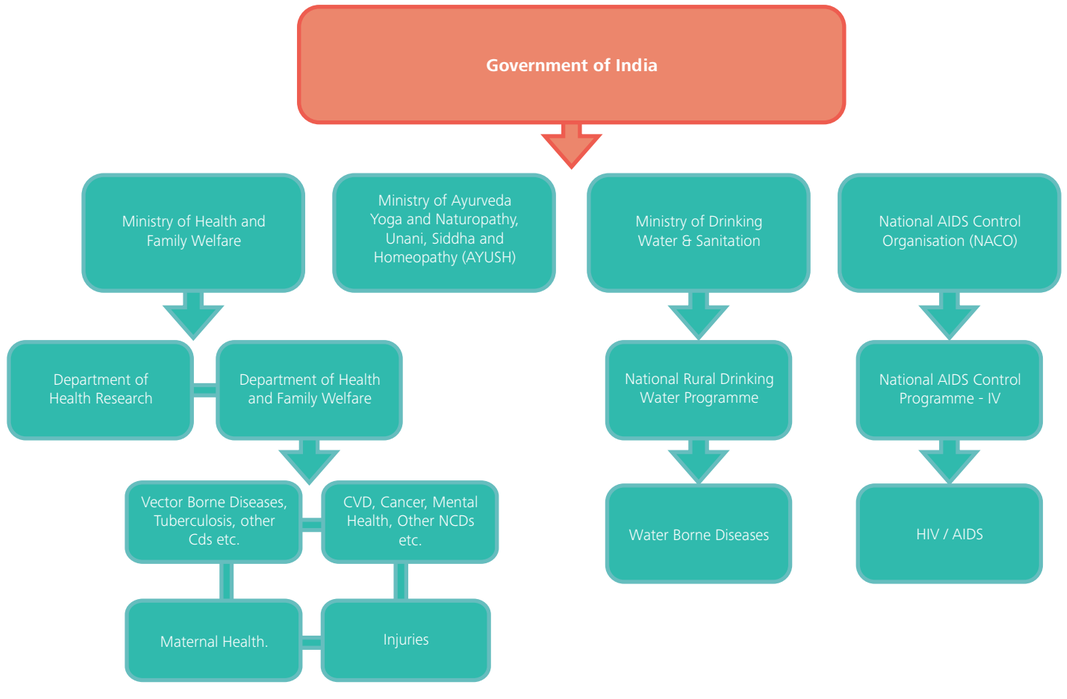
To conclude, India must step up efforts to combat non-communicable diseases while remaining constantly vigilant towards containing communicable diseases. In other words, India needs a life-course approach to handling and resolving public health issues to ensure healthy and productive citizens. India has already demonstrated its ability to combat certain CDs through a co-ordinated and concerted effort as evidenced by eradication of polio and small pox. The same co-ordinated approach needs to be deployed towards NCDs to ensure healthy citizens.

Annexures

Annexures

Annexure – I

Department-wise framework for disease control and prevention under various schemes by related ministries in India.



Annexure – II

Programmes under the Ministry of Health and Family Welfare:

National Health Programmes[100]

- National Vector Borne Disease Control Programme (NVBDCP)
- School Health Programme
- Operational Guidelines / Financial
- Guidelines Prevention & Control of Non Communicable Diseases
- Pilot Programme on Prevention and Control of Diabetes, CVD and Stroke - National Programme for Prevention and Control of Diabetes, Cardiovascular Diseases and Stroke (NPDCS)
- National Programme for Prevention and Control of Deafness
- Universal Immunization Programme (RTI ACT, 2005) PDF [13 KB]
- National Cancer Control Programme
- National Aids Control Programme
- National Mental Health Programme
- National Iodine Deficiency Disorders Control Programme
- National Programme for Control of Blindness
- Revised National TB Control Programme(RNTCP)
- National Leprosy Eradication Programme
- National Filaria Control Programme
- National Tobacco Control Program

Under **National Health Mission**, financial support is provided to the States through following key programme components to strengthen their health facilities:

- Reproductive & Child Health
- Immunization & Pulse Polio Programme
- Family Planning
- Adolescent Health
- National Urban Health Mission
- Health System Strengthening including Human Resource, renovation and creation of infrastructure, drugs & supplies, procurement of equipments, Quality Assurance, Rogi Kalyan Samitis, Untied funds, and training of medical and para medical staff.
- National Disease Control Programmes (Revised National Tuberculosis Control Programme, National Vector Born Disease Control Programme, Integrated Disease Surveillance Progarmme, National Leprosy Eradication Programme)
- Non Communicable Disease Control Programmes (National Programme for Control of Diabetes, Cancer and Stroke, National Programme for Control of Blindness, National Programme for the Health Care of Elderly etc.)
- Infrastructure Maintenance

[100] http://www.mohfw.nic.in/index1.php?page=1&ipp=10&lang=1&level=1&sublinkid=99&lid=126

Annexure – III

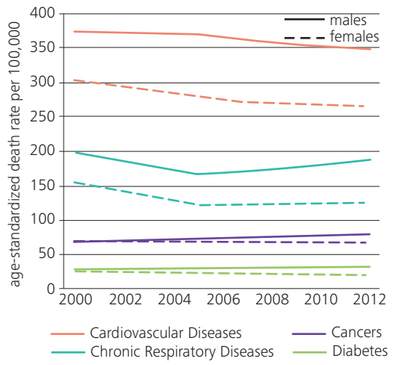
Relevant sections of WHO India Profile 2012

India

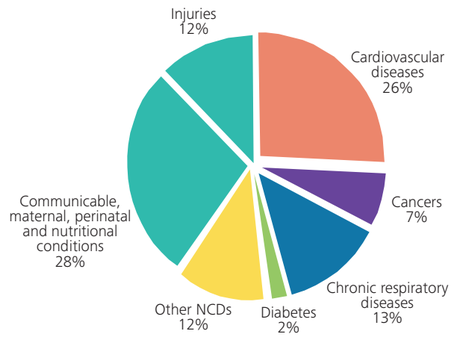
Total population: 1 240 000 000
Income Group: Lower middle

Percentage of population living in urban areas: 31.3%
Population proportion between ages 30 and 70 years: 40.1%

Age-standardized death rates*



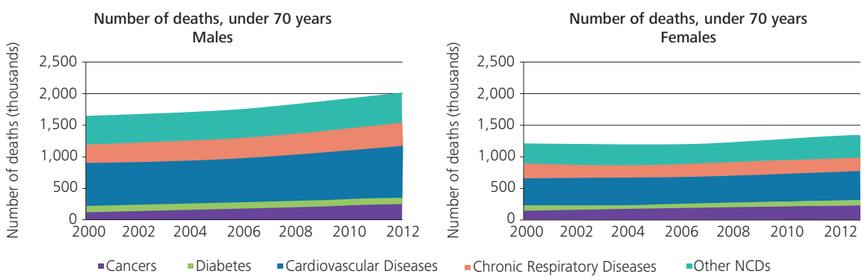
Proportional mortality (% of total deaths, all ages, both sexes)*



Total deaths: 9,816,000
NCDs are estimated to account for 60% of total deaths.

Premature mortality due to NCDs*

The probability of dying between ages 30 and 70 years from the 4 main NCDs is 26%



National systems response to NCDs

Has an operational NCD unit/branch or department within the Ministry of Health, or equivalent	Yes
Has an operational multisectoral national policy, strategy or action plan that integrates several NCDs and shared risk factors	No
Has an operational policy, strategy or action plan to reduce the harmful use of alcohol	Yes
Has an operational policy, strategy or action plan to reduce physical inactivity and/or promote physical activity	Yes
Has an operational policy, strategy or action plan to reduce the burden of tobacco use	Yes
Has an operational policy, strategy or action plan to reduce unhealthy diet and/or promote healthy diets	Yes
Has evidence-based national guidelines/protocols/standards for the management of major NCDs through a primary care approach	No
Has an NCD surveillance and monitoring system in place to enable reporting against the nine global NCD targets	No
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 (see Explanatory Notes).
World Health Organization - Noncommunicable Diseases (NCD) Country Profiles , 2014.

Source: http://www.who.int/countries/ind/en/

Annexure – IV

Relevant sections of WHO India Profile 2010

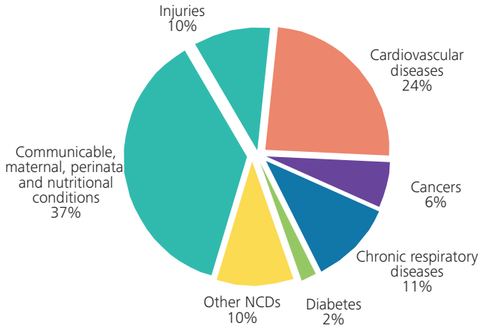
India

2010 Total population: 1 224 614 327
Income Group: Lower middle

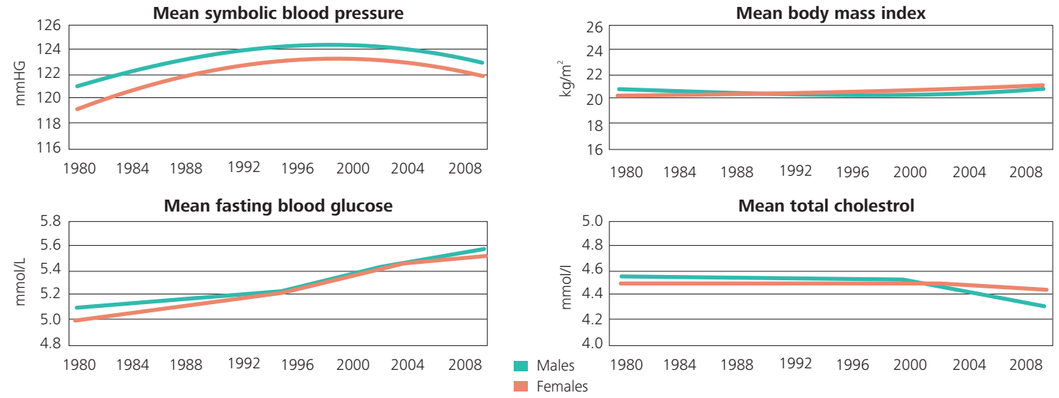
NCD mortality

2008 estimates	*Males*	*Females*
Total NCD deaths (000s)	2967.7	2273.8
NCD deaths under age 60	38.0	32.1
(percent of all NCD deaths)		
Age-standardized death rate per 100 000		
All NCDs	781.7	571.0
Cancers	78.8	71.8
Chronic respiratory diseases	178.4	125.5
Cardiovascular diseases and daibetes	386.3	283.0

Proportional mortality (% of total deaths, all ages)



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



Country capacity to address and respond to NCDs

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

**Covered by integrated policy/programme/action plan

World Health Organisation - NCD Country Profiles, 2011

Annexure – V

Deaths* for Leading diseases in India - 2010-11

Name of diseases	No of deaths
Cds	**2,30,211**
HIV/AIDS	1,64,625
Tuberculosis	63,781
Leprosy	-
Vector Borne Diseases	1,805
Malaria	1,018
Japanese Encephalitis	677
Dengue	110
NCDs	**40,28,391**
CVD	26,13,079
Respiratory Diseases	6,19,548
Cancer	4,95,447
Diabetes	3,00,317
Other NCDs including Mental Disability	**9,641**
Injuries	**5,19,248**
Accidents	3,84,649
Suicides	1,34,599

*Number of deaths are not directly additive due to overlapping data and inherent limitations in reporting and are being considered only for leading diseases in India

References

Http://origin.searo.who.int/india/topics/cardiovascular_diseases/Commision_on_Macroeconomic_and_Health_Bg_P2_Forecasting_vascular_disease_cases_and_associated_mortality_in_India.pdf
http://www.censusindia.gov.in/2011-Documents/mccd_Report1/MCCD-Report-2010.pdf
http://ncrb.gov.in/adsi2013/ADSI-2013.pdf
http://www.naco.gov.in/upload/Surveillance/Reports%20&%20Publication/Technical%20Report%20-%20India%20HIV%20Estimates%202012.pdf
http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Status%20Indicators-2012.pdf
http://cbhidghs.nic.in/writereaddata/mainlinkFile/Health%20Status%20Indicators-2013.pdf
Http://pib.nic.in/newsite/PrintRelease.aspx?relid=108030

Annexure – VI

Global Deaths Cancer Wise - 2008			
#	**Sites of Cancer**	**No of Deaths**	**%**
1	Trachea, Bronchus, Lung cancers	1,387,460	21%
2	Stomach cancer	758,192	11%
3	Liver cancer	695,245	10%
4	Colon and rectum cancers	647,121	10%
5	Breast cancer	482,485	7%
6	Oesophagus cancer	413,743	6%
7	Lymphomas, multiple myeloma	304,758	5%
8	Mouth and oropharynx cancers	281,490	4%
9	Cervix uteri cancer	276,961	4%
10	Prostate cancer	272,223	4%
11	Pancreas cancer	269,796	4%
12	Leukaemia	266,854	4%
13	Other neoplasms	188,227	3%
14	Bladder cancer	160,360	2%
15	Ovary cancer	140,088	2%
16	Corpus uteri cancer	77,946	1%
17	Melanoma and other skin cancers	77,496	1%
	Total	**6,700,443**	

Source: Global Burden of Diseases, WHO
Source: Authors: http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/