State-wise Global Burden of Disease in India

Prioritizing Interventions for Primary Health Care

Pre-conference CME

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PUBLIC HEALTH FOUNDATION OF INDIA

Indian Council of Medical Research

IHME

Disease burden
Years of Life Lost and Years Lived with Disability

YLL - Years of life lost	**YLD - Years lived with disability**
Years lost due to **premature mortality.** YLLs are calculated by subtracting the age at death from the longest possible life expectancy for a person at that age. For example, if the longest life expectancy for men in a given country is 75, but a man dies of cancer at 65, this would be 10 years of life lost due to cancer.	**Years lived in less than ideal health**. This includes conditions such as influenza, which may last for only a few days, or epilepsy, which can last a lifetime. It is measured by taking the prevalence of the condition multiplied by the disability weight for that condition. Disability weights reflect the severity of different conditions and are developed through surveys of the general public.

Disability Adjusted Life Years [DALY]

DALY = YLL + YLD

- **DALY** is an abbreviation for **disability-adjusted life year**.
- DALYs equal the sum of years of life lost (YLLs) and years lived with disability (YLDs).
- It is a universal metric that allows researchers and policymakers to compare very different populations and health conditions across time.
- **One DALY equals one lost year of healthy life**.

The Global Burden of Disease Study

A systematic scientific effort

to **quantify** the comparative magnitude of **health loss due to diseases, injuries and risk factors by age, sex and geographies**

for specific points in time

India State-Level Disease Burden Initiative

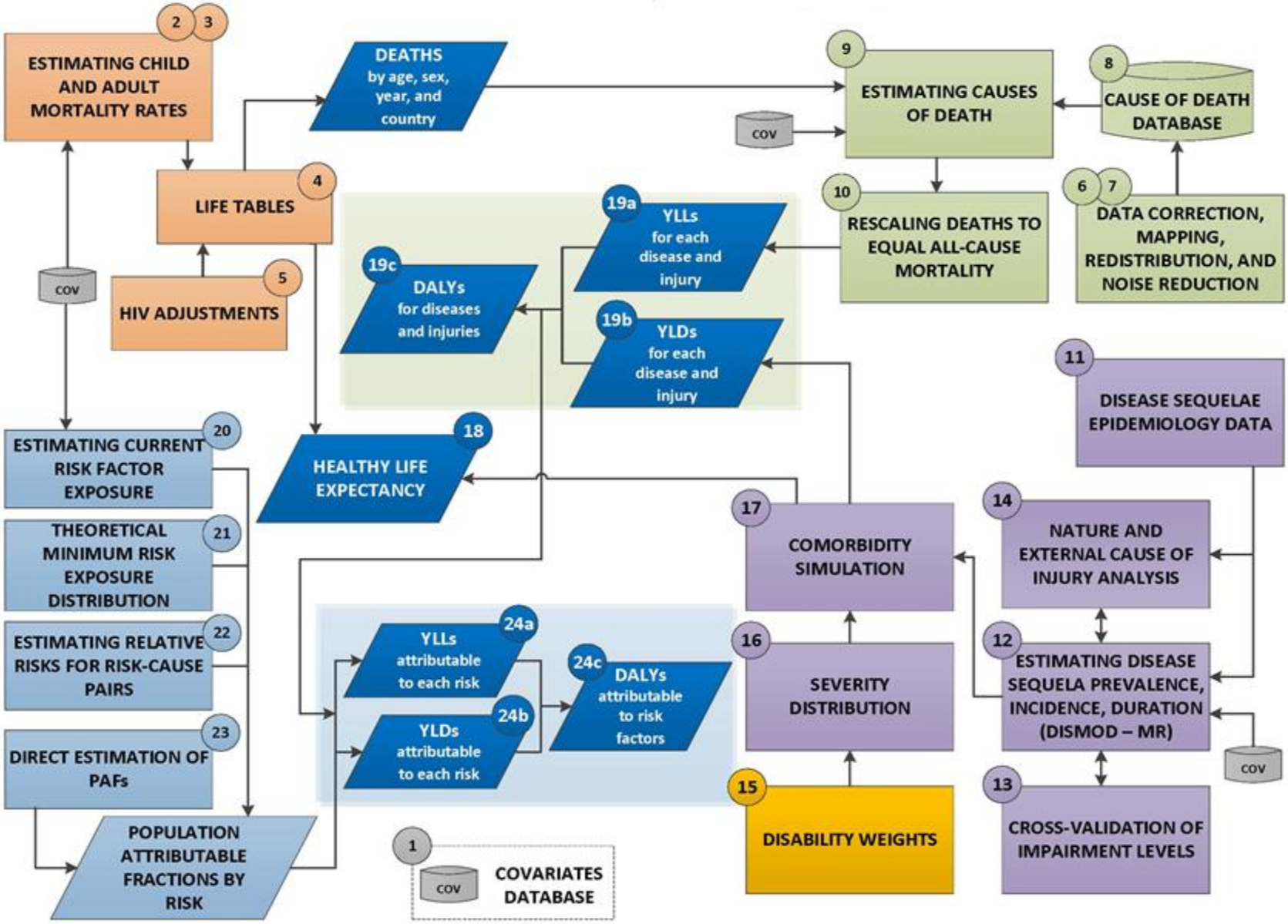
- Launched in Oct 2015 as joint effort of **ICMR, PHFI and IHME**, in collaboration with the **Ministry of Health and Family Welfare**
- Used **scientific methods of the Global Burden of Disease** Study as relevant for the states of India to
  - Produce disaggregated **disease burden trends by age groups, sexes, rural-urban populations** for each state
  - **Identify major data gaps** that could be addressed over time
  - **Build systems and capacity** for producing robust sub-national disease burden estimates on a regular basis
- Over 250 experts from about 100 institutions across India and policy makers were extensively engaged in this work

GBD India Expert Groups

1. GBD India **Cancer** Expert Group
2. GBD India **Cardiovascular Diseases** Expert Group
3. GBD India **Chronic Kidney Disease** Expert Group
4. GBD India **Chronic Respiratory Diseases** Expert Group
5. GBD India **Diabetes** Expert Group
6. GBD India **Mental and Neurological Health** Expert Group
7. GBD India **Musculoskeletal Disorders** Expert Group
8. GBD India **Dietary Risks** Expert Group
9. GBD India **Environmental Risk Factors** Expert Group
10. GBD India **Injuries** Expert Group
11. GBD India **Tobacco Disease Burden** Expert Group
12. GBD India **Maternal and Child Health** Expert Group
13. GBD India **Tuberculosis** Expert Group
14. GBD India **Vector Borne and Neglected Tropical Diseases** Expert Group

Working groups for HIV and for Hepatitis

GBD Data and Model Flow Chart

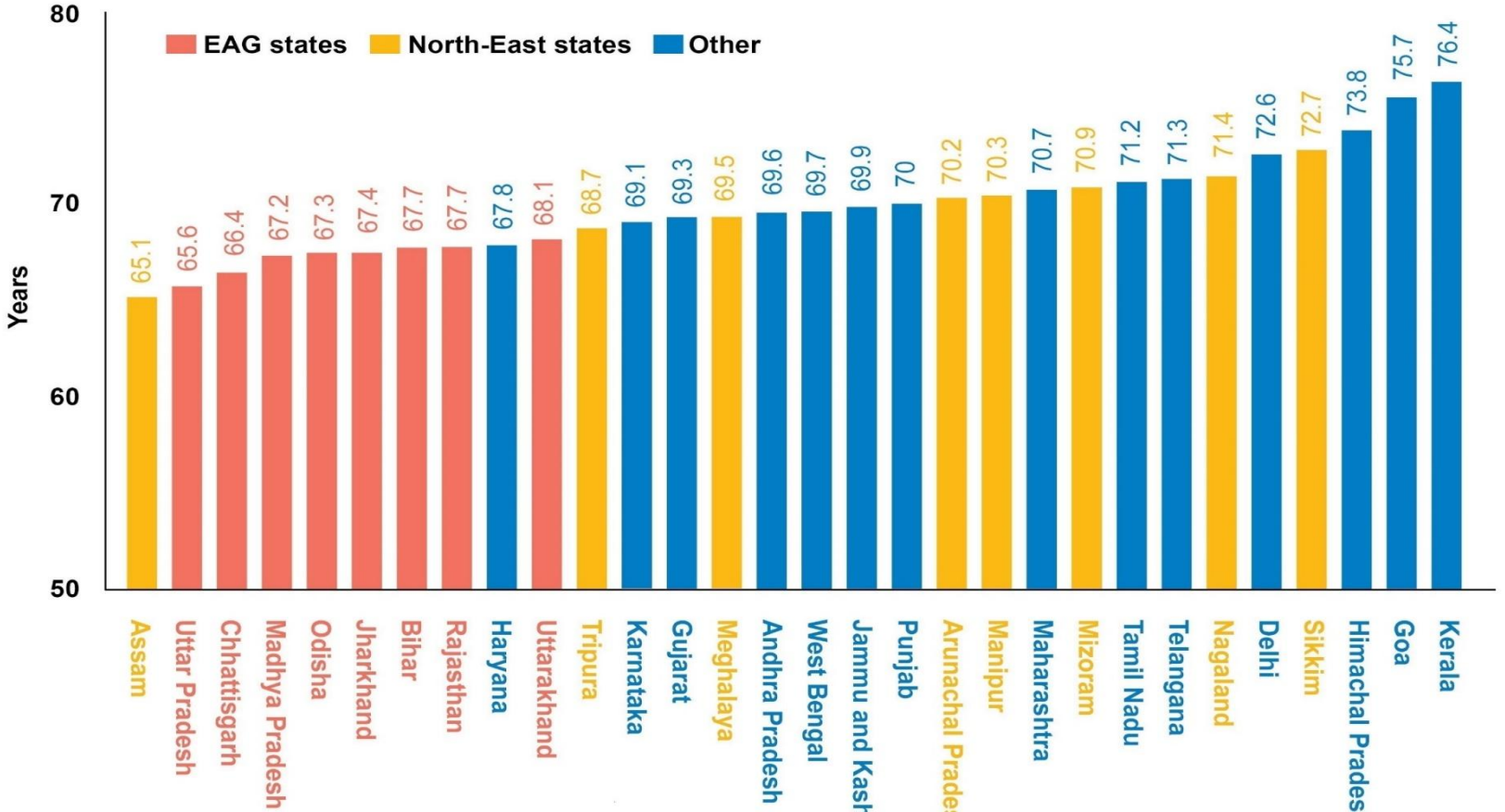


India Major Data Sources: 1990-2016

- Censuses
- Sample registration system
- Vital registration
- Large-scale national surveys (NFHS, DLHS, AHS, NSSO)
- Medically Certified Causes of Death
- Verbal autopsy studies
- Cancer and other disease registries

- Population-level surveys
- Cohort studies
- Systematic reviews of epidemiological studies
- Government programme data on diseases
- Surveillance system data
- Health system data
- Environmental, economic, social and other data

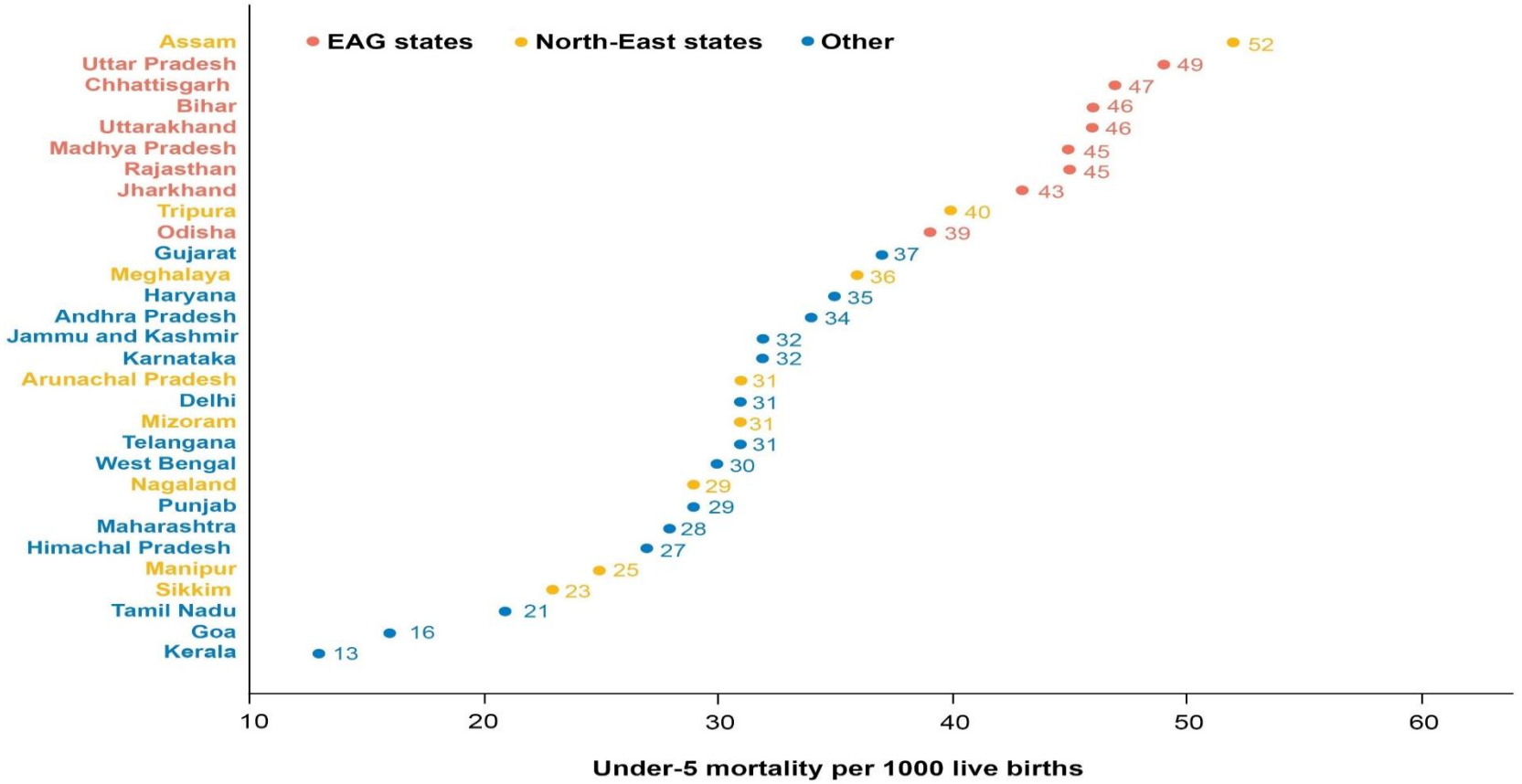
Life Expectancy in the States of India



Life expectancy improved in India by 10 years from 1990 to 2016

Life expectancy in India 11 years lower than in Sri Lanka and China in 2016

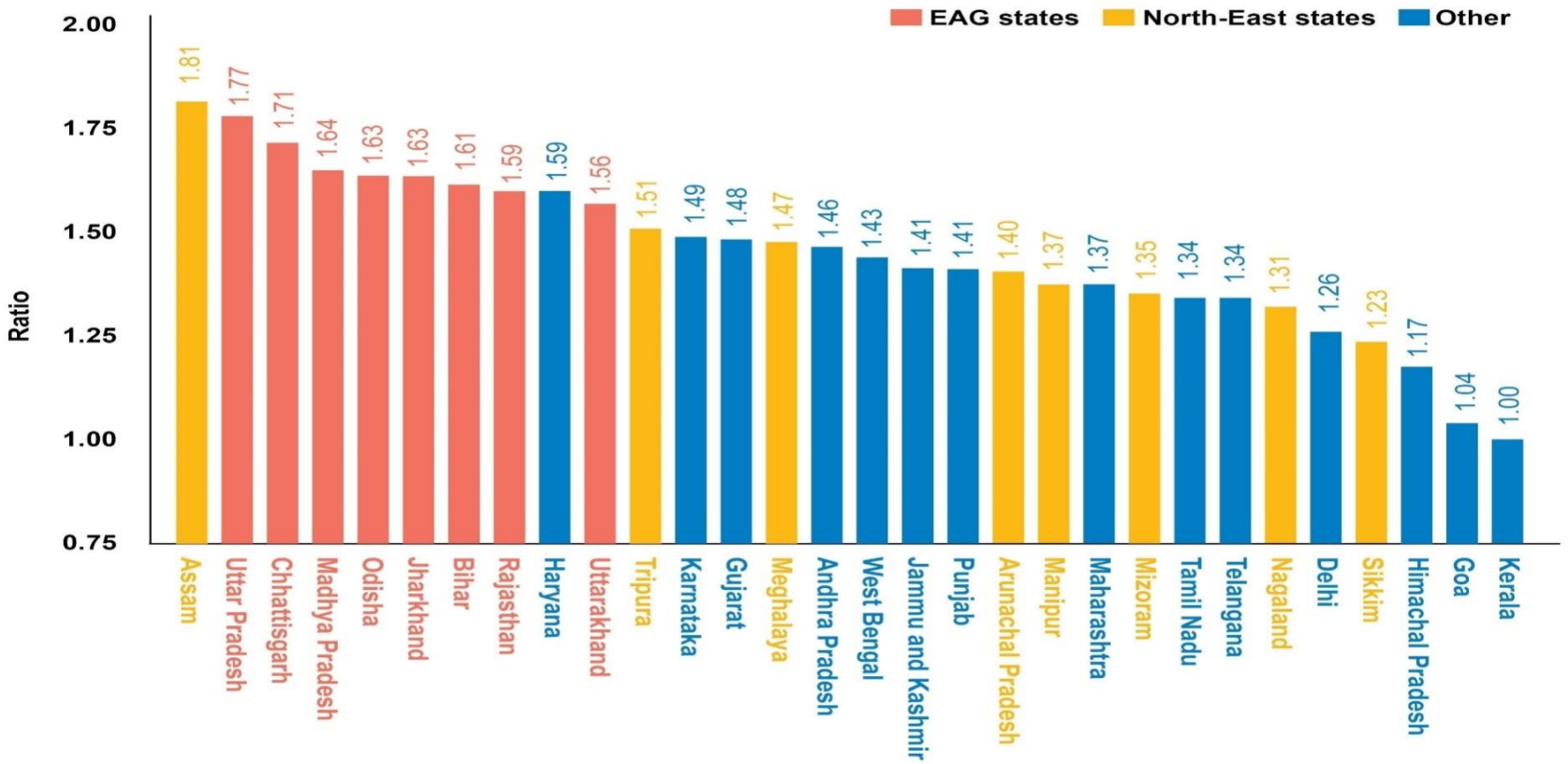
Under-5 Mortality Rate in the States of India



Rate dropped by 65% in India from 1990 to 2016

Under-5 mortality rate in India 6 times higher than in Sri Lanka in 2016

Relative Per Capita Disease Burden in States of India: 2016

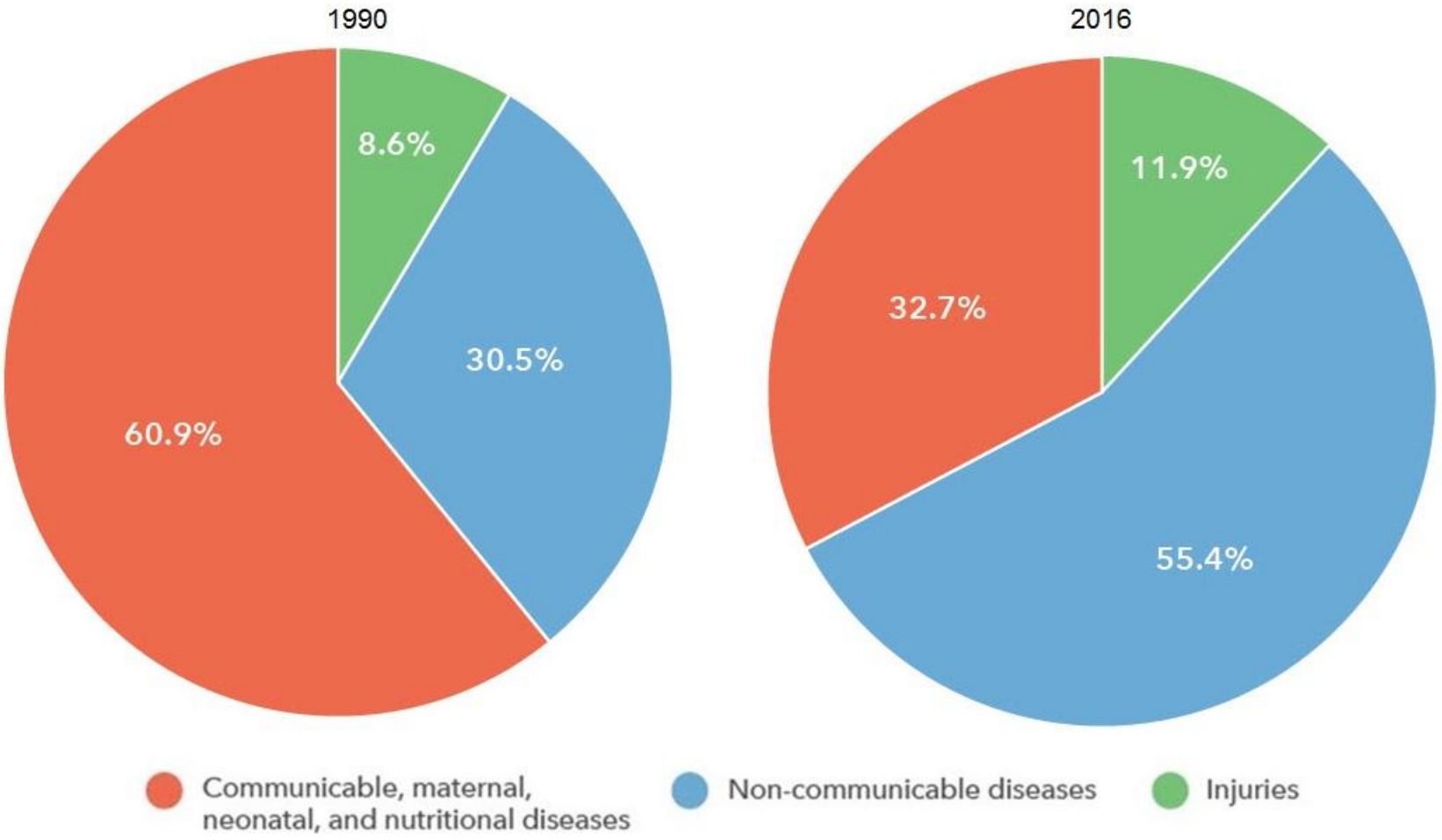


Per capita burden dropped by 36% in India from 1990 to 2016

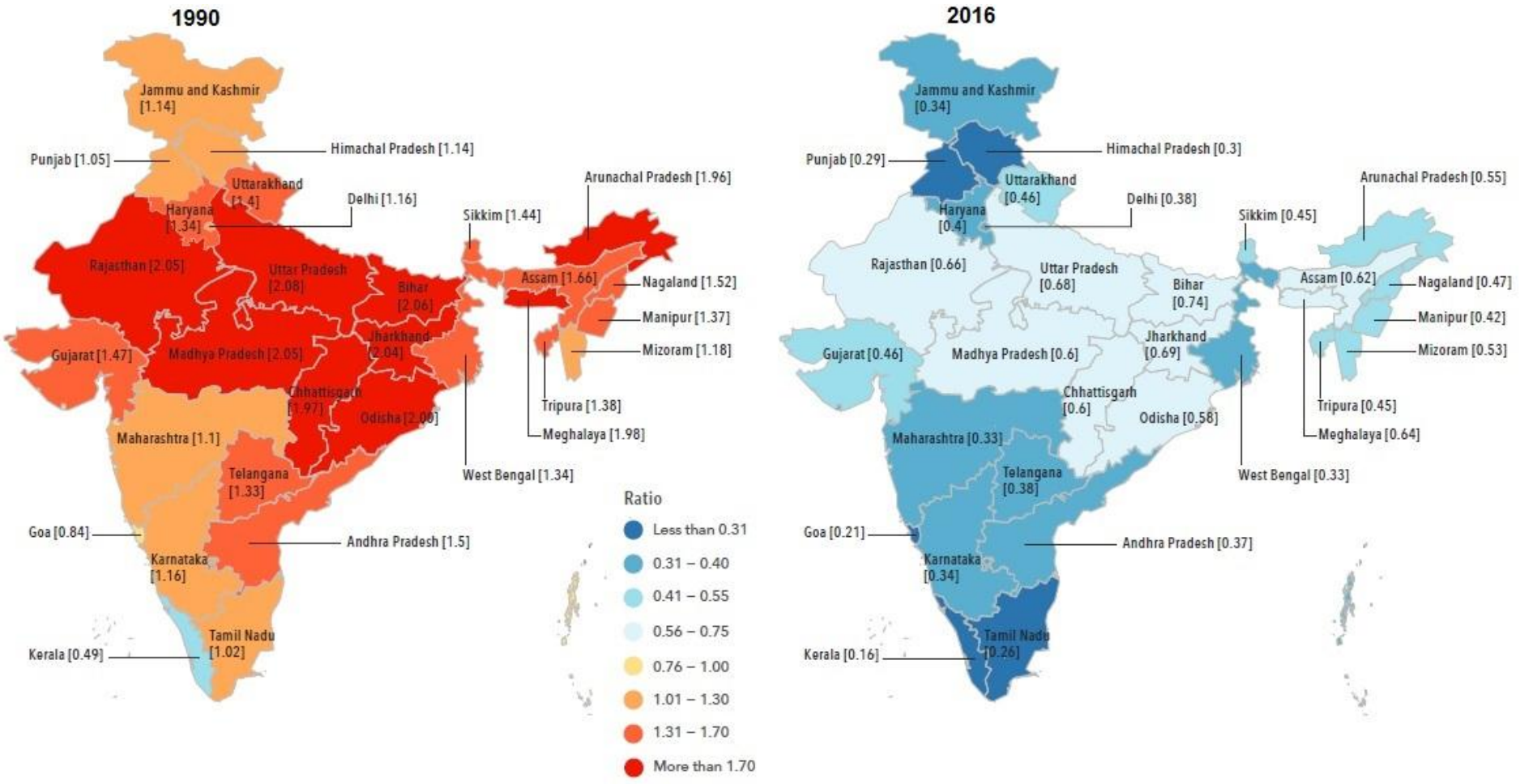
Per capita disease burden 72% higher in India than in China or Sri Lanka in 2016

Shift in Causes of Disease Burden in India

Contribution of major disease groups to disease burden (DALYs)

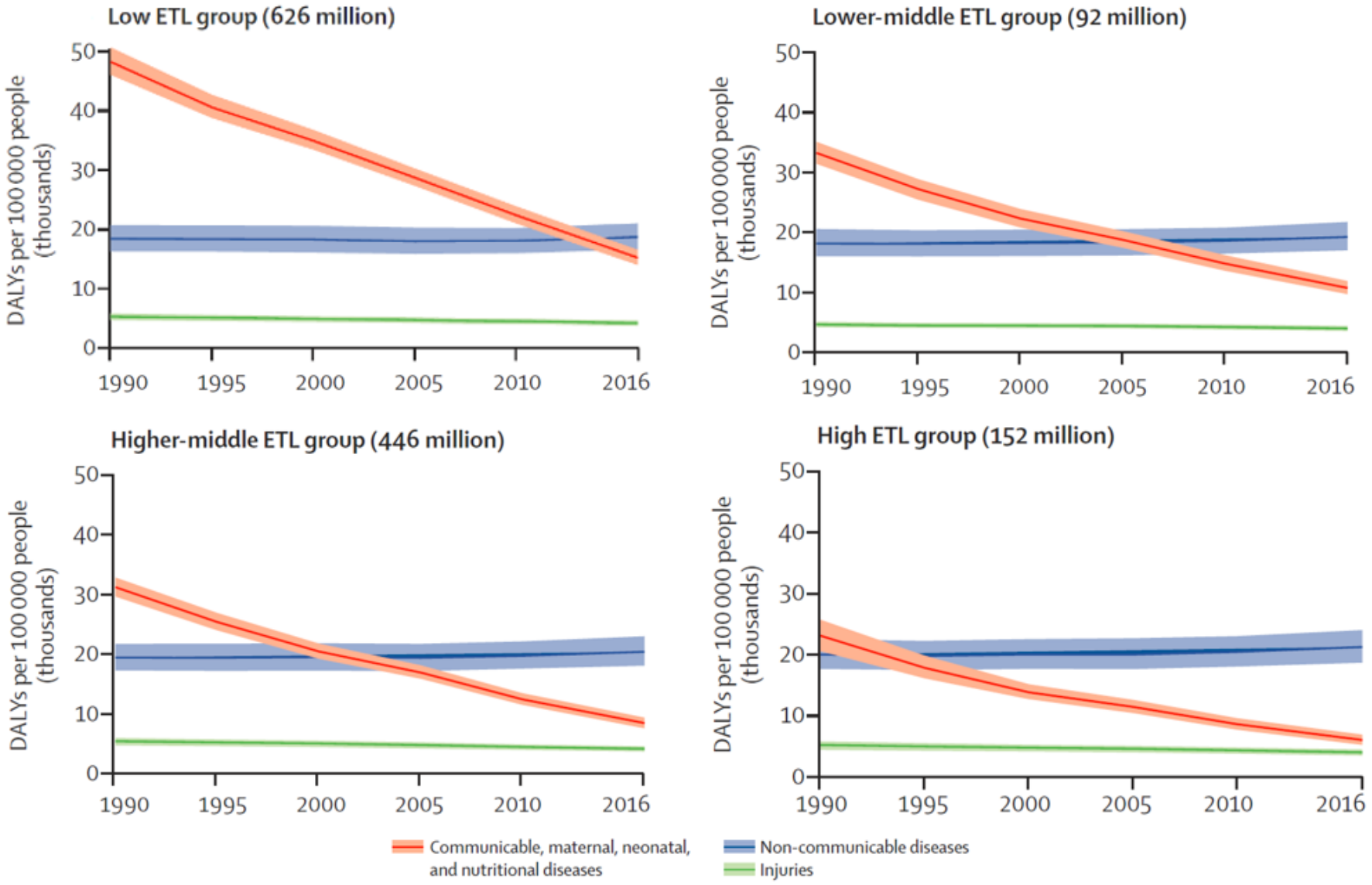


Epidemiological Transition Across the States of India



Infectious and related diseases decreased to cause less than half of the disease burden in some states 30 years ago and in others only in the past few years

Burden of Major Disease Groups in States of India Grouped by Epidemiological Transition Level

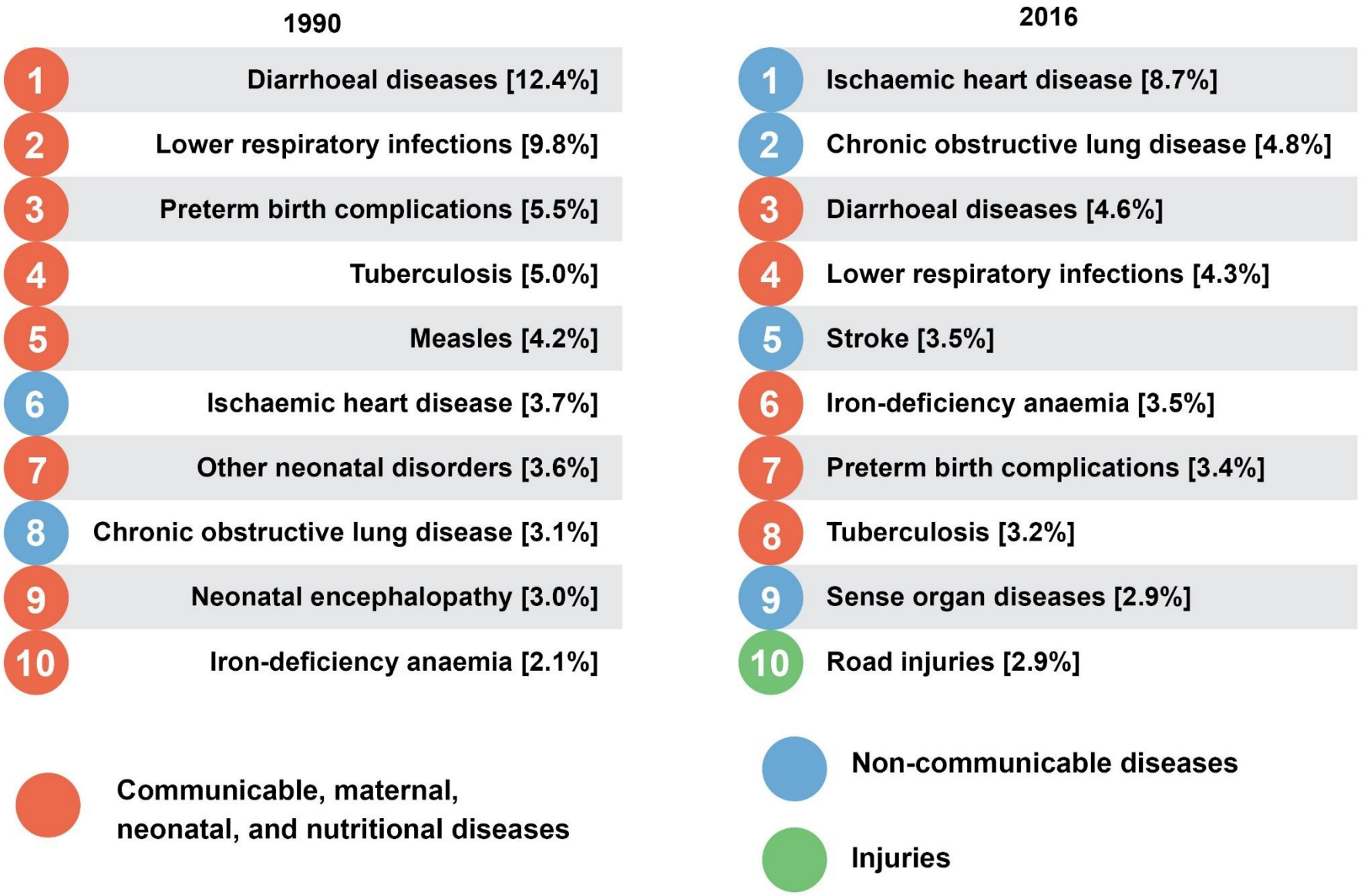


Major NCD and Injury Categories in India: 2016

Percent of total disease burden (DALYs)

Non-communicable diseases	**55.4**
Cardiovascular diseases	14.1
Chronic respiratory diseases	6.4
Mental and substance use disorders	5.6
Diabetes, kidney diseases, and related	5.6
Cancers	5.0
Musculoskeletal disorders	4.6
Neurological disorders	3.6
Other	10.5
Injuries	**11.9**
Unintentional injuries	5.4
Transport injuries	3.3
Suicides and interpersonal violence	3.1

Leading Individual Causes of Disease Burden in India



Leading Individual Causes of Disease Burden in State Groups

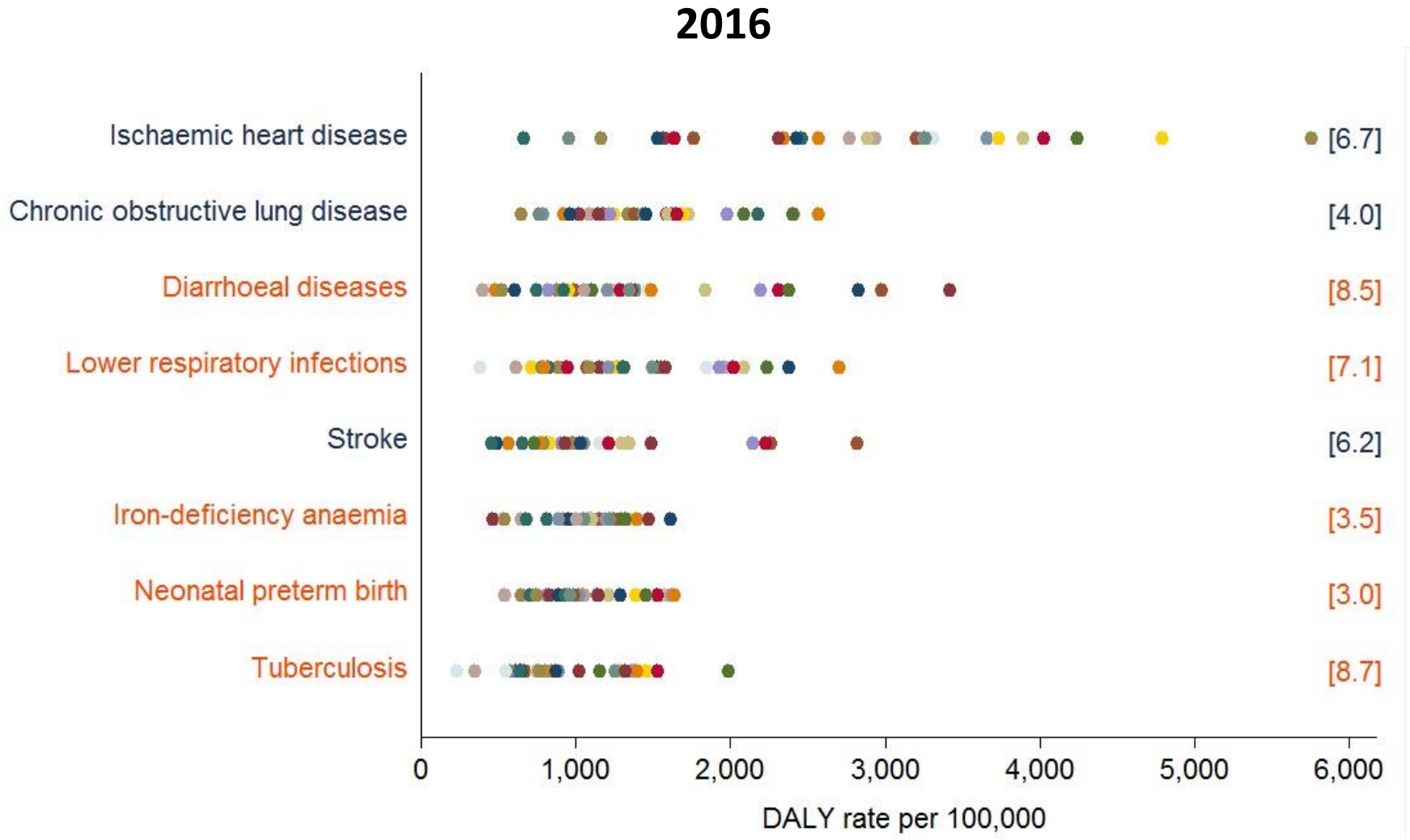
	EAG states	North-East states	Other states
1	Ischaemic heart disese [6.3%]	Diarrhoeal diseases [5.3%]	Ischaemic heart disease [11.5%]
2	Diarrhoeal diseases [6.2%]	Stroke [5.3%]	Chronic obstructive lung dis [4.6%]
3	Lower respiratory infections [5.8%]	Lower respiratory infections [5.0%]	Stroke [4.1%]
4	Chronic obstructive lung dis [5.0%]	Ischaemic heart disease [4.3%]	Iron-deficiency anaemia [3.4%]
5	Tuberculosis [3.9%]	Chronic obstructive lung dis [4.0%]	Sense organ diseases [3.3%]
6	Neonatal preterm birth [3.7%]	Neonatal preterm birth [3.7%]	Suicide [3.2%]
7	Iron-deficiency anaemia [3.6%]	Tuberculosis [3.5%]	Road injuries [3.0%]
8	Other neonatal [2.9%]	Iron-deficiency anaemia [3.5%]	Neonatal preterm birth [3.0%]
9	Stroke [2.8%]	Sense organ diseases [2.5%]	Diarrhoeal diseases [3.0%]
10	Road injuries [2.7%]	Road injuries [2.4%]	Diabetes [2.8%]

Communicable, maternal, neonatal, and nutritional diseases

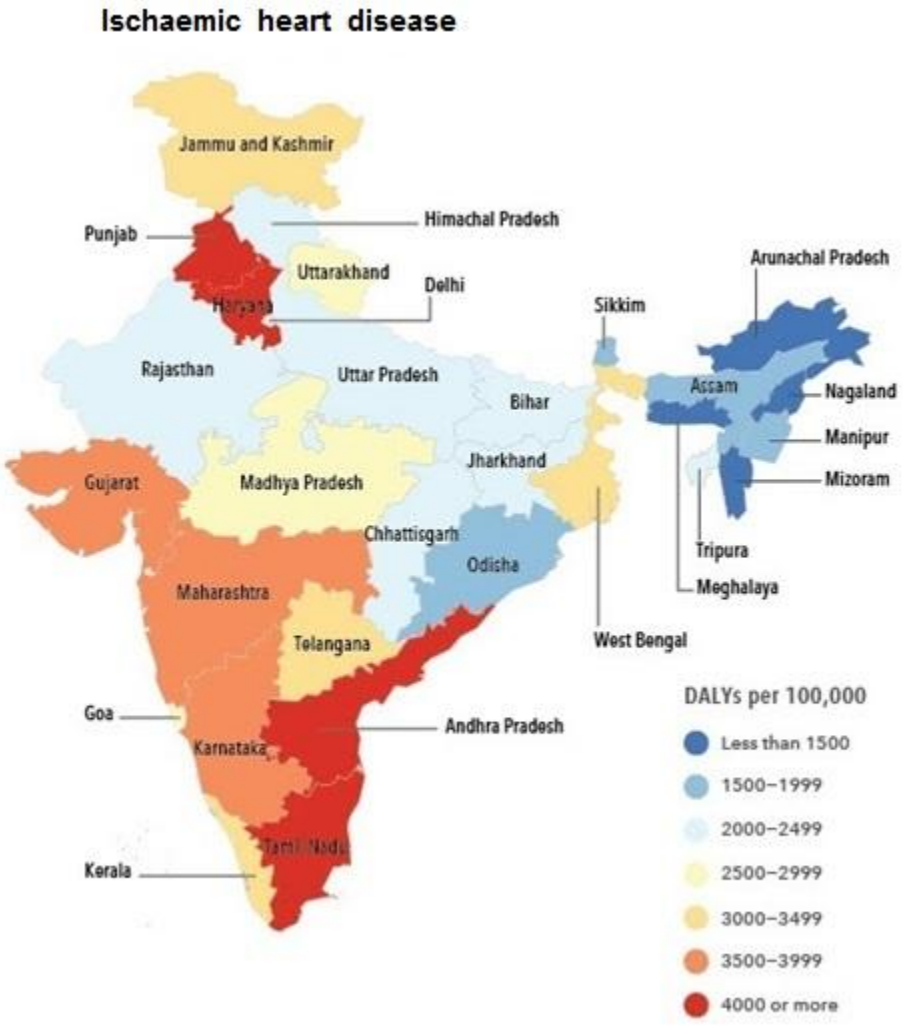
Non-communicable diseases

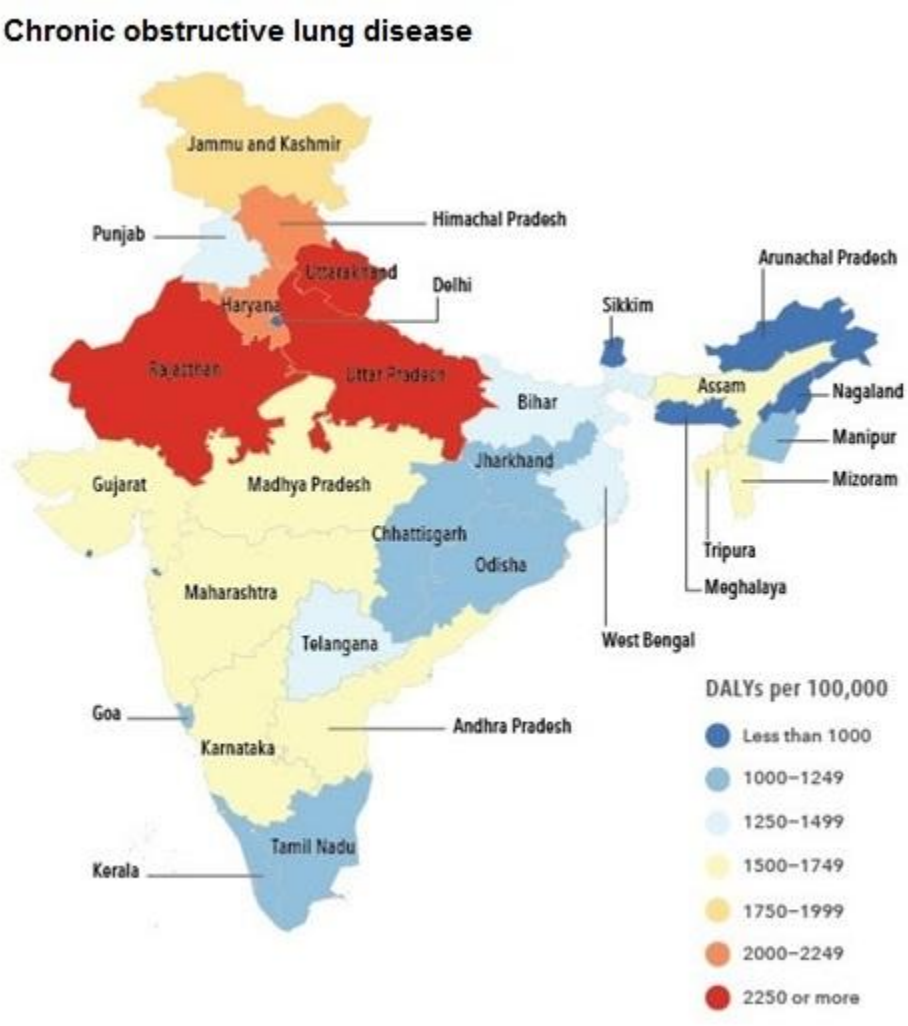
Injuries

Wide Variations in Disease Burden Rates Across States

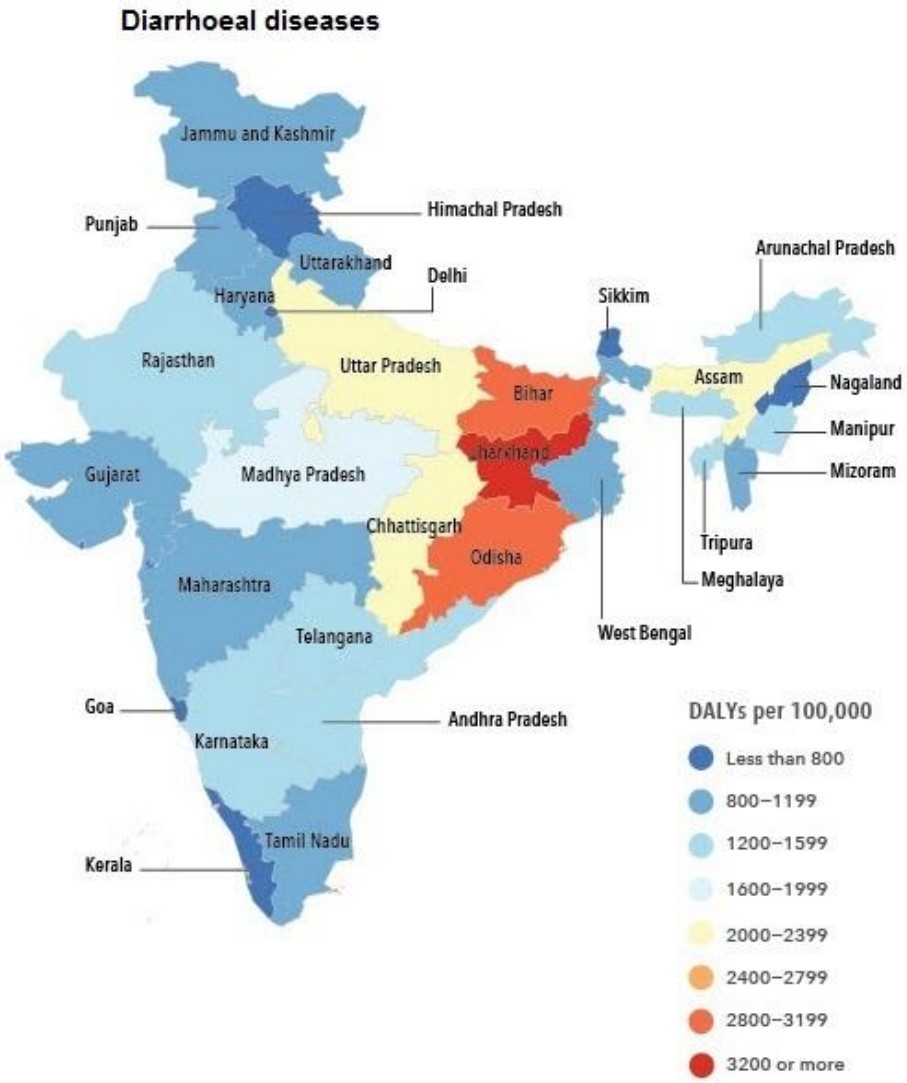


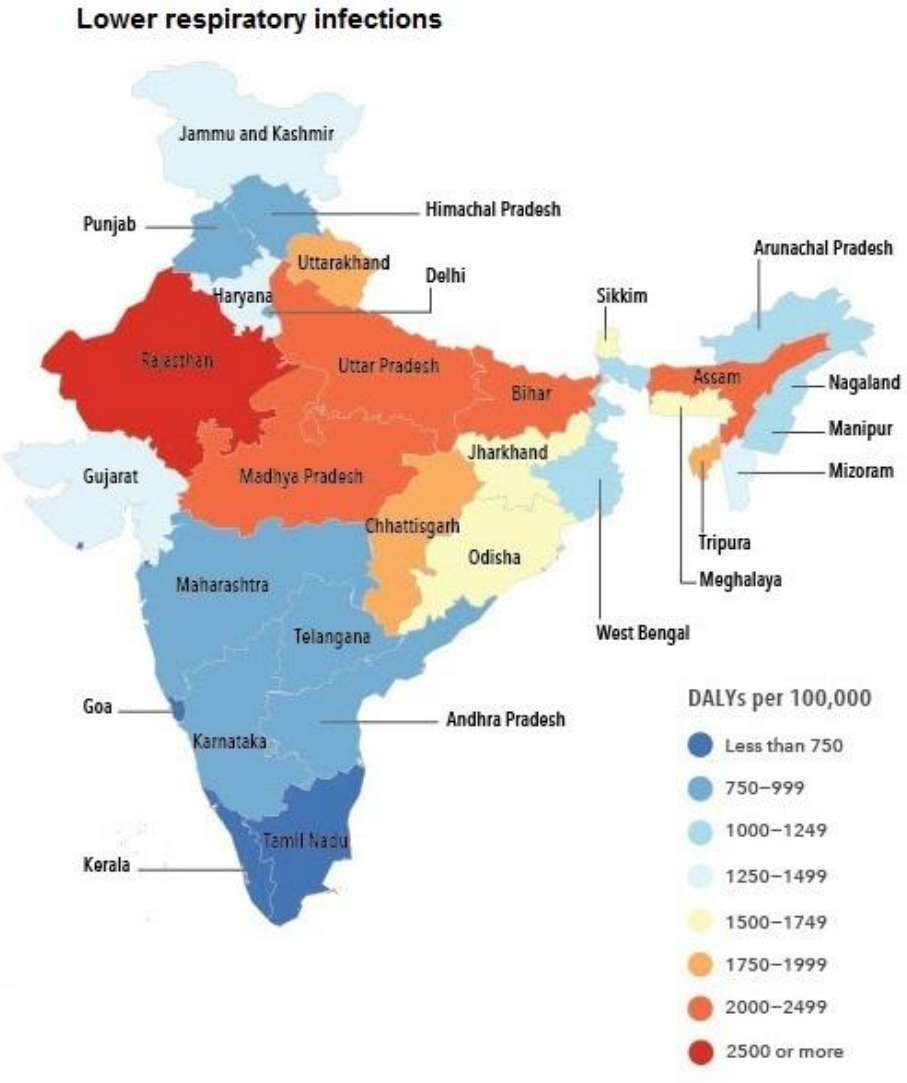
State-level Burden Rates of Leading NCDs: 2016





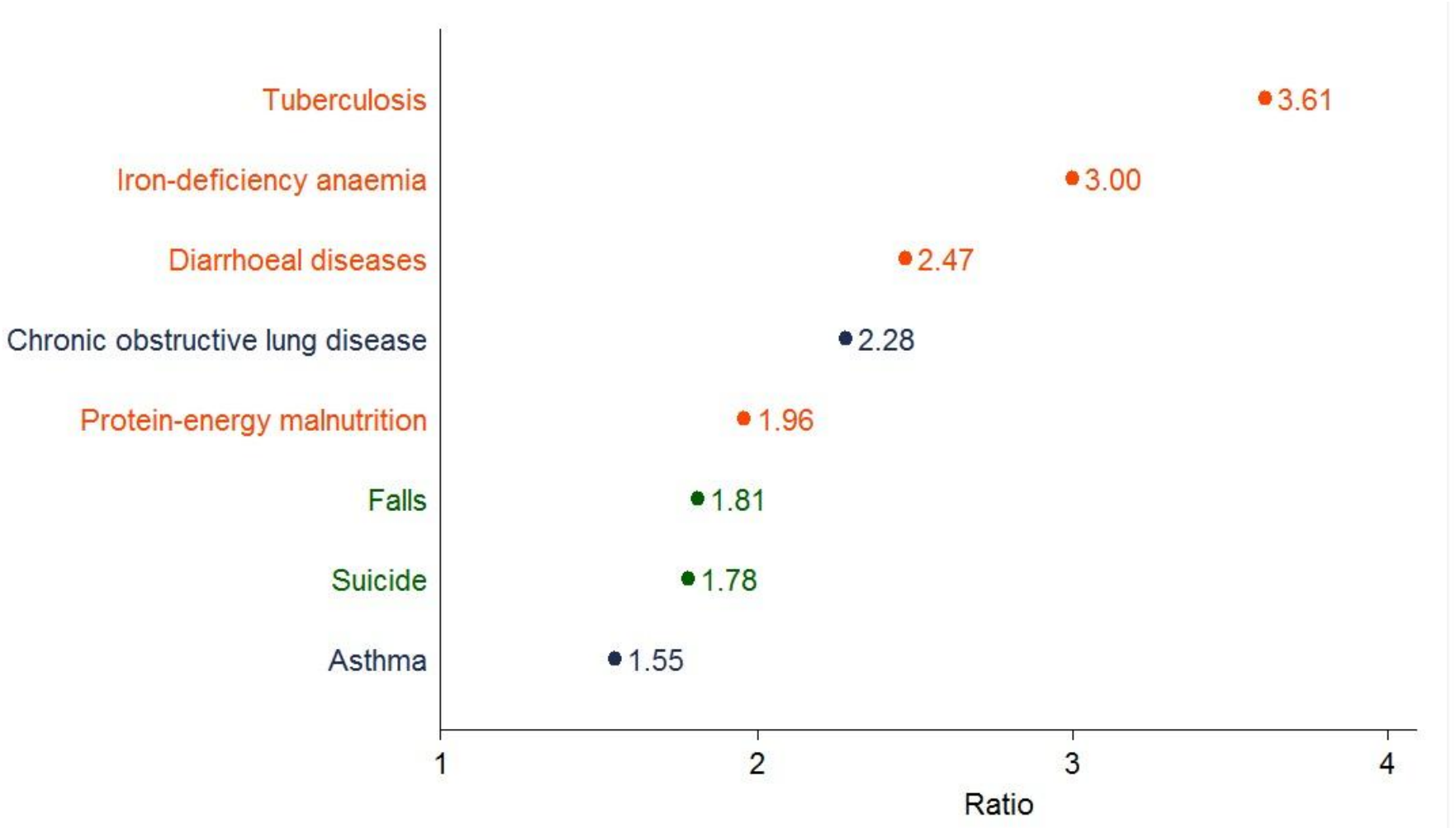
State-level Burden Rates of Leading Infectious Diseases: 2016





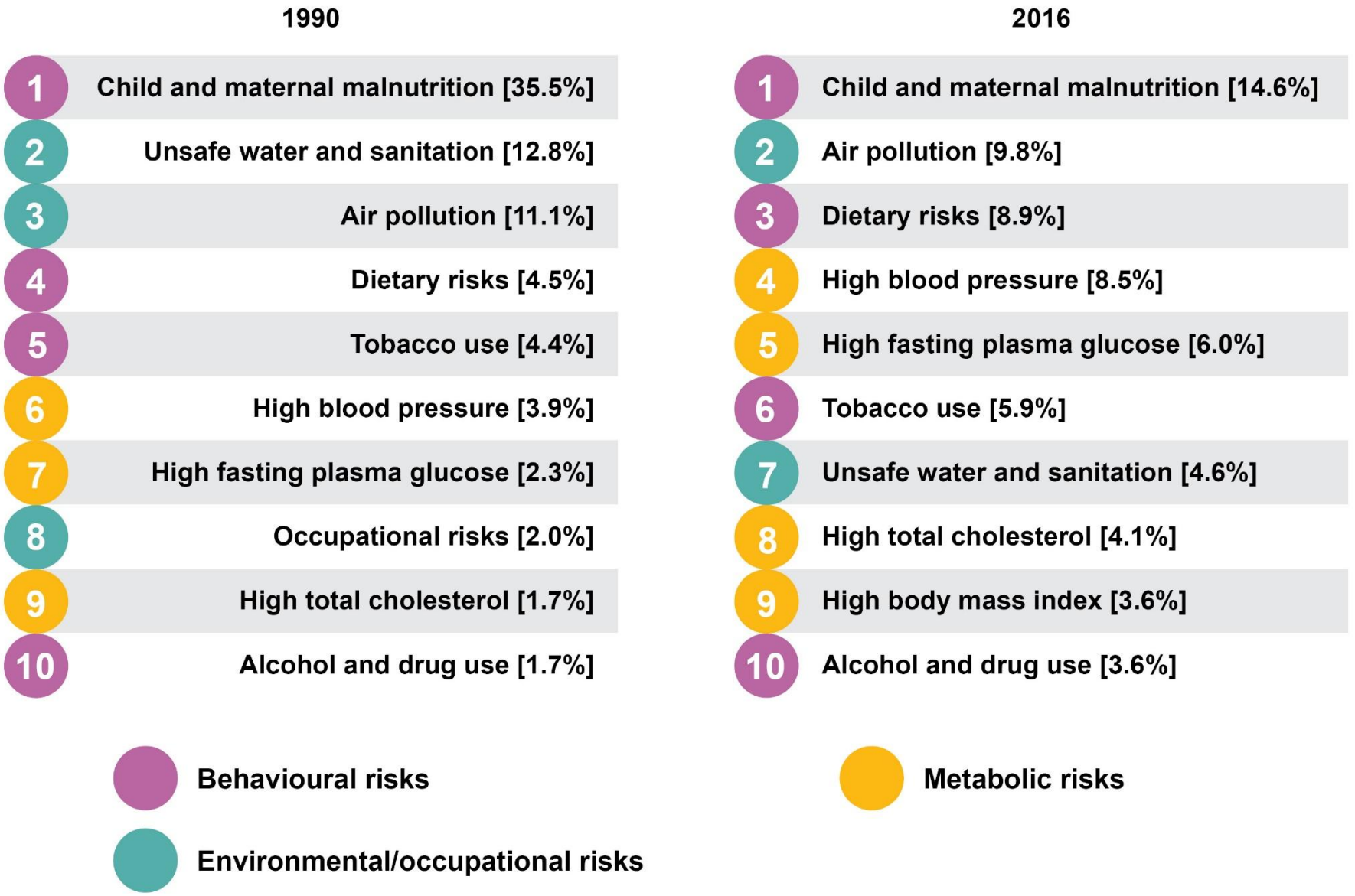
Ratio of Observed vs Expected Disease Burden Rates

India 2016

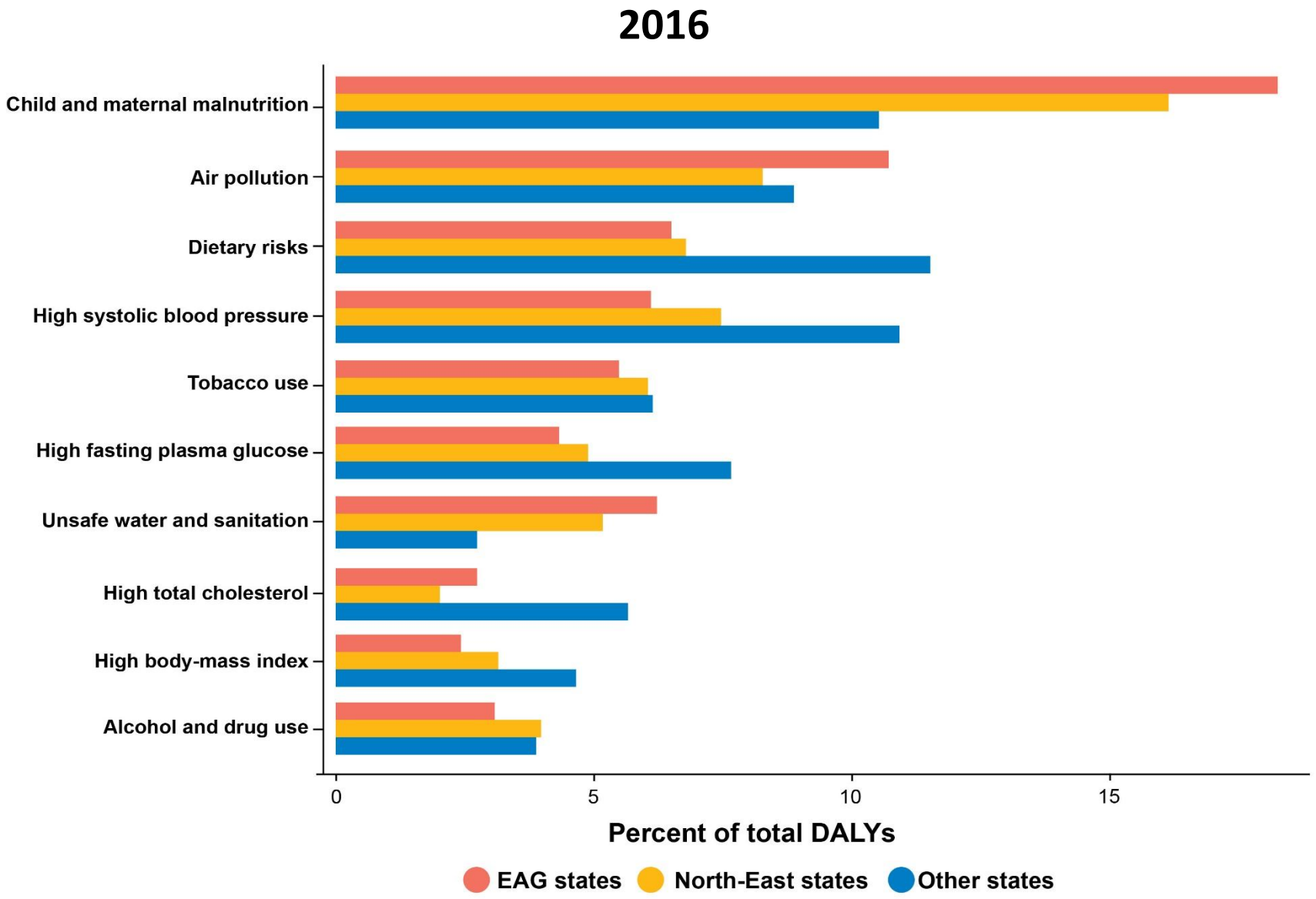


Compared with other countries at similar level of socio-demographic development

Risk Factors Contributing to Disease Burden in India

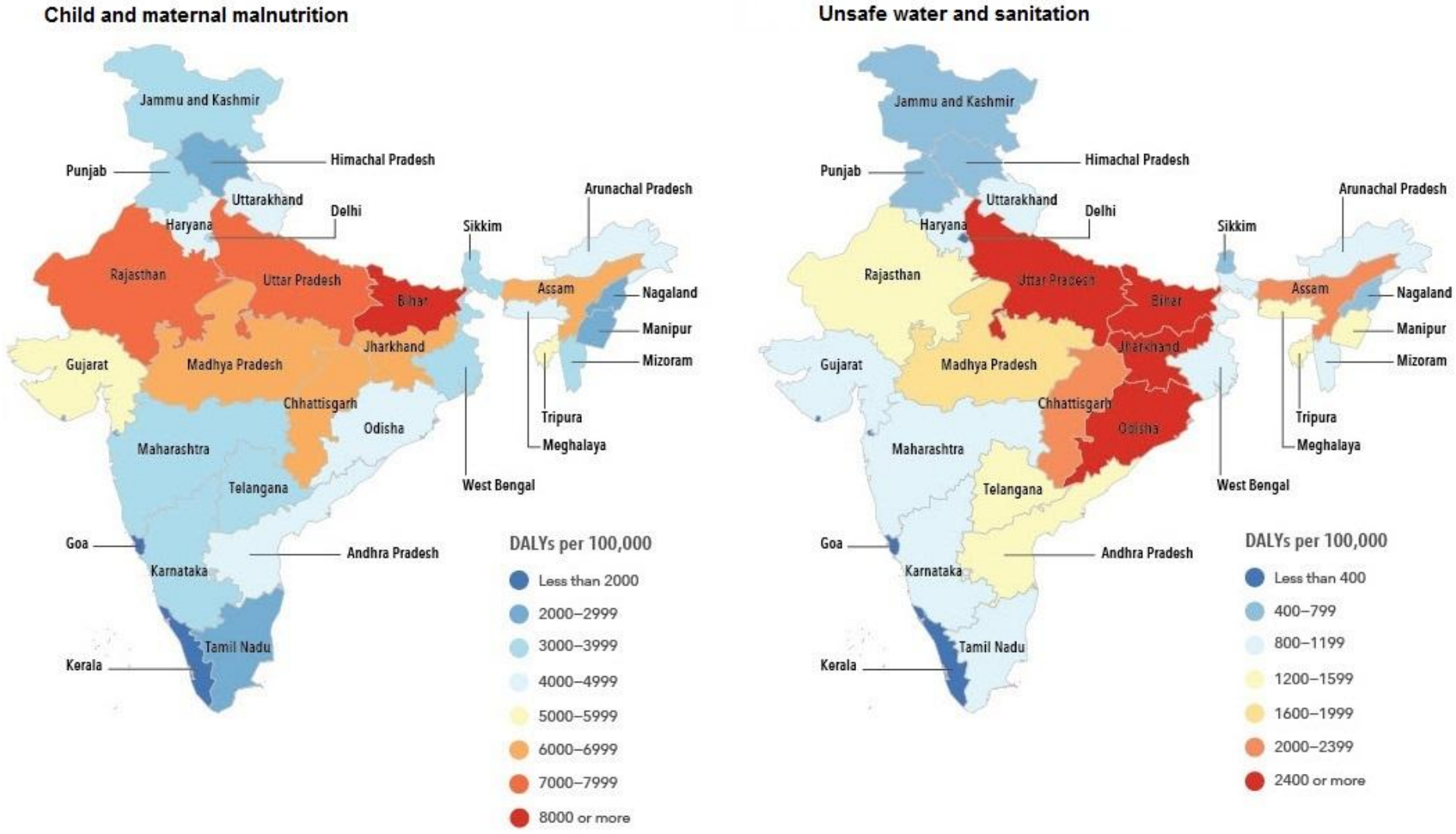


Risk Factors Contributing to Disease Burden in State Groups



State-level Burden Rates from Leading Risk Factors

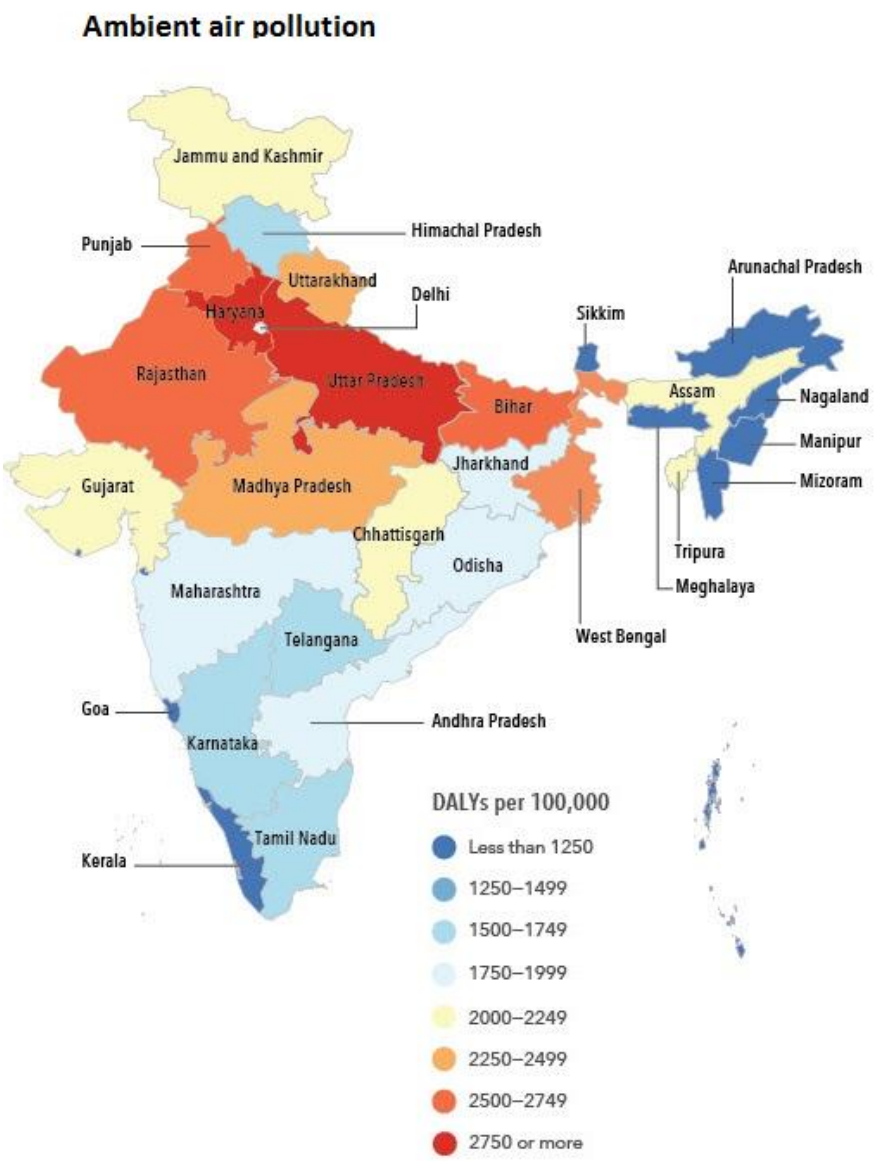
For infectious and related diseases, 2016

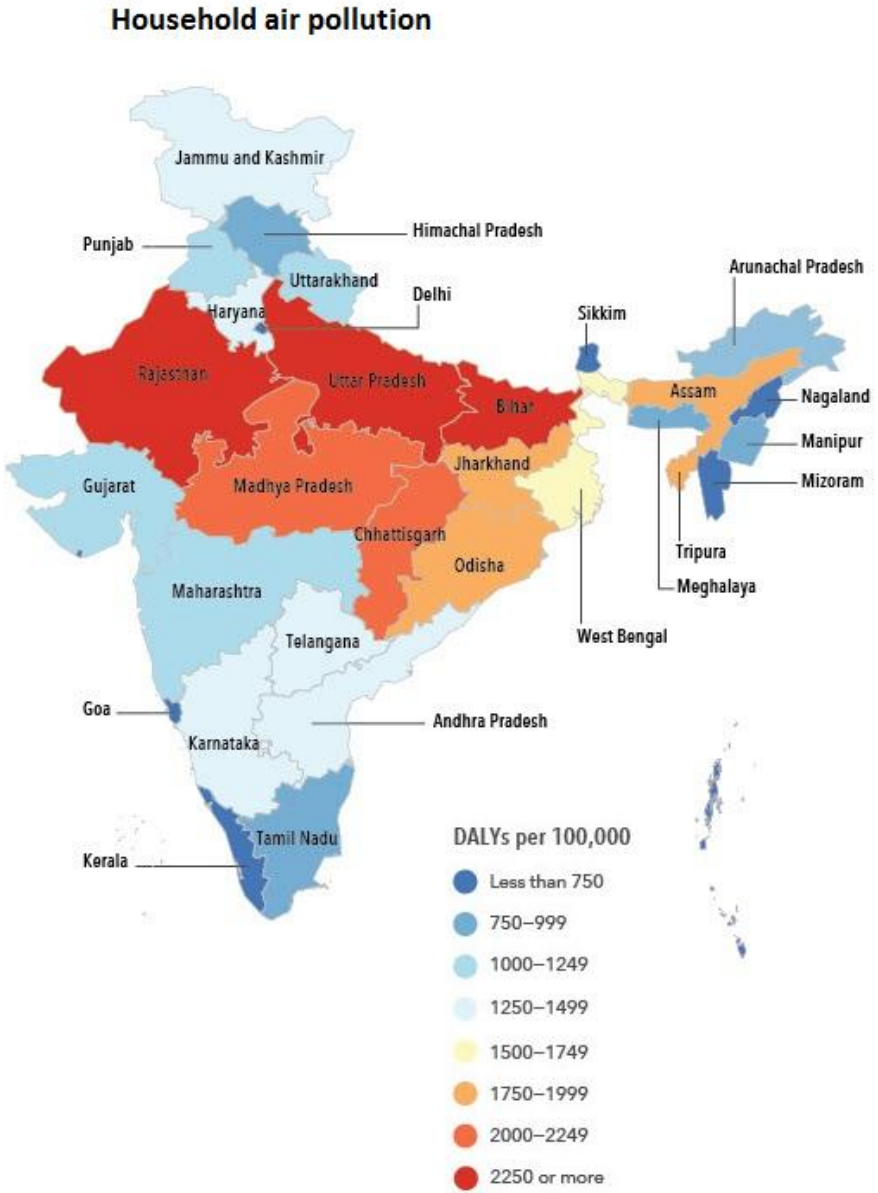


Burden rate from malnutrition 12 times higher and
from unsafe water and sanitation 40 times higher in India than in China

State-level Burden Rates from Leading Risk Factors

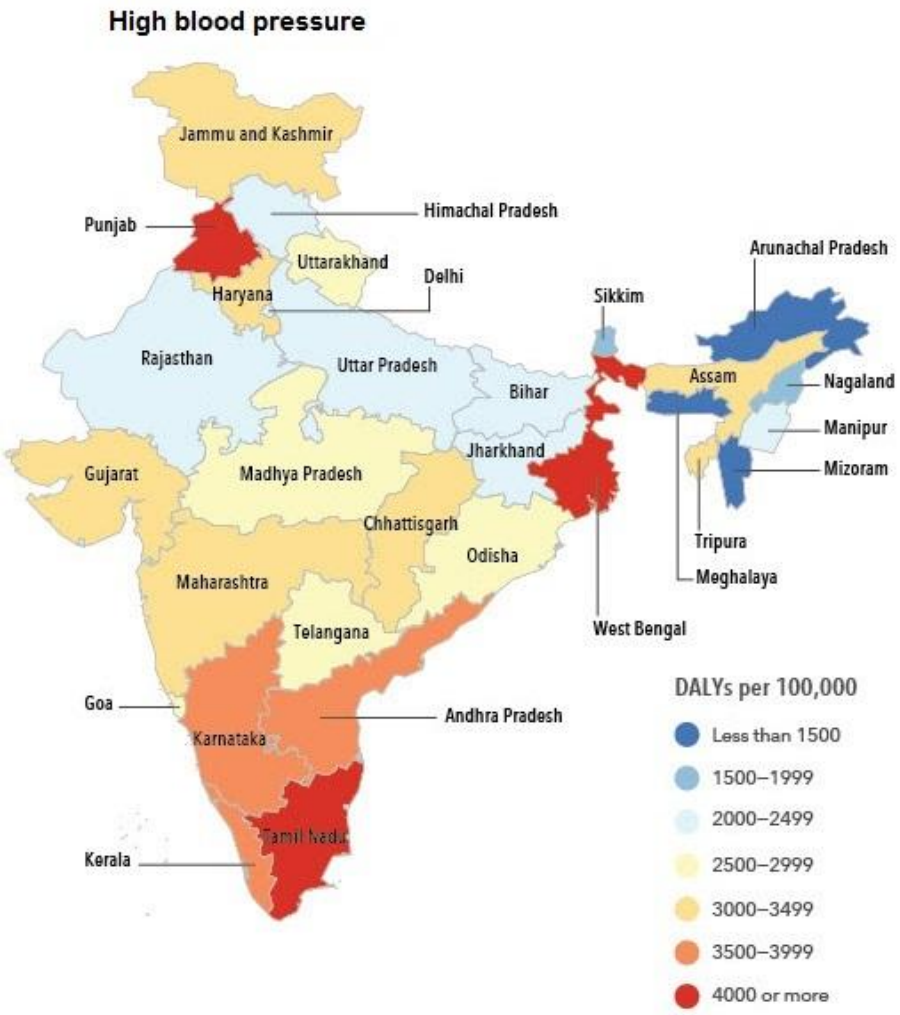
Air pollution, 2016

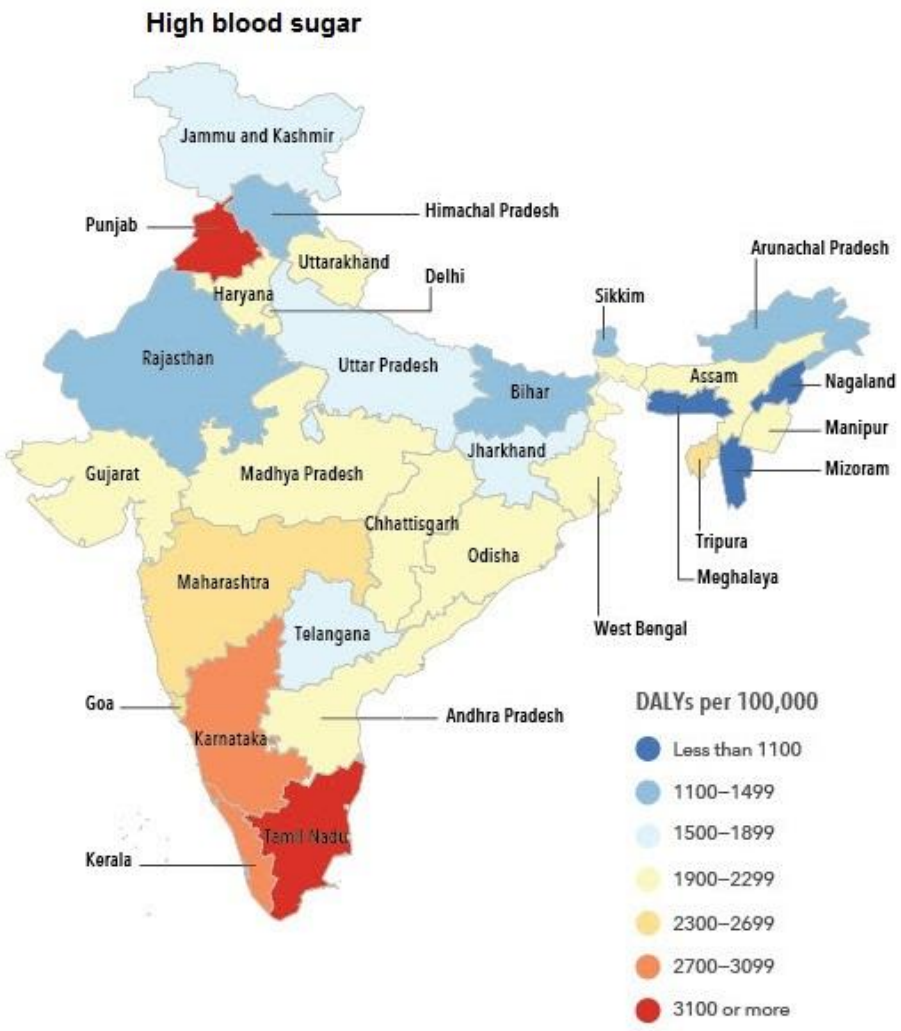




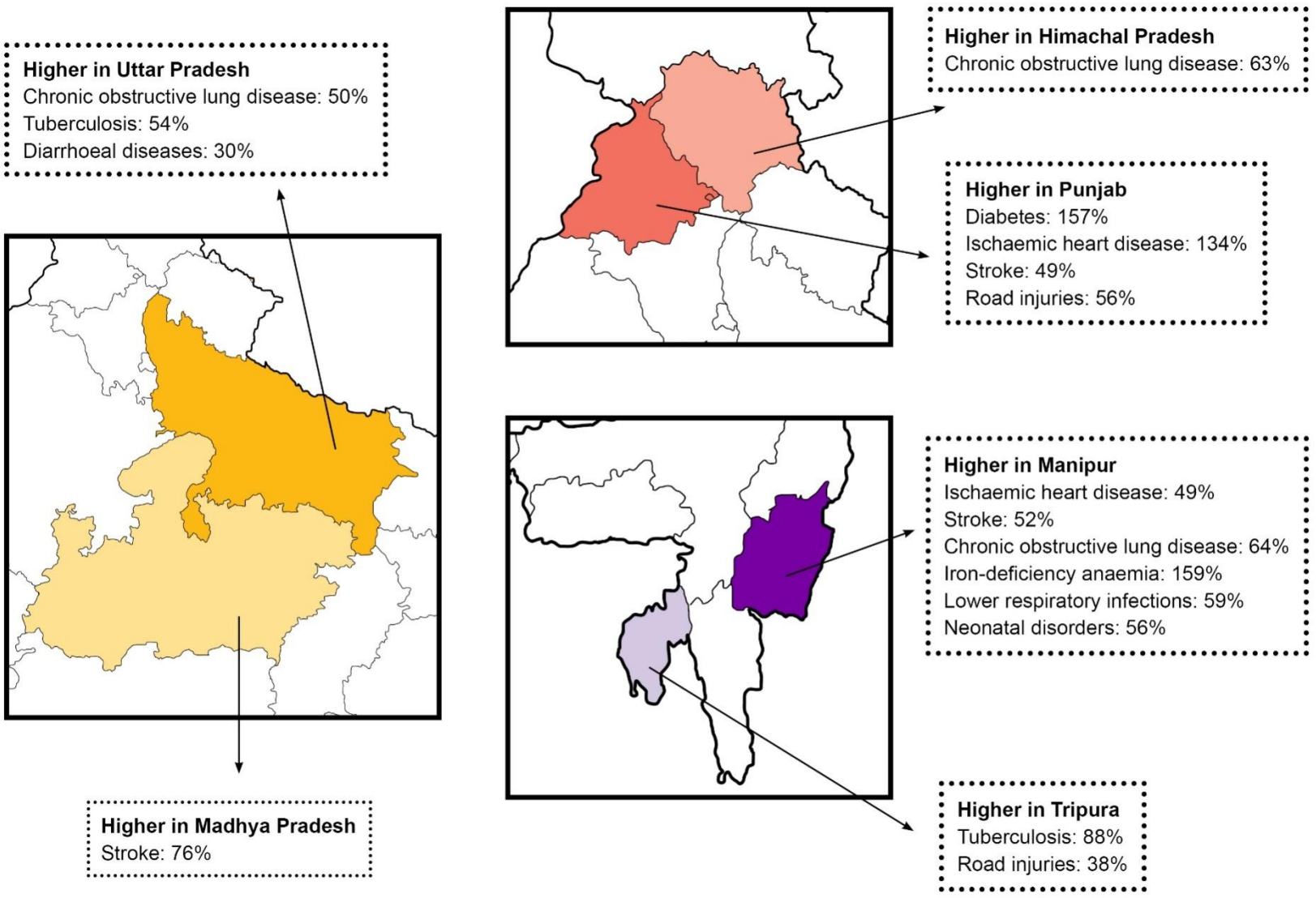
State-level Burden Rates from Leading Risk Factors

For cardiovascular disease and diabetes, 2016





Disease Burden Differences Between Neighboring States: 2016



Disease burden and risk factors profile of each state included in the report

Trends of communicable diseases in India

Diseases Showing Increasing Trends	*Diseases Showing Decreasing Trends*
Dengue, Chikungunya	Poliomyelitis
HIV-TB Co-infections	Tuberculosis
Cholera O139	Neonatal tetanus
Japanese Encephalitis	Measles
Leptospirosis	HIV/ AIDS
Novel H1N1 Infections	
Eradicated : Smallpox , Guinea worm	
Eliminated: Yaws, Leprosy	

Annual Report to the People on Health, Govt. of India, 2010

GBD Initiative: Aligning lessons learned to improve primary health care

- Strengthening national programs
  - Diagnosis and management of NCDs
  - Focusing on elimination on certain communicable diseases
  - Build a strong component of program evaluation as never before

GBD Initiative: Aligning lessons learned to improve primary health care

- Strengthening health systems
  - Improved surveillance at the community level [going up to risk factors]
  - Monitor and track trends
  - Focus on top 10 causes of morbidity and mortality
  - Explore the reasons for wide differences in GBD in neighbouring states

GBD Initiative: Aligning lessons learned to improve primary health care

- Advancing evidence to policy translation
  - Regional/ state level policies for prevention and control of diseases
  - Start planning for areas not focused so far: mental health, injuries, CRD, CKD
  - Develop policies to target control of risk factors at the community level
  - Special policies and programs for people at the age extremes

Anticipated Activities in Next Phase

- **Annual** production of **state-level disease burden estimates**, improving with increasing availability of data
- Application of findings to **inform policy**:
  - Plan state health budgets
  - Prioritize interventions relevant to each state
  - Monitor health-related SDG targets in each state
  - Assess impact of large-scale interventions
  - Forecast population health under various scenarios in each state
- Contribute to the development of a **more robust health information system** in India
- **Capacity building** in India to generate and analyse large-scale health data using strong methods

Project conceptualization, data collection, analysis and report:

India GBD Team: Institute for Health Metrics and Evaluation, Public Health Foundation of India and Indian Council of Medical Research

Slide courtesy:

Lalit Dandona, On Behalf of the GBD Consortium

MANY THANKS FOR YOUR ATTENTION !