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Ministry of Health and Family Welfare
Government of India



The First Comprehensive Estimates and Trends of Disease Burden and Risk Factor for Every State of India Released

The Indian Council of Medical Research (ICMR), the Public Health Foundation of India (PHFI) and the Institute for Health Metrics and Evaluation (IHME) in collaboration with the Ministry of Health and Family Welfare, Government of India generate the first state-level disease burden and risk factors estimates to improve health programmes and planning for every state in India.

- Under-5 mortality rate is improving in every state but this rate has a 4-fold difference between states, indicating major health inequalities
- Every state of India now has a higher burden from non-communicable diseases and injuries than from infectious diseases, the extent of which varies widely between the states
- EAG states face the major challenge of controlling the increasing non-communicable diseases as well as the persistent infectious diseases
- The per person burden from many of the leading infectious and non-communicable diseases varies 5-10 times between different states
- Malnutrition continues to be the single largest risk for health loss in India, which is higher among females and is particularly severe in EAG states and Assam
- Even in states at similar development levels there are major differences in the burden from specific leading diseases, indicating the need to use state-specific estimates for health planning

NEW DELHI – 14 November 2017 — The **India State-level Disease Burden Initiative**, a joint initiative between the Indian Council of Medical Research (ICMR), Public Health Foundation of India (PHFI), and Institute for Health Metrics and Evaluation (IHME) in collaboration with the Ministry of Health and Family Welfare, Government of India along with experts and stakeholders associated with over 100 Indian institutions, released the **first comprehensive set of state-level disease burden, risk factors estimates and trends for each state in India** to inform health planning to reduce health inequalities amongst states in India. These estimates are based on analysis of all identifiable epidemiological data from India over quarter of a century.

Present on the occasion was the **Honourable Vice President of India, Shri M. Venkaiah Naidu**, along with **Union Minister of Health Shri J P Nadda**, **Minister of State for Health and Family Welfare Ms. Anupriya Patel**, **Dr Vinod Paul**, **Member NITI Aayog**, **Dr Soumya Swaminathan**, **Director General ICMR**, **Dr K Srinath Reddy**, **President PHFI**, **Dr Christopher Murray**, **IHME** and **Dr Lalit Dandona**, **PHFI**. The report on the India State Level Disease Burden was released at the event describing the findings in detail, along with the technical paper published in the journal *Lancet* and an open-access interactive visualization tool that allows understanding of the trends in a simple manner. Senior officials from the Ministry of Health, State representatives, Health Secretaries and Directors of Health Services and National Health Missions along with a wide variety of institutions from across India attended the launch.

In his address the **Honourable Vice President of India, Shri M. Venkaiah Naidu** stated *“A systematic compilation of the burden of all diseases and the risk factors behind them is needed for each state of India to plan health and other services that address the specific situation of each state. This report by the India State-level Disease Burden Initiative provides these comprehensive estimates for each state from 1990 to 2016 for the first time in India, and offers insights into the health inequalities between the states of India. The findings show that the overall disease burden per person in some states of India is almost twice as much as in some other states, and the burden rate due to the leading diseases ranges five to ten times between the states. The specific disease burden trends for each state in this report provide a reference for planning interventions that are needed to address the major disease problems in each state. Such evidence-based health planning in each state would result in overall health improvements in India and reduce the health inequalities between the states. I wish continuing success for further work of the India State-level Disease Burden Initiative in providing the best possible annual disease burden estimates for every state and union territory that could be utilized in many ways for improving the health of Indians in every nook and corner of the country.”*

India has been going through a major epidemiological transition over the past 25 years. The burden of premature death and health loss due to non-infectious conditions such as heart disease, stroke, diabetes, chronic obstructive lung disease and road traffic has increased massively, and the burden due to lower respiratory infections, tuberculosis, diarrhea and neonatal disorders still remains unacceptably high. The extent of the burden due to these major conditions is expected to vary significantly across the various population groups and the states of India. National-level estimates do not provide enough detail for targeted-action. Hence reliable sub-national estimation of disease burden in India is crucial for an informed health system response to improve population health.

The report provides the first comprehensive set of findings for the distribution of diseases and risk factors across every state of India from 1990 to 2016, utilizing all available data and in close engagement with many leading health scientists of India. Through an elaborate process all available data sources to estimate disease burden in every state and union territory of India were identified and accessed. These included censuses, vital registration, Sample Registration System, large-scale national household surveys, other population-level surveys and cohort studies, disease surveillance data, disease programme-level data, administrative records of health services, disease registries, and a wide range of other studies conducted across India. Data were included in the analysis if they met quality and inclusion criteria. The burden from 333 disease conditions and injuries and 84 risk factors were computed for each state of India as part of the Global Burden of Disease Study 2016. In order to understand the specific disease trends among states at different levels of epidemiological transition, the states were divided into groups based on the ratio of Disability Adjusted Life Years (DALYs) from infectious and associated diseases to DALYs from non-communicable diseases and injuries combined. Variations of diseases and risk factors were analyzed between the state groups and between individual states that are relevant to inform a more specific health system response in each state.

Although variations in diseases and risk factors have been anticipated between the states of India, this is the first time that a comprehensive compilation of all estimates using a single standardized framework has been done for every state in India. The visual graphics of the findings in an online open-access interactive visualization tool bring to life in an easily understandable manner the disease burden and risk factors trends over time across each Indian state, as well as contrasts between states. This will be particularly useful for policy makers to plan action and policies to improve health outcomes in every state.

Addressing the audience **Union Minister for Health and Family Welfare, Shri J P Nadda** said, *“The National Health Policy 2017 has recommended disease burden tracking to monitor health improvements across the country. The data and results in this report of the India State-level Disease Burden Initiative can serve as a useful guide to fine-tuning health planning in each state of the country. The results show that the burden due to non-communicable disease and injuries has overtaken the burden due to infectious and maternal-child diseases in every state of India, though this happened in some states about three decades ago and in other states more recently. This means that the more developed states that had this transition a long time ago need to go on a war footing to control the rapidly rising burden of major non-communicable diseases and injuries. On the other hand, the states that have had this transition more recently such as the EAG states now have rising risk for non-communicable diseases and also continue to have a high burden of infectious and maternal-child diseases. The profile of each state in this report showing the contribution of specific diseases and risk factors to the overall health loss can be a useful guide for states when they develop their Project Implementation Plans for health. I hope that the planners and experts in each state will use the findings in this report and engage with the India State-level Disease Burden Initiative to further improve health in their respective states.”*

Dr Vinod Paul, Member, NITI Aayog said *“NITI Aayog has recommended monitoring of health status in each state, and the NITI Aayog Action Agenda 2017-2020 envisions data-driven and decentralized health planning to more effectively improve population health. The estimates of disease burden and risk factors produced in this report for every state of India, and the accompanying technical paper published in the journal Lancet, are timely for a more nuanced health policy and system development in each state. In fact, it would be ideal to have such comprehensive estimates for each district, though this may require further generation of relevant data. A corresponding important point to note is that most of these major risks cannot be dealt with by the health sector alone. Extensive inter-sectoral collaborations are needed if these risks have to be mitigated.”*

“This initiative is the need of the hour, and is being released timely”, said **Ms. Anupriya Patel, Minister of State for Health and Family Welfare, Government of India.** *“Details of the data gaps identified as part of the work of the India State-level Disease Burden Initiative can be utilized to inform development of an adequate health information system in India and will be crucial to aid more specific policy and health system development based on the specific situation of each state. These findings highlight the fact that India’s states will require very different policy approaches according to the nature of the disease burden they are facing.”*

“After two years of intense collaborative effort that included many leading health experts and policy makers in India, it is a matter of great satisfaction that this report, technical paper and the visualization tool are available for use, in which the disease burden and risk factors trends in every state of the country from 1990 to 2016 are elucidated. We anticipate that these estimates will continue to be produced at regular intervals and with improving accuracy as more data become available, enabling increasingly more robust monitoring of the progress in health parameters in all parts of India. We are grateful for the constructive engagement of a large number of highly skilled people with this effort to produce an open-access public good knowledge base, which has the potential of making fundamental and long-term contributions to improving health in every state of the country through provision of the best possible composite trends of disease burden and risk factors for policy makers to utilize in their decision making”, said **Dr. Soumya Swaminathan, Director-General of ICMR and Secretary, Health Research, Government of India,** who closely guided the work of the India State-level Disease Burden Initiative.

“The contribution of non-communicable diseases to health loss, fueled by unhealthy diets, high blood pressure, blood sugar and overweight, has doubled in India over the past two decades. Air pollution and tobacco smoking continue to be major contributors to health loss. However, the extent of these risk factors varies considerably across the states of India. The State-level Disease Burden Initiative helps refine the understanding of these variations across India and would assist states in developing appropriate strategies to control this increasing tide. This Initiative is also enhancing capacity to generate and analyze large-scale health data in India using strong research methods” said **Dr. K. Srinath Reddy, President of PHFI.**

“Many Indian states are bigger than most countries in the world. It is necessary to plan health interventions based on the specific disease burden situation of each state, many of which are no less than nations within a nation, if the existing major health inequalities between the states have to be reduced. This requires availability of the best possible disease burden and risk factors estimates for each state based on all available data using a standardized framework. These estimates are now provided in three complimentary outputs released today: the report, the technical paper, and the open-access visualization tool. Discussion with policy makers suggests that these findings will be useful for planning of state health budgets, prioritisation of interventions relevant to each state, informing the government’s Health Assurance Mission, monitoring of health-related Sustainable Development Goals targets in each state, assessing impact of large-scale interventions based on time trends of disease burden, and forecasting population health under various scenarios in each state. We believe that the knowledge base developing out of the ongoing work of the State-level Disease Burden Initiative can serve as a significant public good, providing increasingly more nuanced and crucial inputs for improving health of all Indians,” said **Dr. Lalit Dandona, Director of the India State-level Disease Burden Initiative and Distinguished Professor at PHFI.**

*“The study, as a well as a related policy report, have has significant policy implications for Indian health officials, said **Dr. Christopher Murray, IHME’s Director.** “This research is the culmination of many years of work and it represents a starting point, from which, we hope, new initiatives will be developed to improve the lives and livelihoods of many of India’s 1.3 billion people.”*

The wide variations in the burden rate of leading diseases between the states highlight why it is necessary to understand the specific disease burden trend in each state, over and above the useful understanding provided by trends that are common for groups of states at similar levels of epidemiological transition, in order to plan health action suited to the specific context of each state. If the biggest health problems and risks in each state are tackled on priority, the chances of achieving the overall health targets set by India would be much higher than with a more generic approach not based on the disease burden trends in each state.

Key Findings:

- Life expectancy at birth improved in India from 59.7 years in 1990 to 70.3 years in 2016 for females, and from 58.3 years to 66.9 years for males. There were, however, continuing inequalities between states, with a range of 66.8 years in Uttar Pradesh to 78.7 years in Kerala for females, and 63.6 years in Assam to 73.8 years in Kerala for males in 2016.
- The per person disease burden dropped by 36% from 1990 to 2016 in India. However, there was an almost two-fold difference in this disease burden rate between the states in 2016, with Assam, Uttar Pradesh, and Chhattisgarh having the highest rates, and Kerala and Goa the lowest rates.

- The under-5 mortality rate has reduced substantially from 1990 in all states, but there was a four-fold difference in this rate between the highest in Assam and Uttar Pradesh as compared with the lowest in Kerala in 2016, highlighting the vast health inequalities between the states.
- Of the total disease burden in India, 61% was due to communicable, maternal, neonatal, and nutritional diseases in 1990, which dropped to 33% in 2016. There was a corresponding increase in the contribution of non-communicable diseases from 30% of the total disease burden in 1990 to 55% in 2016, and of injuries from 9% to 12%. Infectious and associated diseases made up the majority of disease burden in most of the states in 1990, but this was less than half in all states in 2016. There were wide variations between the states. Kerala, Goa, and Tamil Nadu have the largest dominance of non-communicable diseases and injuries over infectious and associated diseases, whereas this dominance is present but relatively the lowest in Bihar, Jharkhand, Uttar Pradesh, and Rajasthan.
- The burden of most infectious and associated diseases reduced in India from 1990 to 2016, but five of the ten individual leading causes of disease burden in India in 2016 still belonged to this group: diarrhoeal diseases, lower respiratory infections, iron-deficiency anaemia, neonatal preterm birth, and tuberculosis. The range of disease burden or DALY rate among the states of India was nine-fold for diarrhoeal disease, seven-fold for lower respiratory infections, and nine-fold for tuberculosis in 2016, highlighting the need for titrating efforts based on the specific trends in each state.
- The contribution of most of the major non-communicable disease groups to the total disease burden has increased all over India since 1990, including cardiovascular diseases, diabetes, chronic respiratory diseases, mental health and neurological disorders, cancers, musculoskeletal disorders, and chronic kidney disease. In 2016, three of the five leading individual causes of disease burden in India were non-communicable, with ischaemic heart disease and chronic obstructive pulmonary disease as the top two causes and stroke as the fifth leading cause. The range of disease burden or DALY rate among the states in 2016 was nine-fold for ischaemic heart disease, four-fold for chronic obstructive pulmonary disease, and six-fold for stroke, and four-fold for diabetes.
- The contribution of injuries to the total disease burden has increased in most states since 1990. The highest proportion of disease burden due to injuries is in young adults. Road injuries and suicides are the leading contributors to the injury burden in India. The range of disease burden or DALY rate varied three-fold for road injuries and six-fold for suicide among the states of India in 2016.
- A group of risks including unhealthy diet, high blood pressure, high blood sugar, high cholesterol, and overweight, which mainly contribute to ischaemic heart disease, stroke and diabetes, caused about 25% of the total disease burden in India in 2016, up from about 10% in 1990. There were large variations between states in the degree to which these risks are rising.
- While the disease burden due to child and maternal malnutrition has dropped in India substantially since 1990, this is still the single largest risk factor responsible for 15% of the total disease burden in India in 2016. This burden is highest in the major EAG states and Assam, and is higher in females than in males. The disease burden due to child and maternal malnutrition in India was 12 times higher per person than in China in 2016. Kerala had the lowest burden due to this risk among the Indian states, but even this was 2.7 times higher per person than in China.
- The disease burden due to unsafe water and sanitation has also reduced significantly in India, but this burden is still 40 times higher per person in India than in China. The EAG States and Assam have a particularly high burden due to this risk.
- The contribution of air pollution to disease burden has remained high in India between 1990 and 2016, with levels of exposure among the highest in the world. The burden of household air

pollution has decreased during this period due to decreasing use of solid fuels for cooking, and that of outdoor air pollution has increased due to a variety of pollutants from power production, industry, vehicles, construction, and waste burning. The level of exposure to air pollution is highest in the EAG states.

The findings are available on an online open-access interactive visualisation tool at <https://vizhub.healthdata.org/gbd-compare/india>. These findings are expected to contribute substantially to appropriate health policy and system development through production of reliable state-level disease burden estimates as well as improvement of systems to produce these estimates on an ongoing basis to monitor changing trends at the local levels. This initiative intends to produce more detailed topic-specific publications and policy reports for major diseases and risk factors for further granular insights to plan their control. Annual production of state-level disease burden estimates is planned, with estimates improving with increasing availability of data. Additional disaggregation of estimates is planned, for example, rural-urban estimates for each state next year, and geospatial mapping at a fine-grid level for key diseases and risk factors. Capacity building in India to generate and analyse large-scale health data using strong methods is anticipated over the next five years of this work.

The Advisory Board of this Initiative is chaired by Shri JVR Prasada Rao, Former Health Secretary to the Government of India, and includes some of the leading health policy makers of the country. This Initiative is built upon extensive collaborations across India and has fourteen domain expert groups that are closely involved with the estimation process and interpretation of findings.

Released on 14 November 2017

Report:

Indian Council of Medical Research, Public Health Foundation of India, Institute for Health Metrics and Evaluation. India: Health of the Nation's States – The India State-Level Disease Burden Initiative. New Delhi: ICMR, PHFI, and IHME; 2017.

Scientific paper:

India State-level Disease Burden Initiative Collaborators. Nations within a nation: variations in epidemiological transition across the states of India from 1990 to 2016 in the Global Burden of Disease Study. *Lancet*. Published online on 14 November 2017.

Visualization tool:

India State-level Disease Burden Visualization Tool: India GBD Compare.
<https://vizhub.healthdata.org/gbd-compare/india>

The Indian Council of Medical Research (ICMR), is the apex government body in India for the formulation, coordination and promotion of biomedical and health research. It is one of the oldest medical research bodies in the world. Besides the headquarters in New Delhi, ICMR has 32 research institutes, centres and units across India. ICMR funds both intramural and extramural research in India. The priorities of ICMR coincide with the national health priorities and have the goal of reducing the total burden of disease and to promote health and well-being of India's population. As part of this agenda, ICMR is interested in improving the estimates of disease burden and risk factors in India, especially at the sub-national levels, for better health planning, policy framing and fund allocation. For more information please visit <http://www.icmr.nic.in>

The Public Health Foundation of India (PHFI) is a premier public health institution in India with presence across the country. It collaborates with multiple constituencies including Indian and international academia, state and central governments, multi- and bi-lateral agencies, and civil society groups. The vision of PHFI is to strengthen India's public health institutional and systems capability and provide knowledge to achieve better health outcomes for all through strengthening training, research and policy development in public health. As part of this vision, PHFI has major interest in improving the robustness of sub-national disease burden estimates to inform health action and in evaluating the impact of large-scale population health interventions. For more information please visit www.phfi.org

The Institute for Health Metrics and Evaluation (IHME) is a global research institute at the University of Washington in Seattle that provides independent, rigorous, and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME aims to identify the best strategies to build a healthier world by measuring health, tracking program performance, finding ways to maximize health system impact and developing innovative measurement systems to provide a foundation for informed decision-making that will ultimately allocate resources to best improve population health. For more information please visit www.healthdata.org

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