Health status of populations across the world changes over time in response to socio-economic, demographic, nutritional, scientific, technological, environmental and cultural shifts. Such health transitions have been especially profound in the past half-century due to sweeping industrialisation, rapid urbanisation and relentless globalisation in most parts of the world. It is necessary to understand, and even predict, the patterns and dynamics of health transition so that multi-sectoral actions can be taken to protect and promote the health of populations.

The Global Burden of Disease study was initiated 26 years ago to chart the changing patterns of disease-related death and disability from 1990 onwards. Since then, estimates are periodically provided for years of life lost to premature mortality as well as for years of disease-related disability that is weighted for severity. A combined measure of these two metrics is expressed as the loss of Disability Adjusted Life Years (DALYs) attributable to any disease or risk factor. In recent years, national and sub-national estimates are emerging to provide greater focus to action within countries.

The first-of-its-kind Indian effort to map state-level disease burdens was undertaken by over 1,000 experts led by Lalit Dandona of the Public Health Foundation of India, in partnership with the Indian Council of Medical Research and the team that leads the global study. The results, reported last week, highlight significant trends common to all states as well as important differences between them.

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. However, life expectancy of women in Uttar Pradesh is 12 years lower than that of women in Kerala, while the life expectancy of men in Assam is 10 years lower than that of men in Kerala. The per person disease burden, from all causes, dropped by 36 per cent in the same period. However, there was an almost two-fold difference between the states in 2016, with Assam, Uttar Pradesh, and Chhattisgarh having the highest rates, and Kerala and Goa the lowest rates.

The under-five mortality rate has reduced substantially in all states in these 25 years. 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. Despite a decline from 1990 levels, child and maternal malnutrition remains the single largest risk factor, contributing to 15 per cent of the disease burden in 2016. With its under-five mortality six times higher than Sri Lanka and burden of child and maternal malnutrition 12 times higher than in China, India has wide gaps to bridge.

Communicable, maternal, neonatal, and nutritional diseases contributed to 61 per cent of India's disease burden in 1990. This dropped to 33 per cent in 2016. But the share of non-communicable diseases in the disease burden increased from 30 per cent in 1990 to 55 per cent in 2016, and that of injuries increased from 9 per cent to 12 per cent. While all states show this trend, Kerala, Goa, and Tamil Nadu have the largest dominance of non-communicable diseases and injuries over infectious and associated diseases, whereas this ratio is much lower in Bihar, Jharkhand, Uttar Pradesh, and Rajasthan. Five of the 10 individual leading causes of the disease burden in India in 2016 are a carry-over of past threats: Diarrhoeal diseases, lower respiratory infections, iron-deficiency anaemia, neonatal pre-term birth, and tuberculosis. Though the disease burden due to these factors is 40 times that in China.

In 2016, three of the five leading individual causes of disease burden in India were noncommunicable, with ischaemic heart disease and chronic obstructive pulmonary disease being the top two causes and stroke the fifth leading cause.

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 per cent of the total disease burden in India in 2016, up from about 10 per cent in 1990. Ambient air pollution and household air pollution both rank high as risk factors in 2016, the former rising and the latter declining in the past 25 years.

There were large variations between states in the degree to which these risks are rising. States in early stages of the health transition were coping with both the persisting challenge of infectious, nutritional and pregnancy-related health threats and the rising magnitude of non-communicable diseases. States in the advanced stage of the transition were grappling largely with non-communicable disorders.

These data, of time trends and inter- state variations, highlight the need to develop specific strategies to address the major contributors to disease burden within each state. Disaggregated data, as provided in the recent report, will help to tailor customised state-level responses while summated time trends will help the National Health Policy to set and track the progress towards country-level targets. Since the present report provides modelled estimates derived from multiple and often limited data sets, it is imperative to strengthen vital registration mechanisms and beef up disease and risk factor surveillance systems in every state.

The broad national agenda should be elimination of malnutrition, reduction of child and maternal mortality, control of infectious diseases and containment of risk factors contributing to non-communicable diseases. This report provides each state the GPS to chart their individual journeys towards those goals, from different starting points.

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## END

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