4. FUTURE CHALLENGES

Report of the National Commission on Macroeconomics and Health has provided a glimpse of the future challenges that the country is likely to face by the year 2015. These and other projections have been used to provide the basis of development of research agenda for the 11th Plan period

Demographic Changes

At present, the elderly population in India constitutes approximately 7% of the total population. This is likely to increase to about 20% by 2050. India will have a population of 137 million of older persons in year 2020. Chronic diseases disabilities, mental illnesses, visual, locomotors and hearing impairment are major health challenges in this age group. It is important to ensure that living longer should mean living healthily. The focus of research should be on how to prepare for this change in demographic structure. It should not be adding years to life but life to years – how to ensure that years added to life are not the years of ill health and disease. In addition to equipping medical facilities to handle the disease profile of the aged, a healthy environment has to be created so that old age does not become a victim of surrounding million and become a resident of hospices and hospitals. With growing number of senior citizens, there would be substantial increase in health care needs. Increasing availability and awareness about technological advances for better understanding of these problems raise the expectation of the population for acceptable, affordable and sustainable interventions. Health research will have to gear up to make available necessary preventive, promotive, curative and rehabilitative strategies for growing population of senior citizens.

Disease Burden

I. Communicable Disease

1. *HIV*

   Based on the surveillance data, it is estimated that there are 5.1 million adults with HIV infection between 15 and 49 years. An estimated additional 50 million people are likely to become HIV positive by the year 2025; and some 15-18 million by 2015. Women have a two-fold higher incidence, largely due to female sex workers as well as higher biological

susceptibility of women to HIV-1 infection. What is worrying is the projection of an increasing number of HIV infected women from among the low-risk category.

2. *Tuberculosis*

According to ICMR's Tuberculosis Research Centre, an estimated 3.8 million bacillary cases and 3.9 million abacillary cases, (totaling to 7.7 million) were suffering from TB in 2000. In this estimation the possible association of HIV and multi-drug resistant (MDR)-TB are not included. An estimated 400,000 die of the disease each year. This makes TB the single most important cause of death in India. While no future projections for TB in India are currently available, it is expected that an expanded HIV epidemic will greatly increase the numbers with active TB weakening the affected individuals' immune system in a population with high rates of *M.tuberculosis* infection.

3. *Malaria*

Malaria, dengue and some other conditions fall in the category of 'malaria and vector-borne diseases'. In 1998, these were estimated to account for 1.6% of India's total disease burden. This is likely to be an underestimate of the true disease burden of these conditions. Data show that the prevalence of reported cases of malaria (per 1000 population) declined in India during the period 1995 to 2003 but the proportion of *Plasmodium falciparum* cases, a serious form of malaria that is also expensive to treat, increased during the same period at the all-India level-from 38.8% in 1995 to 47.5% in 2003. With increasing resistance of the malarial parasite to available drugs, and without effective interventions, one may even see an increase in the disease burden from malaria in the future.

4. *Emerging Re-emerging infections*

During the last three decades, 30 new infections have been reported globally. India too had some experience of SARS and later of avian flu. Outbreak of encephalitis due to Chandipura virus was reported in Andhra Pradesh and Gujarat. Nipah virus outbreak happed in Siliguri, a new strain of *V.cholerae* 0139 emerged, diarrhea due to Group B adult rota virus was detected in Kolkata so was *V.parahaemolyticus* 03:K6. The threat is also posed by terrorist groups using natural or genetically engineered strains of microorganism with evil intent. Stepping up specialized disease surveillance is corner stone to emerging infectious disease threat. Laboratories with adequate biosafety levels would be needed and trained staff to work in them. Repositories of important microorganism would be needed to compare and study genetic changes. Animal facilities would be required to under take animal studies and development of diagnostics and other tools. Japanese encephalitis is spreading from rural to urban areas and dengue from urban to rural

areas. The annual number of cases are increasing and so is the number of deaths. And now Chikungunya is reported to be spreading.

II. Non-communicable Diseases

1. *Cardio-vascular Diseases*

   Starting from a level of about 38 million cases in the year 2005, there may be as many as 64.1 million cases of cardiovascular disease (CVD) in 2015; and the number of deaths from CVD will also more than double mostly on account of coronary heart disease - a mix of conditions that includes acute myocardial infarction, angina pectoris, congestive heart failure and inflammatory heart disease, although these are not necessarily mutually exclusive terms. The rates of prevalence of CVD in rural populations will be lower than in urban populations, but will continue to increase, reaching roughly 13.5% of the rural population in the age group of 60-69 years by 2015. The prevalence rates among younger adults and women (in the age group of 40 years and above) are also likely to increase.

2. *Diabetes*

   Diabetes, also associated with an increased risk for CVD, is emerging as a serious health challenge in India, even though it accounted for only about 0.7% of India's disease burden in 1998. It is estimated that there may be a significant load of diabetes cases in India-rising from 31 million in 2005 to approximately 46 million by 2015, and particularly concentrated in the urban population.

3. *Cancers*

   In India, cancers account for about of 3.3% of the disease burden and about 9% of all deaths. These estimates will, however, surely change as many of the common risk factors for cancers, such as tobacco and alcohol consumption, continue to become more prevalent in India. It is estimated that the number of people living with cancers will rise by nearly one-quarter between 2001 and 2016. Nearly one million new cases of cancers will be diagnosed in 2015 compared to about 807,000 in 2004, and nearly 670,000 people are expected to die.

4. *Mental Health*

   Nearly 65-70 million people in India are in need of care for various mental disorders in all age groups. This estimate excludes a large group of common mental disorders like phobia, anxiety, disassociative disorders, panic states, mild depression and substance abuse (varying spectrum of associated hazardous use). It is difficult to establish the true burden of all these disorders but has been estimated to be nearly 20.5 million people. Alcohol related problems are increasing in India nearly 62

million people predominantly men - are likely to be current alcohol users with nearly 10.2 million being alcohol dependants and about 30 million alcohol users.

5. *Chronic and Obstructive pulmonary diseases and asthma*
   It is estimated that there were roughly 15 million chronic cases of COPD in the age group of 30 years and above, and 25 million cases of asthma in 2001 in India. These numbers are projected to increase by nearly 50% by the year 2016, including 'severe' cases, some of whom may require greater levels of care, including hospitalization.
6. *Accidents and injuries*
   Data from Survey of Causes of Death and Medical Certification of Causes of Deaths reveals that 10-11% of total deaths in India were due to injuries. It is estimated that nearly 8,50,000 persons die due to direct injury related causes every year in India during 2005, with 17 million hospitalizations and 50 million requiring hospital care for minor injuries. By 2015, the toll is expected to rise to 1.1 million deaths and 22 million hospitalization and 53.0 million minor injuries in the absence of any positive intervention. While official reports capture majority of these deaths, domestic and occupational injuries, falls, drowning, animal bites and injuries in disaster go unreported.
7. *Oral Health*
   The number of cases of the various oral health conditions is expected to increase by 25% over the next decade.
8. *Suicide*
   Suicide is major public health problem and is among the top ten causes of death in most countries. In India, total numbers of suicides were 38829 in year 1967, which has increased to 110851 in the year 2003 (National Crimes Records Bureau). The numbers of suicides (during decade 1993-2003) have increased at an annual compound growth rate of 3.11 per cent as against the corresponding population growth rate of only 1.9 per cent. Recently, suicides by students (pressures of examinations) and farmers (economic pressures) have brought into sharp focus the need for research in this neglected though important area. With increasing urbination, the stress factor is likely to also increase and may prove to be a trap for larger number of suicides among the vulnerable population.
9. *Strokes and Neurological Disorders*
   The estimates for the burden of NCD by ICMR indicated the prevalence rate of stroke to be 1.54/1000 in age group 20 years and more with a death rate of 0.6/1000 (2004). The number of cases of stroke in India increased from 0.79 million in 1998 to 0.93 million cases in year 2004,

whereas DALYs attributable to stroke increased from 5.8 million in year 1998 to 6.4 million in year 2004.

III. Problems of Urban Health

India's urban population is 285 million which amounts to nearly 30% of the total population. The urban growth will account for over two thirds of the total population increase in the first quarter of this century. Slum population growth will continue to outpace growth rates of India, urban India and mega cities. Demographers refer to this as the 2-3-4-5 syndrome; in the last decade, India grew at an average growth rate of 2%, urban India grew at 3%, mega cities at 4% and slum population increased by 5%. By 2030, the urban population is expected to reach 297 million. Official estimates do not account for unrecognized squatter settlement and other populations. Population projections postulate that slum growth is expected to surpass the capacities of civic authorities to respond to the health and infrastructure needs of the urban population.

Lack of water and sanitation and the high population density in slums facilitates rapid spread of infections. Poor housing conditions, exposure to heat or cold, air and water pollution and occupational hazards add to the environmental risks for the urban poor. The urban health is also vulnerable, as they do not have back up savings, food stocks or social support systems to help them during illness. Thus, even though there is a concentration of health care facilities in urban areas, the urban poor lack access to health care. Urban health initiatives in the country to date have been limited and fragmented. The challenge of increasing urbanization with growth of slums and low-income families in cities has made access to health care for the urban poor a matter of priority. It may be necessary to create a separate unit with multi-discipline expertise to address this issue.

IV. Nutritional Problems

The incidence of nutritionally poor population, particularly the rural poor, is the quite high in Orissa, Bihar, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh. Another related issue is the problem of *hidden hunger* - as the problem of micronutrient deficiency. While estimates suggest that 800 million people are undernourished, the number of people suffering from micronutrient deficiency is as high as 3.5 billion globally; a very high percentage of these are in India. In India, the magnitude of iron deficiency is perhaps the greatest. Thus, for example, 70% of pregnant women in India suffer from iron deficiency anaemia (IDA); and the figure for young children is also high. Between 10 and 20 million children in

India suffer from vitamin A deficiency (VAD) and 60,000 annually go blind because of VAD. The consequences of these deficiencies, in terms of impaired physical and cognitive development, disability and mortality are correspondingly staggering. There is a need to develop appropriate vehicles for these micronutrients. With the increase in the availability of processed food and development of food industry, food safety has emerged as an important issue. High levels of certain chemicals in ground water (like arsenic) and use of unacceptably large amounts of pesticides in agriculture, find their way in foodstuffs consumed by people. There is an urgent need to develop technology to deal with such toxic agents in the food chain. Energy requirements for special groups like women who have to walk several kilometers to draw potable water or collect wood for fuel needs to be addressed by development of low cost technology.

V. Reproductive and Child Health

According to the NRHM maternal, perinatal and childhood conditions account for a significant percentage of the disease burden. The IMR is about 66 per 1000 live births, a substantial improvement over the levels nearly 30 years ago. The under-five mortality rate (U5MR) was estimated at 95 per 1000 live births in 1998-99, and is declining at a rate similar to that of the IMR. Two-thirds of deaths occur within the first week of birth. About 35 babies of every 1000 childbirths die within one month; 30 before one year and 26 between 1 and 5 years of age. In India, the ratio of the neonatal death rate to the 1-5 year death rate is 1.3, against 10 in developed countries. Therefore, any strategy to reduce child deaths must focus on all three-age periods, as focusing on any one may result in merely shifting the burden to the other. There is a reported decline of the maternal mortality rate (MMR) from about 580 per 100,000 live births during 1982-86 to 540 per 100,000 live births in 1998-99(NFHS-II).

Significant improvement has taken place in reproductive health of the population. The couple protection rate has increased from 1.4% in 1970-71 to 50-52% in 2002-03 and total fertility rate has declines from 6 to 3. However, there are problem areas which need to be tackled. Maternal mortality, infant and neonatal mortality are still very high. Main causes of maternal mortality are unattended delivery, obstructed labour, post-partum complications and unsafe abortions. Use of spacing method (about 6%) and male participation (7-8%) are very low. Unmet need for contraception is very high, particularly among young women below 20 years (27%) resulting in high rate of unplanned and undesirable pregnancy, compelling them to resort to unsafe abortions.

In addition to the unmet need for reproductive health care, there are myriad of sociological factors which have contributed to the continued reproductive ill health.

Research would, therefore, be needed to, for example, how to alter gender perceptions, strategies to build rational and healthy sexual attitude and behaviour amongst adolescents and youths, approaches to ending discrimination and injustice, better understanding of barriers to girls education, empowerment and development, improve men's participation in reproductive health care, needs of under-privileged sections of population like the tribal, inequities related to poverty and access to health care.

Other Challenges

Quality of drugs and devices

The quality of drugs sold in the market has been a major concern. The common man often ends up buying spurious or sub-standard drugs. The Supreme Court of India, the National Humans Rights Commission and MPs have time and again expressed concern about this and have urged the Government to improve the drug regulatory system. In the past, several committees have been constituted to examine the issue and have made many recommendations. Some of these have been implemented, but the core issue has remained unresolved. The NCMH's report has too flagged the need for strengthening of regulatory mechanism of not only drugs but also of devices. According to this report, there is no effective quality regulation also on the sale of high-technology medical devices, with the existing BIS (Bureau of Indian Standards) mark norm limited to a small subset of low-cost medical equipment. Consequently, substandard second-hand medical devices are currently flowing into and floating around the country. There is severe shortage of technical experts for repairing medical equipment.

Narrow Research Base

Presently, there are about 170 MCI recognized and 65 permitted medical colleges. About 20,000 to 25,000 students graduate every year. Medical schools are the cradle of health researchers of tomorrow. About 8000 of these do post-graduation in various specialties (38 PG degree courses, 32 PG diploma, 37 discipline for Ph.Ds and 24 super specialties). The quality of research in these medical colleges is low. Less than 10% are active in research, most of the papers resulting from research are published in non-

indexed journals with low impact factor. More than half of the medical colleges (53%) had published less than 10 research papers in an indexed journal during 1990-94, and only 10% have 100 or more papers during that period. It is essential to inculcate a culture of research in medical colleges if the quality and quantity of health research is to be improved in the country.

Limited Human Resource

There have not been any organized and focused efforts towards human resource estimation for research or its development. It is not only an issue of numbers and skills, but also giving attention to generate a demand for research among policy makers. There has also been a ban on creation of new positions. This has further hampered human resource development. The only new blood that has been inducted has been against vacant posts. Rapid progress is being made in biomedical sciences. Fresh technologies are opening new vistas. But the country is unable to exploit them to the full in absence of adequate human resource. Cutting edge areas are being neglected.

Neglect of Translational Research

Translation of research to action involves using scientific knowledge to develop drugs, vaccines, diagnostics, devices and other interventions. There is a gap in using knowledge to inform policy and practice in health systems countries. Some challenges faced are limited access to technology and scientific information leading to scientific isolation, limited scientific career opportunities and the inability to synthesize existing knowledge towards improving interventions and performance of health systems. There is thus an urgent need for a health research system that would not only generate research outputs but also utilize scientific knowledge to inform policy and to promote knowledge-based change in health system.

Shift from Medical to Health Research in 11th Plan

Conventional response to persisting and new emerging health challenges would be to step up research in control method and improving the health systems research. Epidemiology of the disease goes beyond biology. Sociological perspective is important to understand the occurrence of a disease and its cure so that the patient returns and normalcy and contributes to functioning of society.

No amount of pure bio-medical research would be complete unless it is extended to social determinants of health. Many of them are embedded in the circumstances in which people live and work. All forms and shades of

poverty, inequity, food insecurity, social discrimination, poor conditions of housing, unsafe working conditions, poor access and/or utilization of health services influence disease burden.

Health care does not end once the fever is down and stitches are out. Disease are persisting, and/or emerging because of sociological changes, life-style changes, and social disruptions (riots, violence etc.). Diseases are not solely rooted in biological causes, but are multifactorial. This calls for a multi and inter disciplinary approach to health research.

Central to health research is improvement in public health and making available to them the 'goods' required for attaining positive health. This requires partnerships with various stakeholders' viz. donors, pharmaceutical industry, IT industry, engineering sciences, science and technology and biotechnology, social sciences, town planners, architects. It requires strengthening research capacity of medical schools, colleges, universities and institutions, development of skills and infrastructure. Human resource development, creating an enabling environment for researchers, setting up new infrastructure to address gap areas and creating effective networks are also priority areas. Undertaking these activities would translate into allocation of more funds for health and to health research. Underpinning all these principles are the attainment of targets laid down Millennium Development Goals (MDGs) meeting the objectives of the National Rural Health Mission, addressing the Government's Common Minimum Needs Programme.◈