

Trends in Nutrition Outcomes, Determinants, and Interventions in India (2006–2016)

Report

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ABOUT POSHAN

POSHAN (Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India) is a multi-year initiative that aims to build evidence on effective actions for nutrition and support the use of evidence in decision-making. It is supported by the Bill & Melinda Gates Foundation and led by IFPRI in India.

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ACRONYMS AND ABBREVIATIONS

AARR	average annual rate of reduction
ANC	antenatal care
ASHA	Accredited Social Health Activists
AWC	Anganwadi Centers
AWW	Anganwadi Workers
ARI	acute respiratory infection
BMI	body mass index
EBF	exclusive breastfeeding
EIBF	early initiation of breastfeeding
IFA	iron–folic acid
ICDS	Integrated Child Development Services
IYCF	infant and young child feeding
JSY	Janani Suraksha Yojana
LBW	low birthweight
MoHFW	Ministry of Health and Family Welfare
NHM	National Health Mission
NFHS	National Family Health Survey
ORS	oral rehydration solution
POSHAN	Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
RMNCH+A	Reproductive, Maternal, Newborn, Child and Adolescent Health
RSoC	Rapid Survey on Children
SDG	Sustainable Development Goals
SNP	supplementary nutrition program
WHA	World Health Assembly
WHO	World Health Organization

EXECUTIVE SUMMARY

Background and objectives

Nutrition is central to the Sustainable Development Goals (SDGs) of the 2030 Agenda, and at least 12 of the 17 SDGs include indicators relevant for nutrition. In addition, the World Health Assembly unanimously endorsed 6 ambitious maternal, infant, and young child nutrition targets¹ and several noncommunicable disease-related targets to be achieved by 2025. These global targets are intended to set the course for country-specific nutrition-focused policies and programmatic actions to address malnutrition and set a better course for human and economic development for all.

India contributes a third of the global burden of undernutrition and has an emerging burden of noncommunicable diseases. Given India's population size, investing in actions to reduce all forms of malnutrition is especially important, not just for India itself, but also to support the attainment of global targets.

Data-driven analyses are invaluable in helping to identify actions for accelerating progress toward a malnutrition-free India. Assessing India's progress on nutrition and its determinants has been challenged by limited data availability because the last National Family Health Survey-3 (NFHS-3) was completed in 2006. However, in 2017, after a long hiatus, new summary data from the National Family Health Survey-4 (NFHS-4) are now available to support a data-driven analysis of India's progress, of lingering challenges, and of factors that need to be addressed to accelerate progress. This is, therefore, an opportune time to examine India's status and progress on the global nutrition targets, on the determinants of nutrition outcomes, and on the scale and reach of interventions that have been put in place in India over the last decade.

This report aims to provide a general overview of national trends and of state-level variability in nutrition outcomes, determinants, and intervention coverage, thus helping to identify areas of progress and areas where more investment is critical to accelerate progress. Using data available at the time of analysis and writing, the goal of this report is to bring together data to support policy decisions for nutrition at the national level and across multiple states. This report is accompanied by a series of state-focused *Policy Notes*.²

¹ World Health Assembly targets: 1. 40% reduction in the number of children under 5 who are stunted; 2. 50% reduction in anemia among women of reproductive age; 3. 30% reduction in low birthweight; 4. No increase in childhood overweight; 5. Increase the rate of breastfeeding in the first 6 months to at least up to 50%; and 6. Reduce and maintain childhood wasting at less than 5%.

² POSHAN *Policy Notes* are available at www.poshan.ifpri.info

Methods

We used summary data from the recently released National Family Health Survey-4 (NFHS-4, 2015–2016) factsheets and data from the NFHS-3 (2005–2006) to compare national-level trends in outcomes, determinants, and interventions over the last decade. We also used information from factsheets of the Rapid Survey on Children (RSOC 2013–2014) for indicators that are not currently available in NFHS-4 factsheets.

We identified a list of immediate and underlying determinants of nutrition using UNICEF’s conceptual framework for nutrition. We also reviewed Indian policies on maternal and child health as well as the two national programs—the National Health Mission (NHM) and the Integrated Child Development Services (ICDS)—to compile a comprehensive list of interventions and platforms used to deliver nutrition-specific interventions within India’s policy frameworks for nutrition. In this report, we only include those indicators for which data are currently available in the factsheets of both rounds of the NFHS-3 and NFHS-4 or in the RSOC for national-trend analysis. As more data become available, the analyses in this report will be updated and expanded.

Results

National trends in outcomes, determinants, and intervention coverage

India has made considerable progress on several **maternal and child nutrition outcomes** in the last decade. Stunting among children below 5 years declined from 48 percent to 38.4 percent, at an average annual rate of reduction (AARR) of 2.2 percent per year. Underweight also declined from 42.5 percent to 37.5 percent, at an AARR of 1.7 percent per year. Exclusive breastfeeding increased by nearly 9 percentage points (46.4 percent to 54.9 percent). The proportion of low birthweight children declined as well (21.5 percent to 18.6 percent).

Not all nutrition outcomes improved, however. Wasting increased slightly (from 19.8 percent in 2006 to 21 percent in 2016), and anemia among women of reproductive age declined very little. Both wasting (at close to 20 percent) and anemia (affecting more than half the women of reproductive age) remain major public health challenges for India.

The period of improvements in nutrition outcomes coincides with modest and mixed improvements in the **immediate determinants** of nutrition. The nutritional status of women improved between 2006 and 2016: low body mass index (BMI) declined from 35.5 percent to 22.9 percent. Early initiation of breastfeeding doubled (from 23.4 percent to 41.6 percent), but timely introduction of complementary foods declined from 52.6 percent in 2006 to 42.7 percent in 2016. The disease burden among children

remained low—that is, below 10 percent for both diarrhea and acute respiratory infection (ARI)—but has not changed much over time. This suggests that more efforts to prevent illness are essential, especially as the low national levels could conceal high illness burden in some states and districts.

Overall, the **coverage of nutrition-specific interventions**, which influence the immediate determinants of nutrition, improved over time. For interventions during pregnancy, exposure to antenatal care and protection against neonatal tetanus improved, as did consumption of iron–folic acid (IFA) supplements, institutional deliveries, and birth registration. For childhood interventions, the coverage of immunization and vitamin A supplementation improved remarkably in the last decade, and the proportion of children receiving oral rehydration solution (ORS) during diarrhea also increased. Food supplementation during pregnancy, lactation, and early childhood, however, remained low at 40–50 percent, and increases were not as large as with some of the other nutrition-specific interventions.

These improvements in the coverage of interventions occurred during **a period of substantial change in the policy and programmatic environments** in India, particularly for the two national programs—the ICDS and NHM. Both these programs underwent massive scale-up to increase coverage and reach, as well as other changes to address various elements of service quality. Despite these changes, however, average national-level coverage did not reach 90 percent for any of the interventions. Of the 12 interventions covered in our analysis, only three (institutional delivery, skilled birth attendance, and birth registration) reached 75 percent of the client population. Several interventions still reach only 50 percent or less of the target client populations. This calls for efforts to improve coverage by analyzing issues related to policy guidance, financing, state-level implementation efforts, and client-level uptake barriers or choices.

Underlying determinants of nutrition improved quite significantly in India between 2006 and 2016. Indicators of women’s well-being improved, but large gaps remain (for example, despite improvements, only 33 percent of women 15–49 years of age have completed more than 10 years of education). We note, however, that this could reflect generational gaps and not capture secular trends among the younger generation of women). Household access to drinking water and electricity improved, but sanitation continues to lag behind. Examining the reasons for the discrepancy between the reach of electricity, water, and sanitation might be helpful in addressing the sanitation and other infrastructural gaps in India.

Perhaps most importantly, our analysis, summarized below, highlights the fact that different states changed and progressed along different trajectories for nutrition outcomes, determinants, and intervention coverage over this same period. A careful investigation into this variability and into the

factors that drive the differences across states can potentially help to accelerate change and achieve more uniform outcomes across India.

State trends in nutritional outcomes, determinants, and intervention coverage

Several states in India made considerable progress on **nutrition outcomes** in the last decade, but the progress has not been uniform. Despite a positive trend in stunting declines between 2006 and 2016, the prevalence of stunting as of 2016 remains “very high” (≥ 40 percent) in 6 states and “high” (30–39 percent) in 12 states. In contrast to stunting, wasting declined only in 12 states and increased in 17 states. In addition, several states and union territories (29 states) fall in the category of “very high” wasting levels (≥ 15 percent). Underweight among children declined in all the states in India, but in 13 states, the prevalence remains as high as 30 percent. None of the states in India reached acceptable levels of wasting or underweight in 2016, based on World Health Organization (WHO) cut-off rates for public health significance.

The prevalence of low birthweight (LBW) declined in all states except Nagaland. Overall, the northeastern states have lower LBW prevalence compared to the rest of the states. Between 2006 and 2016, exclusive breastfeeding (EBF) rates increased in most states, but declined in six states. In most the states, EBF is at more than 50 percent, suggesting an overall positive picture. While the prevalence of anemia among women of reproductive age, pregnant women, and children declined in the majority of states, it increased in a few states. Based on the WHO categorization of severity of prevalence, anemia is still a severe public health problem in several states.

Our analysis of the **immediate determinants** indicates considerable progress in multiple determinants across the states, but again, we see high interstate variability. There have been improvements in women’s BMI and early initiation of breastfeeding in most states, but improvement in EBF (as summarized above) is mixed. Complementary feeding is of particular concern. The rate of timely introduction of complementary foods declined in nearly all the states, and diet quality and frequency, as measured by adequate diet among children age 6–23 months is very low. Improvements in the morbidity burden among children have been mixed; ARI improved in most of the states except in a few where the prevalence increased. Diarrhea prevalence declined only slightly, and even increased in seven states and union territories.

An overall positive trend in **coverage of nutrition-specific interventions** at the national level hides state-level variability both in trends and levels of achieved coverage. The coverage of antenatal care (ANC) (both during the first trimester and those receiving 4 ANC visits) increased in most of the states, with a few exceptions where it declined. The consumption of IFA supplements improved between 2006 and

2016 in most states; in 10 states and union territories, more than 50 percent of women reported consuming IFA supplements for 100 days during pregnancy. In 2016, the coverage of the Janani Suraksha Yojana conditional cash transfer program, to encourage institutional delivery was highly variable across the states. Coverage levels ranged from 1.4 percent to 72.6 percent, which could signal both operational variability and uptake variability. Despite this, the coverage of institutional deliveries and births assisted by health professionals increased in almost all states between 2006 and 2016. With more than 70 percent coverage of institutional delivery in 2016 in several states, India is set to achieve full coverage soon.

There is similar interstate variability in trends and achieved coverage of childhood interventions, but overall, coverage of childhood interventions is lower than for interventions during pregnancy. Immunization coverage improved in nearly all states, and the coverage of vitamin A supplementation increased in *all* states. Receipt of food supplementation delivered as part of the ICDS program changed in more varied ways, reaching very high levels of coverage in some states but remaining very low in others.

The **underlying determinants of nutrition** improved across India and in most states, especially in relation to women's education and age at marriage. In *all* states, the proportion of women with 10 or more years of education increased between 2006 and 2016, although the magnitude of change varied among the states. On a similar positive note, the proportion of women getting married before age 18 declined substantially, a trend observed in *all* states except Manipur. However, there is much scope for improvement in several states where more than a quarter of women are married before age 18.

The availability of facilities for water, sanitation, and electricity at the household level also improved. Use of improved sanitation facilities improved in several states over the period, but even in 2016, less than 50 percent of households reported using such facilities in some states. Access to improved drinking water sources improved in all but six states. Indeed, despite declines in access to water in six of the states, coverage was still high, at or above 90 percent, in 19 of the states.

The most critical insight from our analyses of **state-level variability** in changes in nutrition outcomes and determinants and the levels achieved in 2016 is that no one state is demonstrating singular success across all domains examined, nor is any one state exhibiting singular failures. The story is mixed across the board—whether for changes and levels achieved in outcomes, determinants, or coverage of interventions. This finding is, in fact, promising rather than disappointing, because it suggests that there is strong potential for change at the state-level despite the varied governance, political, financial, cultural, and economic fabric of India's states. However, it does indicate that a state-by-state analysis of

trends, changes, and even internal variability, by districts within the state, can help signal areas for state-level strategic investments in specific areas that can help to accelerate momentum for nutrition.

Conclusions

Looking forward, to accelerate progress in a global context of commitments to nutrition as a critical development investment and as a human right, India needs to focus on setting targets and accelerating change in the multiple determinants of nutrition, and not shy away from tackling what seems like a mammoth challenge. First, it is crucial to acknowledge the multiple forms of malnutrition and ensure that nutrition strategies at the national level and the state level begin to address these multiple challenges. Regarding the roll-out of policies and programs, it is essential, for those interventions that are already at high coverage, to continue to deliver well and to sustain coverage and improve quality of services and interventions. Efforts are most urgent for strengthening those determinants and interventions for which coverage has been lagging. A special focus is required on continuing support breastfeeding, investing immediately in improving complementary feeding, strengthening full immunization and vitamin A supplementation for children, and improving sanitation for households.

While continuing to focus on reducing stunting and wasting among children, efforts are also essential to address anemia among women and children. Alongside investments in improving early nutrition, it is also important for India to fully acknowledge the challenge of non-communicable diseases. The NFHS-4 data reveal that the challenge is substantial, with close to 20 percent of women and 19 percent of men in India overweight or obese, and as with other outcomes, high variability across states. High blood pressure and high blood sugar are also emerging challenges.

Health and nutrition are human rights, and healthy populations are a major prerequisite for productive economies. With both these goals in mind, India and all states within India should develop strategies to simultaneously address these multiple forms of malnutrition. Their determinants vary by state, and even by district, but with several robust policy instruments already in place, India is well-positioned to strengthen and solidify actions without undue delay.

INTRODUCTION

Recognizing the need to continue investments in nutrition in the post–Millennium Development Goals era, in 2015, the global community adopted a set of goals to end poverty, protect the planet, and ensure prosperity for all by the year 2030. Nutrition is central to the Sustainable Development Goals (SDGs) of the 2030 Agenda, and at least 12 of the 17 SDGs include indicators relevant for nutrition (such as water, sanitation, hygiene, education, and food systems). In addition, the World Health Assembly (WHA) unanimously endorsed 6 ambitious targets³ to be achieved by 2025. These two sets of targets are intended to set the course for nutrition-focused policies and programmatic actions to spur urgent action to prevent malnutrition. Investing in actions to reduce all forms of malnutrition in India is especially important to support the achievement of global targets, as India contributes a third of the global burden of undernutrition.

India's progress on nutrition has accelerated over the last decade: child stunting has been reduced from 48 percent in 2006 to 38.4 percent in 2016 (IIPS, 2017); exclusive breastfeeding has increased from 46.4 percent to 54.9 percent (IIPS, 2017); and progress has been made on most other WHA target indicators. Despite these improvements, levels of stunting and most other malnutrition indicators remain high, and the positive trends mask wide variation among the Indian states.

Data and evidence are ever-evolving, contentious, and sometimes difficult to interpret (John & Menon, 2015); honest and dispassionate analyses are essential to help harmonize interpretations. In 2016, after a 10-year gap, new data were collected and published on nutrition in India. This is an opportune time to bring together the multiple stakeholders and consolidate efforts for concerted action on nutrition. It is crucial to examine India's status relative to the WHA targets and identify actions for accelerating progress to achieve those targets by 2025.

The national trends for India mask the high variability in the nutrition outcomes, drivers, and implementation of nutrition policies and programs across different states (Rayakar, Majumder, Laxminarayanan, & Menon, 2015). In a financial and policy landscape where the 14th Finance Commission in India has set in motion fiscal devolution and the national government is devolving policy decision making to state governments, there is both a critical need, and a great opportunity, to focus efforts on tackling the challenges of maternal and child malnutrition at the state level. This will require

³ World Health Assembly targets: 1. 40% reduction in the number of children under 5 who are stunted; 2. 50% reduction in anemia among women of reproductive age; 3. 30% reduction in low birthweight; 4. No increase in childhood overweight; 5. Increase the rate of breastfeeding in the first 6 months to at least up to 50%; and 6. Reduce and maintain childhood wasting at less than 5%.

state-level analyses to unmask the diversity, both among and within the states, to facilitate development of strategies for geographically-specific actions to achieve the WHA targets.

A state's readiness and commitment to deliver for nutrition in the new policy and financial environment should be supported by a careful examination of state-specific data, evidence, and operational experiences, and through subsequent strategic use of such information to guide decisions by nutrition actors within each state. The insights gained into a state's capability to execute programs and its strengths and challenges provide guidance for developing state-specific strategies for nutrition. For example, our recent work on understanding the story of change in scaling up nutrition and health programs in Odisha (Kohli et al., 2017; Menon et al., 2016) has revealed both specific and broad elements of success—political stability and commitment to social sector programs, bureaucratic capacities, a goal-oriented focus, excellent technical support, and reasonable transparency in the social sector programs. It has also been useful in reaffirming that progress achieved in improving the Integrated Child Development Services (ICDS) and health systems alone is likely not sufficient to achieve reductions in overall undernutrition. This suggests that challenges lie ahead on the underlying social drivers of nutrition and calls for stronger multisectoral actions for nutrition. In an environment of broad consensus on critical intervention packages at the national level and a nutrition policy framework, the time is ripe for deeper state engagement with data, analytics, and evidence to support state-level strategies.

POLICY CONTEXT FOR THIS REPORT

The period for the data trends covered in this report coincides with several changes and an overall evolution in the policies and programs that aim to address nutrition. Here we summarize the evolution in policies and programs that focus on nutrition-specific interventions, since to date, India's efforts to tackle malnutrition have been implemented predominantly through these programs. Nutrition-specific interventions in India are delivered through two major national programs—ICDS and National Health Mission (NHM), which operate under the Ministry of Women and Child Development and the Ministry of Health and Family Welfare (MoHFW), respectively. The interventions delivered via these program platforms cover the a spectrum of recommended, evidence-informed interventions (Avula, Suneetha, Singh, & Menon, 2013; Vir et al., 2014).

The ICDS program began in 1975 with a cadre of frontline workers, called Anganwadi Workers (AWWs), trained to deliver nutrition and early childhood interventions (that is, food supplementation, nutrition and health education, growth monitoring, referrals, and preschool education) through the Anganwadi Centers (AWCs). In addition, the AWWs are expected to support the implementation of health services

(immunizations, health check-ups) delivered by the health worker, the Auxiliary Nurse-Midwife. During the early 2000s, a review of the ICDS program found the quality of its services to be subpar. At the same time, the issue of undernutrition gained prominence with the “Right to Food Campaign” framing undernutrition as a human rights issue. The campaign filed a case in the Supreme Court, which resulted in a demand for action to protect the right to food. This was followed by several Supreme Court judgements that resulted in legislation and several actions to support the universalization of the ICDS program. In 2004, the Supreme Court directed the government of India to universalize the ICDS, to increase the number of AWCs, and to revise the cost norms for the food supplements provided under the ICDS program (Supreme Court of India 2004). This was followed up with an additional order in 2006 that mandated the states to comply with the 2004 Supreme Court orders.

As a result, the ICDS coverage expanded from 37.5 million beneficiaries in 2002 to 56.8 million beneficiaries in 2006. However, most of the expansion (more than 50 percent) took place after 2005. In 2008–2009, there was a rapid expansion from 844,000 AWCs in 2007 to 1.319 million operational AWCs in August 2012, with a target of 1.4 million AWCs by the end of 2012.

Funding for the ICDS increased substantially over time from INR 10,392 crore (1.6 billion USD) for the 10th Five Year Plan (2002–2007) to INR 44,400 crore (6.83 billion USD) for the 11th Five Year Plan (2007–2012) (Adhikari & Bredenkamp, 2009). The funding structure for the Supplementary Nutrition Program (SNP) within the ICDS varies across states. Since 2009–2010, the funding for the SNP in most states is shared equally between the national and state governments, except in case of the northeastern states, where the national government funds 90 percent of the SNP. For other components of ICDS, the national government funds 90 percent of activities.

In late 2012, the ICDS Systems Strengthening and Nutrition Improvement program (formerly called ICDS-IV Project) was envisaged to improve the performance of the ICDS system; the program was launched in 2013 by the Ministry of Women and Child Development. Taken together, multiple civil society initiatives, court orders, and political increased the focus on both coverage and quality of the ICDS services, which has played out in different ways across the different states in India.

Between 2005 and 2016, when the ICDS program was going through expansion and programmatic changes, there were developments in the health system as well, which increased its role in delivering interventions that influence nutrition outcomes. In 2005, the National Rural Health Mission, currently referred to as NHM, was launched with the goal of providing healthcare to all of the rural population. The Accredited Social Health Activists (ASHAs), a new cadre of frontline workers at the village level, were recruited to promote newborn care, and several programs were introduced to reduce maternal and infant mortality. Under NHM, a conditional cash transfer program, Janani Surksha Yojana (JSY) was

initiated to encourage institutional delivery. A family-based newborn- and child-care program providing free diagnostics for pregnant and sick newborns was also introduced.

Over the last decade, the MoHFW developed guidelines and strengthened platforms for improving the delivery and coverage of nutrition interventions within the health system. As the NHM was initiated in 2006 and progressed, training modules introduced for the ASHAs included some nutrition modules, especially around interventions in pregnancy and breastfeeding. In 2011, the MoHFW developed guidelines for Facility-based Management of Children with Severe Acute Malnutrition, and in 2013, it released guidelines for enhancing optimal infant and young child feeding (IYCF) practices. In 2014, the Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) strategy was developed with a continuum-of-care approach across the lifecycle, with the aim of ensuring coverage of all the populations with health interventions. Between 2013 and 2015, iron supplementation and calcium supplementation guidelines were separately developed and launched. In 2014, a national deworming day was instituted for children between ages 1 and 19. A fortnightly campaign was put in place to promote oral rehydration solution (ORS) and zinc to manage diarrhea. More recently, in 2016, the MoHFW launched the “Mother’s Absolute Affection” campaign to promote awareness regarding early initiation of breastfeeding and to support counseling for breastfeeding.

All of these programmatic and policy guidelines pertain to the delivery of nutrition-specific interventions. On the ground, interventions are intended to be delivered in concert by frontline workers from both ministries. While several commentaries and analyses have reported on the challenges observed in delivery, there are multiple areas of success, although these are marked by state-level variability. Our report aims to highlight these differences, and to integrate insights on the other determinants of nutrition that are not covered by the policy and program initiatives of the ICDS and the NHM.

OBJECTIVES OF THIS REPORT

Using summary data recently available from the National Family Health Survey (NFHS) factsheets, this report examines trends in nutrition outcomes, determinants, and interventions. It covers the key WHA targets, multiple immediate and underlying determinants of nutrition, and the coverage of nutrition-specific interventions spanning the first 1,000 days of life. This report begins with a general overview of national trends, followed by comparisons of interstate variability, based on data available at the time of writing. We aim to generate dialogue that can support policy decisions for improving nutrition in

multiple states. The report is accompanied by several state-specific *Policy Notes*⁴, which each provide a state-focused analysis of the same issues.

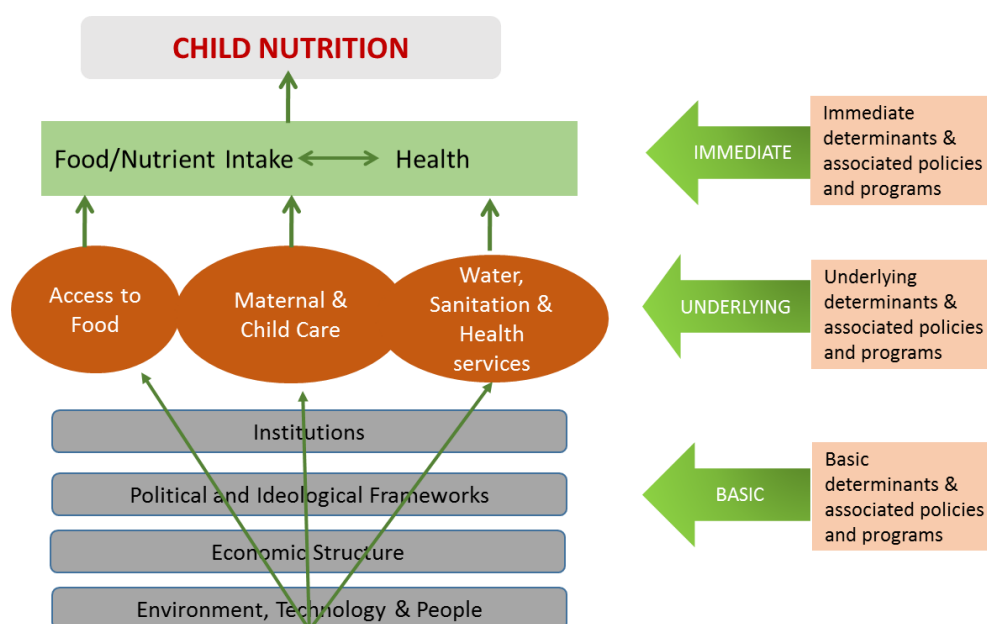
⁴ POSHAN *Policy Notes* are available at www.poshan.ifpri.info

METHODS

We used summary data from the recently released NFHS-4 (2015–2016) factsheets (IIPS, 2017) and data from the NFHS-3(2005–2006) (IIPS, 2008) to compare national-level trends in outcomes, determinants, and interventions over a decade. We also used some data from factsheets of the Rapid Survey on Children (RSoC 2013–2014) (RSoC, 2014) for indicators that are currently not available in NFHS-4 factsheets.

We used UNICEF’s conceptual framework to identify the multiple determinants of nutrition (**Figure 1**). We also reviewed Indian policies on maternal and child health (Vir et al., 2014) and the two national programs—the NHM and the ICDS—to compile a comprehensive list of interventions and platforms used to deliver these interventions (Avula et al., 2013). Although we identified an exhaustive list of determinants and of intervention coverage indicators, we only include those indicators for which data are currently available in the factsheets of both rounds of the NFHS-3 and NFHS-4 or in the RSoC for national trend analysis. In case of state trends, we used only those indicators that had information from both NFHS-3 and NFHS-4.

FIGURE 1. CONCEPTUAL FRAMEWORK



For **outcome indicators**, we examined progress on a set of global nutrition targets for maternal, infant, and young child nutrition (WHO, 2014). These include stunting, wasting, low birthweight, exclusive breastfeeding, and anemia status among women of reproductive age. We also examined other nutrition outcomes such as underweight, anemia among pregnant women, and anemia among children.

For **indicators of the determinants of nutrition**, we examined levels and changes in *immediate, underlying, and basic* determinants, and in nutrition-specific interventions across the lifecycle, including interventions affecting pregnant women, newborn babies, infants, and children (Black et al., 2013). The list of indicators and their definitions are presented in **Table 1**. We calculated the average annual rates of reduction (AARR) for stunting, underweight, wasting, and low birthweight based on a formula from UNICEF (UNICEF, 2007), which is also used in calculating rates of reduction for global nutrition targets. The differences between 2006 and 2016 for other indicators were calculated as percentage point changes.

TABLE 1. INDICATORS AND DEFINITIONS

INDICATORS	DEFINITION
World Health Assembly target indicators for maternal, infant and young child nutrition	
Stunting	Percentage of children 0–59 months who are <-2SD from median height for age of the WHO Child Growth Standards
Wasting	Percentage of children 0–59 months who are below <-2SD from median weight for height of the WHO Child Growth Standards
Low birthweight	Percentage of live births in the last 5 years weighing less than 2,500 grams at birth
Anemia among women of reproductive age	Percentage of women 15-49 years old who are anemic (<12.0 g/dl for non-pregnant women and <11.0 g/dl for pregnant women)
Exclusive breastfeeding	Percentage of infants 0–5 months old who were exclusively breastfed
Other nutrition outcomes	
Underweight	Percentage of children 0–59 months who are <-2SD from median weight for age of the WHO Child Growth Standards
Anemia among pregnant women	Percentage of pregnant women 15–49 years old with hemoglobin concentration <11.0 g/L
Anemia in children	Percentage of children age 6–59 months with hemoglobin concentration <12.0 g/L
Overweight/obesity	15-49 year old men and women with body mass index ≥ 25 kg/m ²
High blood pressure	15-49 year old men and women with systolic ≥ 140 mm of Hg and/or Diastolic ≥ 90 mm of Hg
High blood sugar	15-49 year old men and women with blood sugar level > 140 mg/dl
Immediate determinants	
Low body mass index (BMI)	Percentage of women 15–49 years old with BMI less than 18.5 kg/m ²
Early initiation of breastfeeding	Percentage of children who were breastfed within one hour of birth
Timely introduction of foods	Percentage of infants 6–8 months old who received solid and semi-solid foods and breastmilk
Adequate diet	Percentage of children 6–23 months old who received 4 or more food groups and a minimum meal frequency
Prevalence of acute respiratory infection (ARI)	Percentage of children less than 5 years with symptoms of ARI in 15 days preceding the survey
Prevalence of diarrhea	Percentage of children aged less than 5 years, who had diarrhea in 15 days preceding the survey

INDICATORS	DEFINITION
Nutrition-specific interventions*	
ANC (first trimester)	Percentage of mothers who received ANC during the first trimester of pregnancy for the last birth in the last 5 years
ANC (4 or more visits)	Percentage of mothers receiving at least 4 ANCs for the last birth in the last 5 years
ANC-neonatal tetanus injections	Percentage of mothers who were protected against neonatal tetanus for the last birth in the last 5 years
Consumption of IFA supplements	Percentage of mothers who took IFA supplements for at least 100 days for the last birth in the last 5 years
Food supplementation (pregnancy)	Percentage of mothers with children under age 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during pregnancy ⁵
Janani Suraksha Yojana (JSY)	Percentage of women who received financial assistance under JSY for births delivered in an institution for the last birth in the last 5 years
Skilled attendant at birth	Percentage of births in the last 5 years attended by skilled health personnel
Delivery in a health facility	Percentage of births delivered in a health facility for births in the last 5 years
Birth registration	Percentage of children under age 5 years whose birth was registered
Food supplementation (lactation)	Percentage of mothers with children under age 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during lactation ⁶
Full immunization	Percentage of children age 12–23 months who received BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).
Vitamin A	Percentage of children age 9–59 months who received vitamin A supplements
ORS during diarrhea	Percentage of children less than 5 years with diarrhea in the last two weeks who received ORS
Food supplementation (6–35 months)	Percentage of children 6–35 months covered by AWCs who received supplementary food provided at the AWC in the last 12 months ⁷
Underlying determinants	
Women who are literate	Percentage of women who are literate
Women with at least 10 years of education	Percentage of women 15–49 years old having at least 10 years schooling
Access to electricity	Percentage of households with electricity
Married before 18	Percentage of women aged 20–24 years married before age 18
Improved sanitation	Percent distribution of households using improved sanitation facilities
Improved drinking water	Percent distribution of households with an improved drinking water source
Open defecation	Percentage of households having no sanitation facilities

**Note that intervention coverage indicators are only available for a small set of interventions included in India's policy framework for nutrition at this time.*

⁵ For RSoC, percentage of currently pregnant women covered by an AWC who received supplementary nutrition.

⁶ For RSoC, percentage of mothers with child age 0–5 months covered by an AWC who received supplementary nutrition.

⁷ For RSoC, percentage of children aged 6–35 months covered by AWC who received supplementary food provided at the AWC.

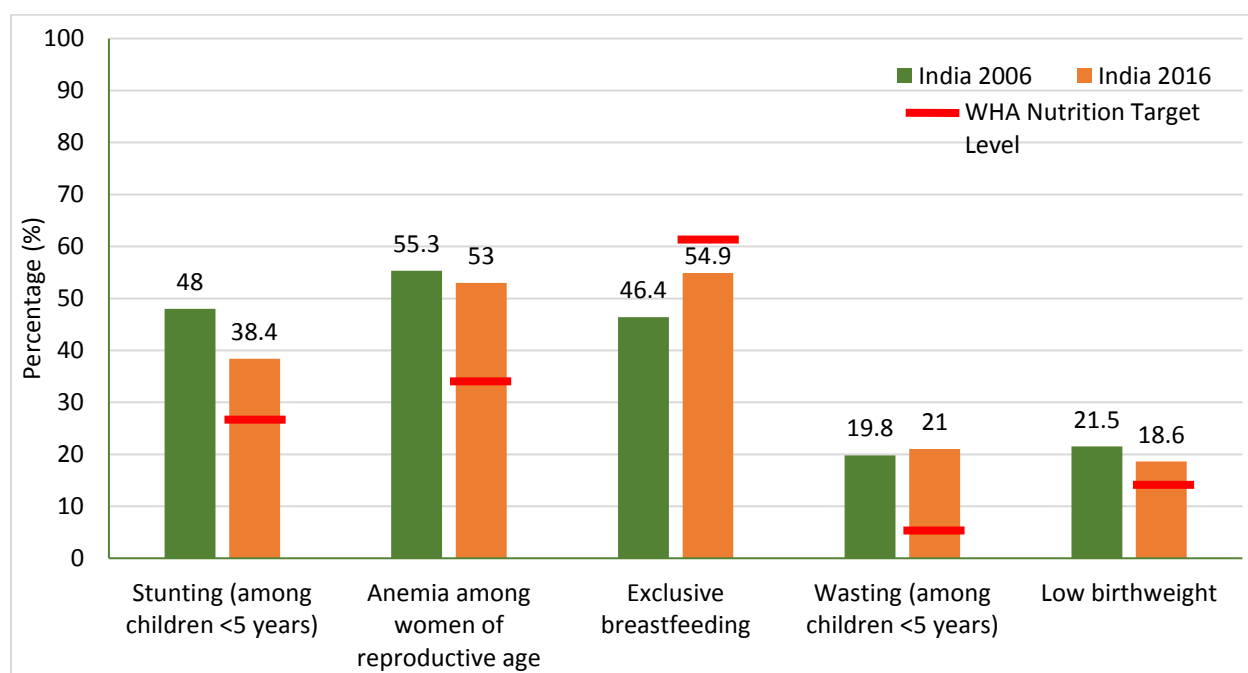
RESULTS

SECTION 1: NATIONAL TRENDS IN OUTCOMES, DETERMINANTS, AND INTERVENTION COVERAGE

NUTRITIONAL OUTCOMES

India saw a notable decline in stunting between 2006 and 2016. Stunting among children below 5 years declined from 48 percent to 38.4 percent (**Figure 2**), at an average annual rate of reduction (AARR) of 2.2 percent per year. This reduction in the last decade is high compared to previous decades (long-term trend results not shown). Exclusive breastfeeding increased from 46.4 percent to 54.9 percent during the last decade. There was a small decline in anemia among women of reproductive age, from 55 percent to 53 percent, remaining a public health problem. The proportion of low-birthweight children declined slightly from 21.5 percent in 2006 to 18.6 percent in 2014.⁸ The prevalence of wasting, however, increased slightly during the same period (from 19.8 percent in 2006 to 21 percent in 2016). We do not present childhood overweight status as data are not available.

FIGURE 2. TRENDS IN THE WORLD HEALTH ASSEMBLY TARGETS BETWEEN 2006 AND 2016

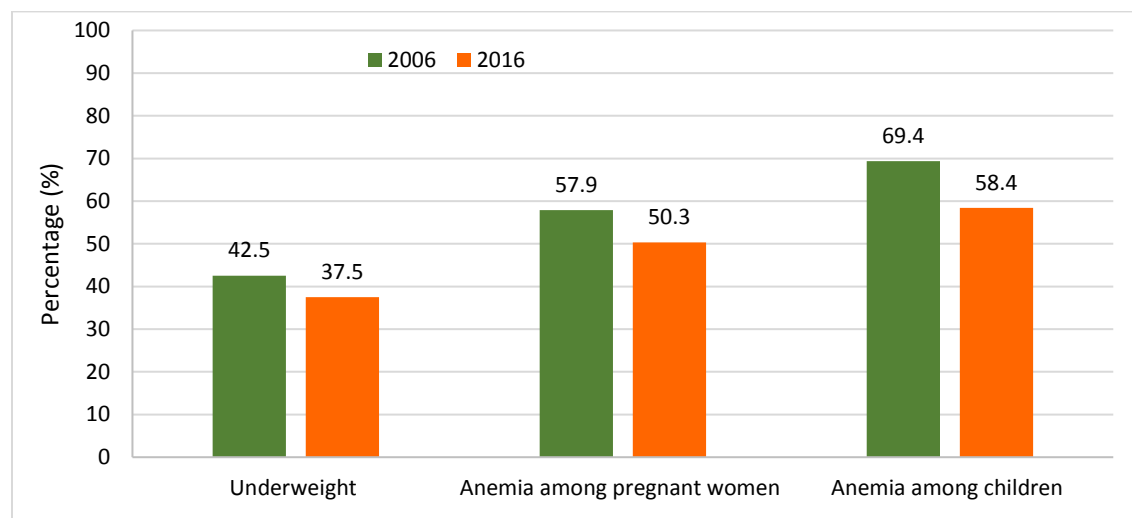


Sources: NFHS-3 and NFHS-4. RSoC for low birthweight.

⁸ Low birthweight data is not yet reported in the NFHS-4 factsheet and hence can be only compared with the RSoC estimates.

There has been a modest decline in childhood underweight from 42.5 percent in 2006 to 37.5 percent in 2016, at an AARR of 1.7 percent per year. Anemia among pregnant women declined from 57.9 percent to 50.3 percent and among children from 69.4 percent to 58.4 percent (**Figure 3**).

FIGURE 3. TRENDS IN OTHER NUTRITION OUTCOMES BETWEEN 2006 AND 2016

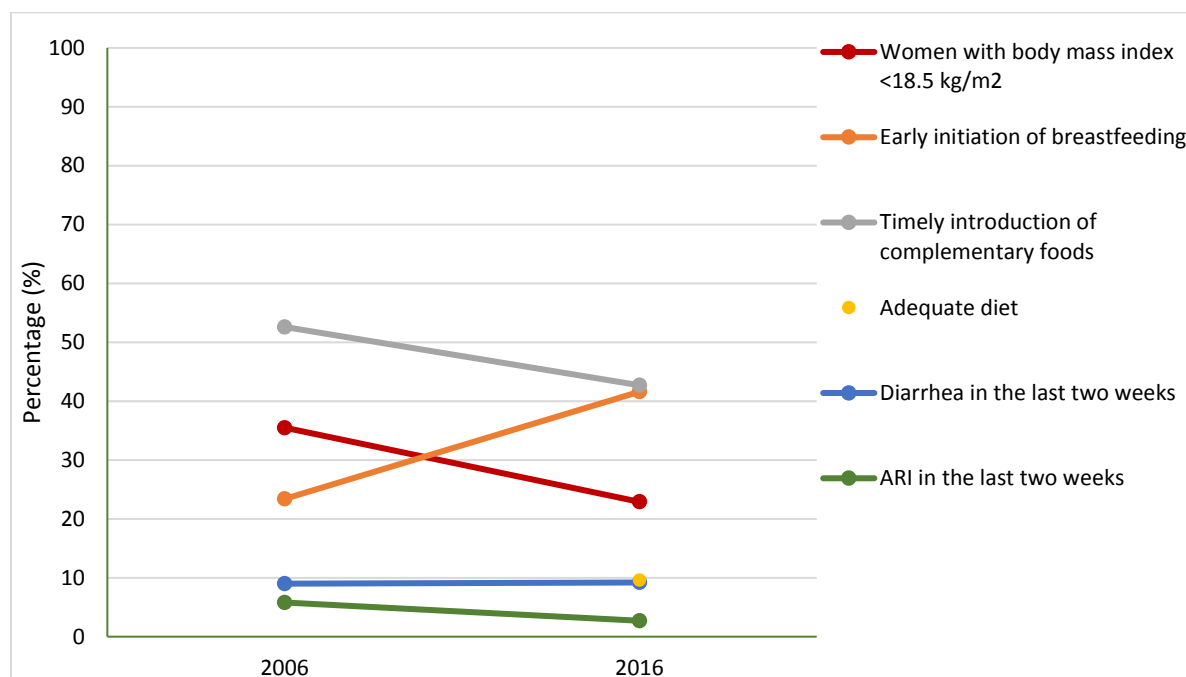


Sources: NFHS-3 and NFHS-4.

IMMEDIATE DETERMINANTS

During the last 10 years, there have been modest improvements in the immediate determinants of nutrition (**Figure 4**). The proportion of women with low body mass index (BMI) declined from 35.5 percent to 22.9 percent, indicating improvements in the nutritional status of women. Early initiation of breastfeeding nearly doubled (from 23.4 percent to 41.6 percent). However, timely introduction of semi-solid foods for children age 6–8 months declined from 52.6 percent to 42.7 percent. There was mixed progress in the disease burden among young children. The proportion of children under 5 with diarrhea remained unchanged at nearly 9 percent, while the proportion of children with acute respiratory infection (ARI) declined from 5.8 percent to 2.7 percent during the same period.

FIGURE 4. TRENDS IN IMMEDIATE DETERMINANTS OF NUTRITION OUTCOMES BETWEEN 2006 AND 2016



Sources: NFHS-3 and NFHS-4
Notes: ARI= Acute respiratory infection.

COVERAGE OF NUTRITION-SPECIFIC INTERVENTIONS

The coverage for nutrition-specific interventions improved between 2006 and 2016 (Figure 5). We examined the coverage of these interventions in each stage in the first 1,000 days: pregnancy, the first 6 months of life, and the subsequent period of early childhood. No information is available on coverage of recommended nutrition interventions for women in the pre-pregnancy stage of life, and as noted earlier, for several interventions, information is not currently available for both time periods.

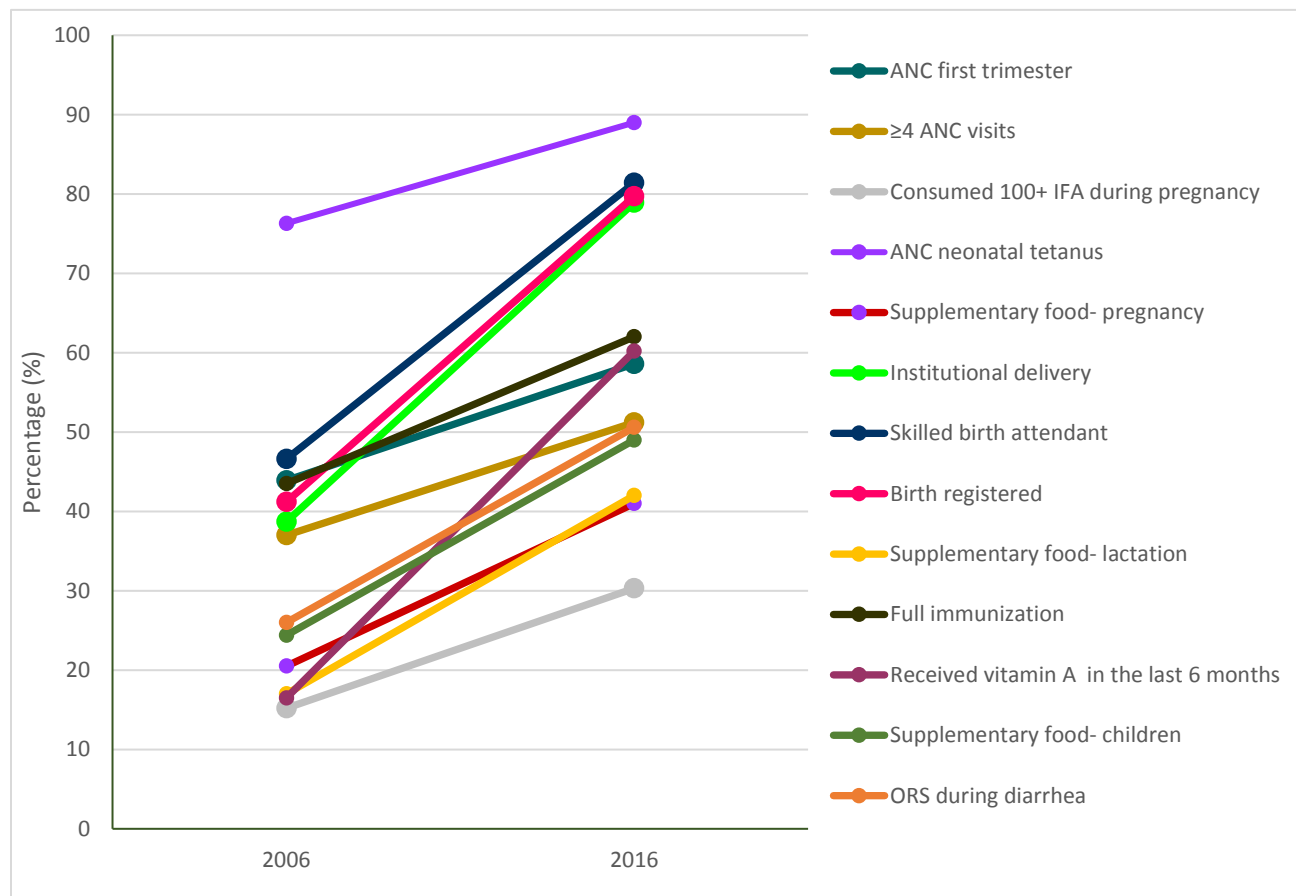
During pregnancy, we find that the proportion of women who had an antenatal (ANC) check-up in the first trimester increased from 44 percent in 2006 to 59 percent in 2016. Similarly, the proportion of women who had at least four ANC visits increased from 37 percent to 51 percent. Consumption of iron-folic acid (IFA) supplements during pregnancy doubled from 15 percent in 2006 to 30 percent in 2016. Deliveries at health facilities and births assisted by skilled birth attendants close to doubled, as did birth registration, which increased from 41.2 percent to nearly 80 percent.

The proportion of women receiving food supplements during lactation increased from 17 percent in 2006 to 42 percent in 2014. The coverage of immunization improved from 43.5 percent to 62 percent. There was a remarkable increase in vitamin A supplementation among children, with coverage more than tripling from 17 percent to 60 percent. The proportion of children receiving food supplements

increased from 24 percent to 49 percent. The proportion of children receiving ORS during diarrhea increased from 26 percent to 51 percent.

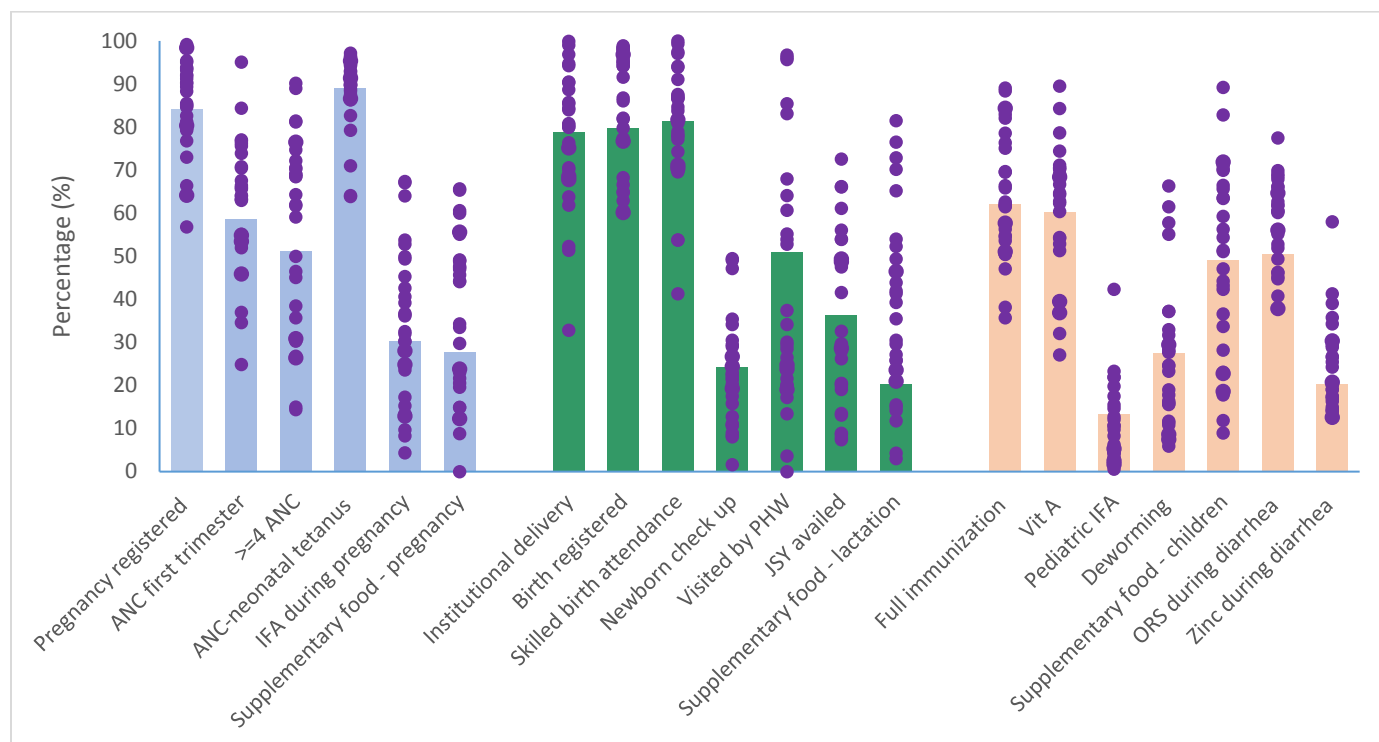
Although coverage of several interventions improved, as illustrated in Figure 5, the coverage of interventions for mothers and children in the first 1,000 days remains a challenge. Only interventions related to delivery (that is, the proportion of women who delivered in health facilities, skilled birth attendance, and birth registration) were used by more than three-quarters of the potential beneficiaries. For other health interventions, coverage remained between 50 and 60 percent at the national level. Receipt of food supplementation and of cash transfers related to delivery were among the lowest. Most notably, there is tremendous variability across states (Figure 6). For coverage of some interventions, state variability ranges from levels as low as 10 percent to levels well-above 90 percent. This variability in coverage is the focus of the state-specific analysis of trends that follows in this report and in our accompanying *Policy Notes*.

FIGURE 5. TRENDS IN NUTRITION-SPECIFIC INTERVENTIONS BETWEEN 2006 AND 2016



Sources: NFHS-3 and NFHS-4. RSoC data used for food supplementation.
 Notes: ANC= Antenatal care; IFA= Iron and folic acid; ORS= Oral rehydration salts.

FIGURE 6. COVERAGE OF INTERVENTIONS VARIES ACROSS CONTINUUM OF CARE IN 2016



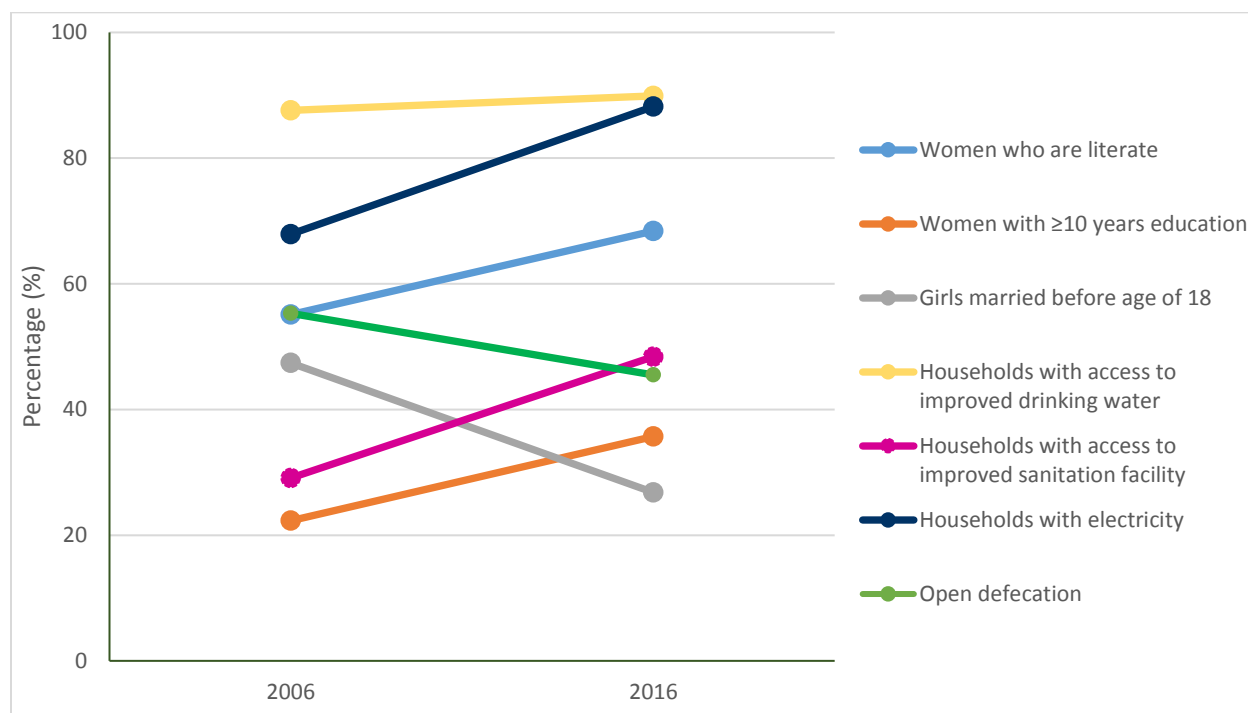
Sources: NFHS-4. RSoC data was used for indicators on pregnancy registration, food supplementation during pregnancy and lactation, and for children, visits by health worker, pediatric IFA, and deworming for children.

Notes: The bars represent the Indian average for the indicators. The purple dots represent state averages. ANC= antenatal care; IFA= iron-folic acid; JSY= Janani Suraksha Yojana; ORS= oral rehydration solution; PHW=Primary health worker

UNDERLYING DETERMINANTS

In the last decade, India experienced improvements in the underlying determinants of nutrition (**Figure 7**). There were modest improvements in women’s education and remarkable improvements in women’s age at marriage, indicating a positive trend for women’s well-being. The proportion of women with 10 or more years of education increased by 13 percentage points, and the proportion of girls getting married before age 18 declined by 20 percentage points. In addition, access to household-level basic amenities also improved between 2006 and 2016. Access to electricity showed a remarkable increase, from 68 percent to 88 percent. The proportion of households with access to improved drinking water was already high at 87.6 percent and it further improved to 89.9 percent. Although households with access to improved sanitation facilities increased from 29.1 percent to 48.4 percent, that leaves more than half the population in India without access to such facilities.

FIGURE 7. TRENDS IN UNDERLYING DETERMINANTS OF NUTRITION OUTCOMES BETWEEN 2006 AND 2016



Sources: NFHS-3 and NFHS-4. RSoC data used for open defecation indicator.

SUMMARY OF FINDINGS ON NATIONAL TRENDS

Our analysis indicates that, overall, India has made considerable progress on several **maternal and child nutrition outcomes** in the last decade, including stunting and underweight among children below 5 years, low birthweight, anemia among pregnant women and children, and exclusive breastfeeding. However, not all nutrition outcomes improved over this period. There has been a slight increase in wasting (19.8 percent in 2006 to 21 percent in 2016). The prevalence of anemia among women of reproductive age experienced a minimal decline and, with more than half of women anemic, remains a significant public health challenge.

The period of improvements in nutrition outcomes overlaps with modest and mixed improvements in the **immediate determinants** of nutrition. There were improvements in the nutritional status of women and early initiation of breastfeeding, but not in timely introduction of complementary foods. The disease burden among children remained low, at below 10 percent for both diarrhea and ARI, but has not changed much over time. This suggests that greater effort to prevent illness is essential, especially as the low national disease burdens could conceal very high illness burdens in some states and districts.

Overall, improvements were seen in the **coverage of nutrition-specific interventions**, which in turn, improve the immediate determinants of nutrition. Exposure to ANC, protection against neonatal tetanus, consumption of IFA supplements, institutional deliveries, and birth registration have all increased in the last decade. Immunization coverage and vitamin A supplementation improved remarkably. Similarly, the proportion of children receiving ORS during diarrhea increased. Although food supplementation during pregnancy, lactation, and early childhood improved between 2006 and 2014, it remained low at 40 -50 percent.

The improvements in the coverage of interventions occurred during a period of substantial change in the policy and programmatic environments in India, particularly the two national programs, the ICDS and NHM. The national ICDS and health programs provide guidance and funds for the states to act on nutrition. The ICDS program was universalized in this period. The NHM program was initiated and introduced a new cadre of frontline workers, the ASHAs, and also increased the focus on maternal, neonatal, and child health within the health system. The improvements observed in the nutrition-specific interventions in the last decade appear to align with these programmatic and policy changes in both the programs.

Despite changes in the policy and programmatic environment, the national-level coverage did not reach 90 percent for any of the interventions. Of the 12 interventions covered in our analysis, only 3 (institutional delivery, skilled birth attendance, and birth registration) reached 75 percent of the potential beneficiaries. Several interventions still reach only 50 percent or less of the potential beneficiaries. Furthermore, progress on the interventions has not been uniform across states. This calls for efforts to improve coverage by analyzing issues related to national guidance, financing, state-level implementation efforts, and client-level uptake barriers or choices.

Underlying determinants of nutrition also improved greatly in India between 2006 and 2016. Indicators of women's well-being improved, but still there are large gaps (for example, only 36 percent of women age 15–49 have more than 10 years of education, but this could reflect a generational gap and not capture secular trends among the younger generation of women). Household access to drinking water and electricity improved, but sanitation access continues to lag. Examining the factors that contributed to improved coverage of electricity and water might shed light on the processes necessary for improving sanitation in India, with the caveat that the individual drivers of sanitation behavior and toilet use are quite different from those related to electricity and water.

SECTION 2: STATE TRENDS IN OUTCOMES, DETERMINANTS, AND INTERVENTION COVERAGE

STATE TRENDS IN NUTRITIONAL OUTCOMES

STUNTING

Although stunting in children under the age of 5 in India declined in the last decade at an AARR of 2.2 percent per year, the rate of stunting reduction varied considerably by state (**Figure 8**). Some states (Himachal Pradesh, Tripura, and Arunachal Pradesh) experienced a very high AARR of 3.8 percent while other states (Rajasthan and Jharkhand) saw a very modest AARR of around 1 percent. State-level disparities in stunting prevalence are substantial, and in 2016, stunting prevalence remained high in several states (**Map 1**). Bihar had the highest level (48.3 percent), closely followed by Uttar Pradesh (46.3 percent), while Kerala had the lowest level of stunting (19.7 percent). Categorizing states based on World Health Organization (WHO) recommended cut-off values for public health significance (Nutrition Landscape Information System, World Health Organization), prevalence of stunting was “very high” (>40 percent) in 6 states in 2016, “high” (30–39 percent) in 12 states, “medium” (20–29 percent) in 17 states, and “low” (<20 percent) only one state (Kerala).

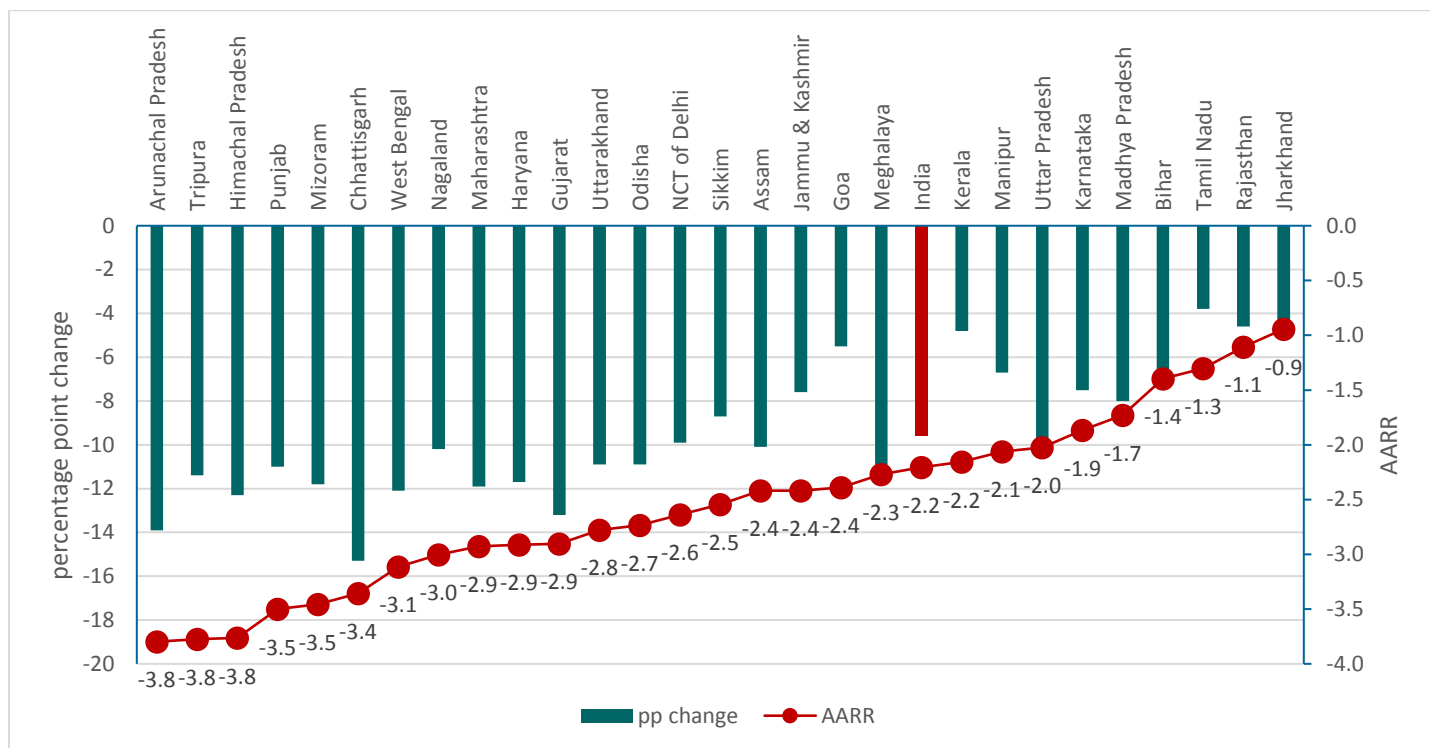
WASTING

The change in wasting also varied widely among states and union territories (**Figure 9**). Some states with high levels of wasting in 2006 saw substantial wasting reduction, including Meghalaya (AARR of 6.7 percent) and Tripura (AARR of 3.7 percent). In contrast, wasting increased in 17 states, especially Punjab, Goa, Maharashtra, and Karnataka, which saw an increase of more than 4 percent per year. In 2016, Jharkhand recorded the highest levels of wasting (29 percent), closely followed by Dadra and Nagar Haveli (27.6 percent), Gujarat (26.4 percent), and Karnataka (26.1 percent), while Manipur and Mizoram showed the lowest levels of wasting (6.8 and 6.1 percent, respectively) (**Map 2**). Based on WHO recommended cut-off values for public health significance, in 2016, most states and union territories (28 of them) fell into the category of very high wasting levels (≥ 15 percent), 6 states had high wasting levels (10–14 percent), and only 2 states had medium wasting levels (5–10 percent).

It is useful to note here that the national level of “severe wasting” (7.5 percent), which demands immediate public health intervention, is quite a bit lower than the overall level of wasting (21 percent) and varies tremendously by state. Careful examination of the levels of severe wasting in specific pockets

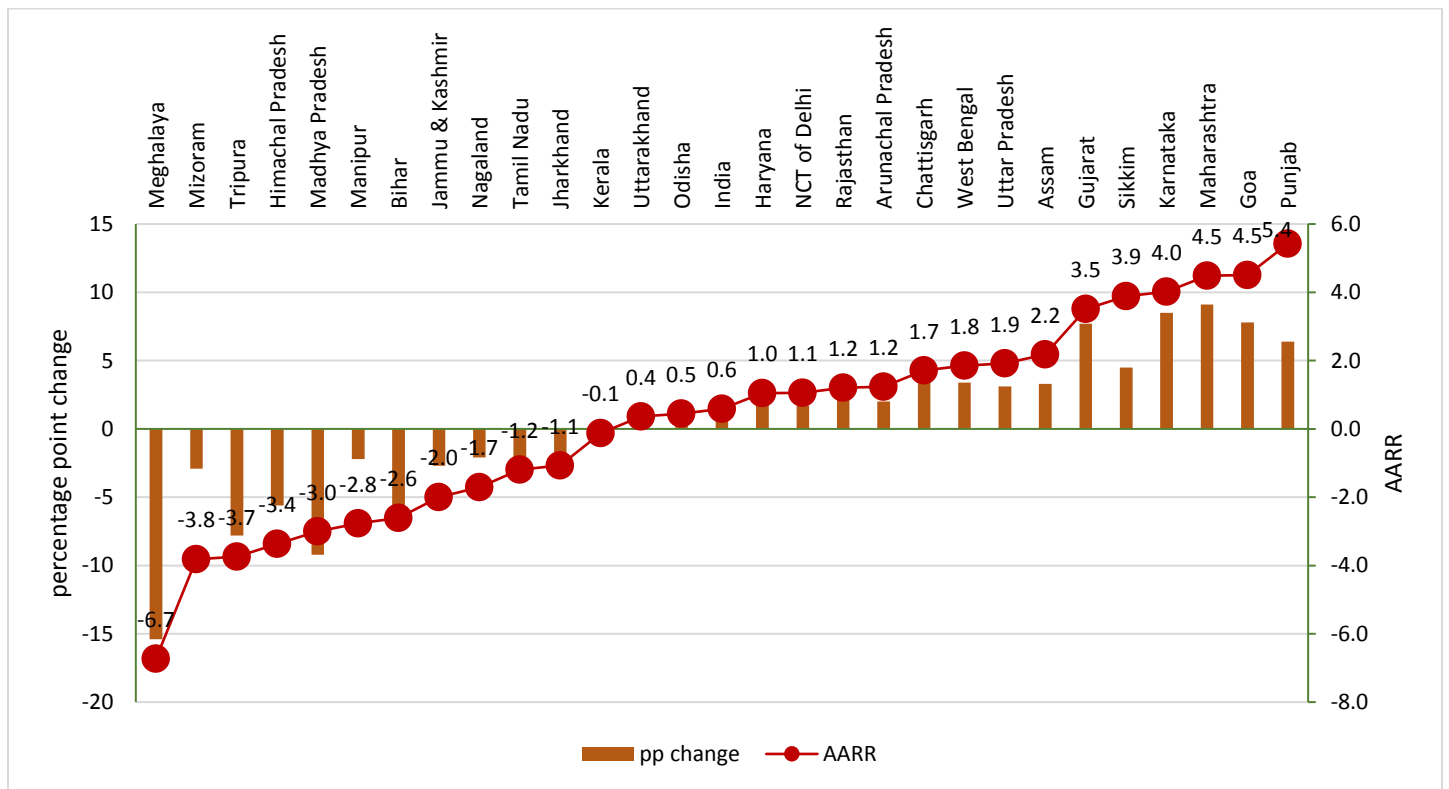
will be needed to identify the extent and level of intervention needed to tackle severe wasting. It is possible that in some areas, the severe wasting is seasonal or restricted to sub-populations that need immediate attention, whereas in others, it could reflect broader deprivation.

FIGURE 8. STUNTING REDUCTION BETWEEN 2006 AND 2016, BY STATE



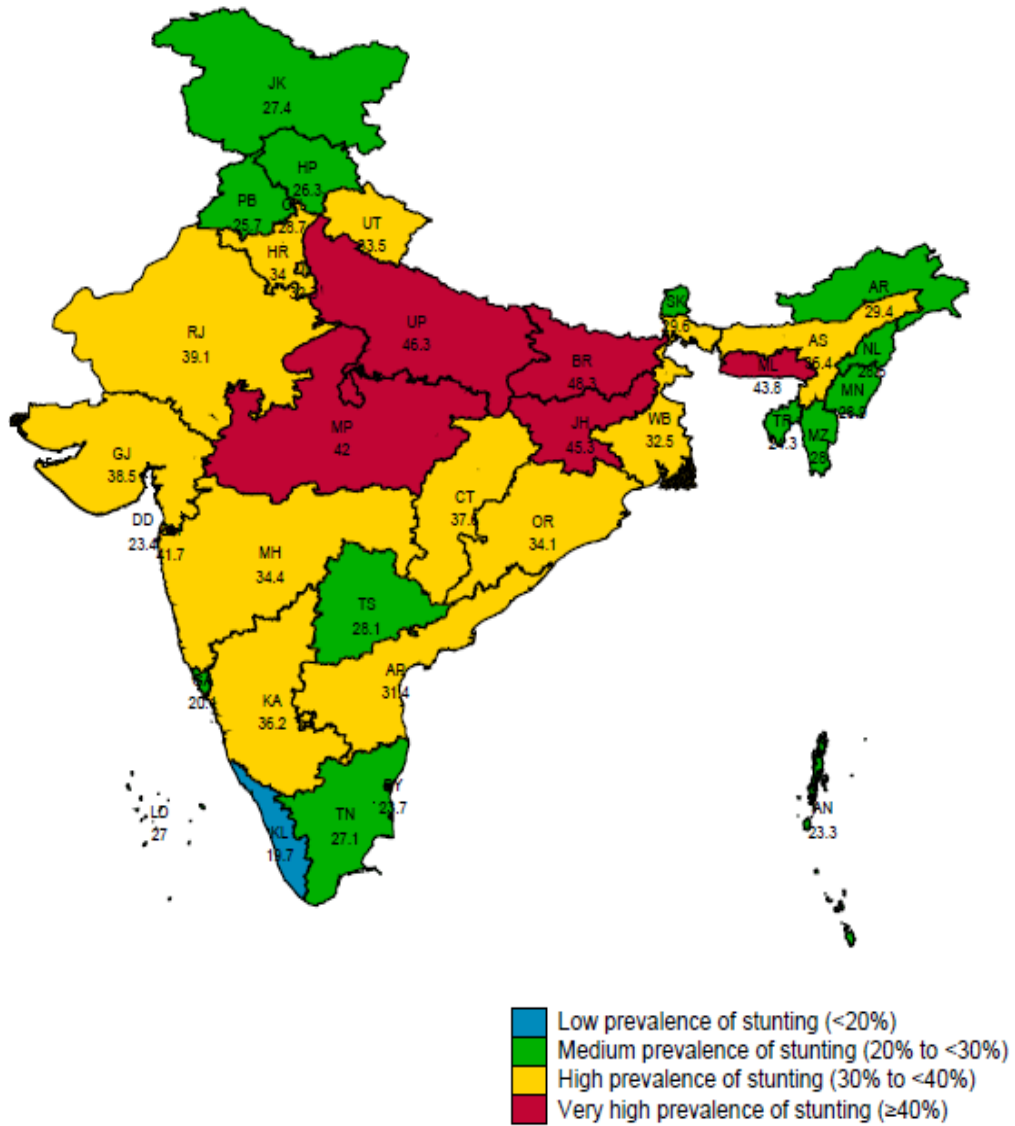
Sources: NFHS-3 and NFHS-4.

FIGURE 9. WASTING REDUCTION BETWEEN 2006 AND 2016, BY STATE



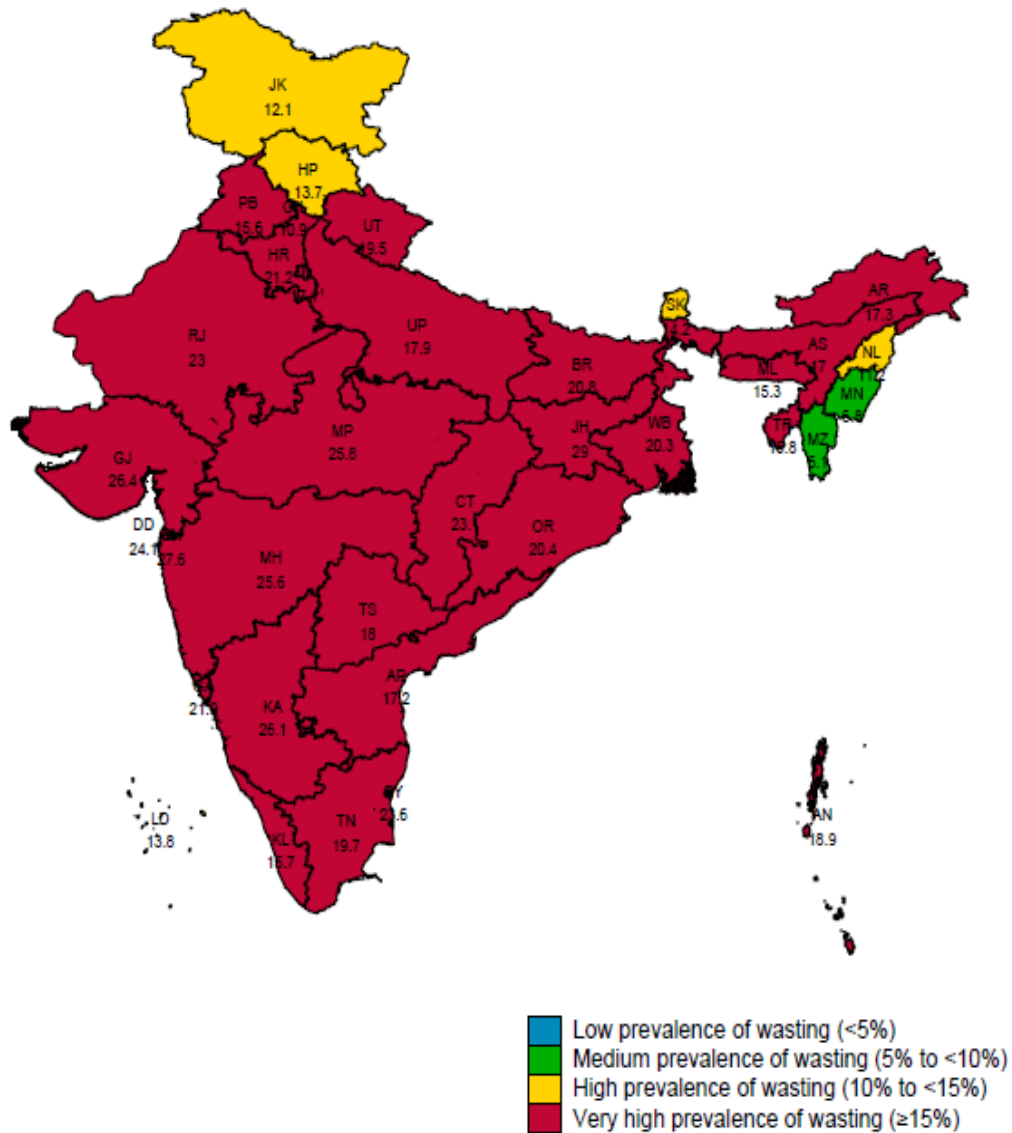
Sources: NFHS-3 and NFHS-4.

MAP 1. MAP OF STUNTING IN INDIA 2016



Sources: NFHS-4.

MAP 2. MAP OF WASTING IN INDIA 2016



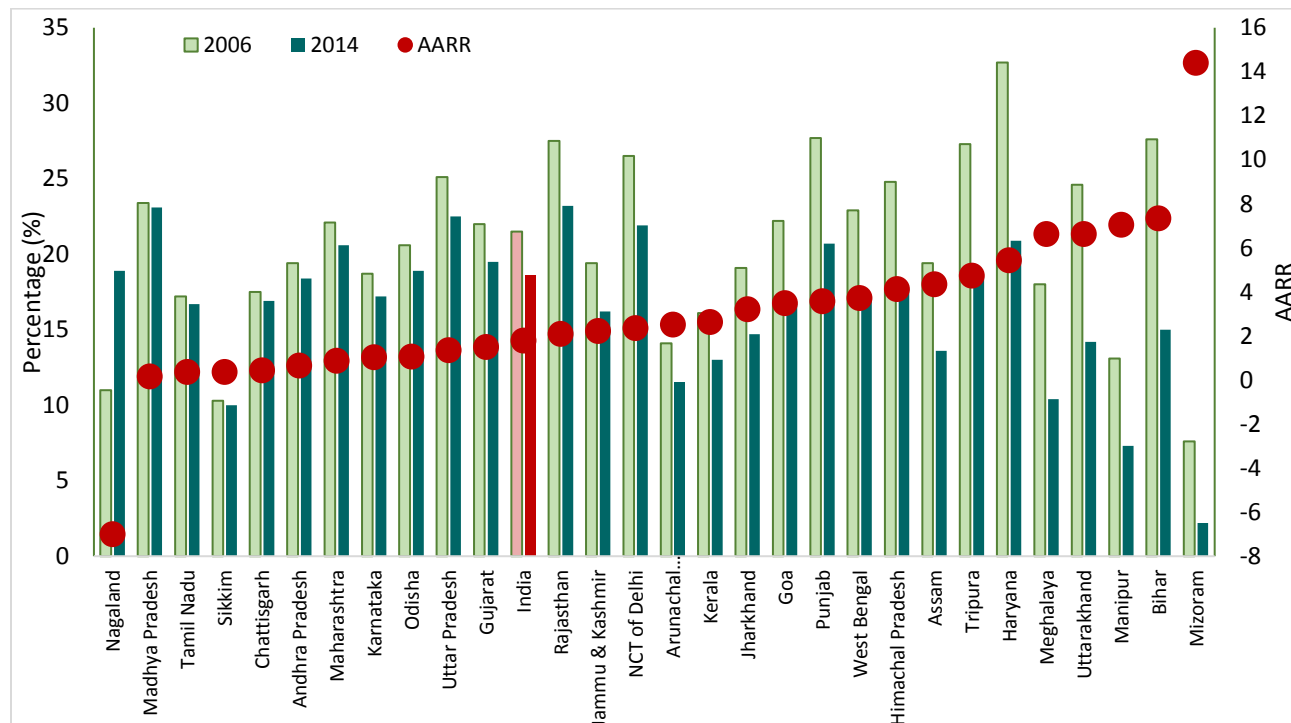
Sources: NFHS-4.

LOW BIRTHWEIGHT

Because low birthweight (LBW) data are not available in NFHS-4 summary factsheets, we compared LBW using NFHS-3 data (2006) and RSoC data (2014) (**Figure 10**). At the state level, LBW rates fell across the country except for Nagaland, where it increased by 7.0 percent per year. Mizoram, Bihar, Manipur, Uttaranchal, and Meghalaya observed a decline of over 6 percent per year, while Madhya Pradesh, Tamil Nadu, Sikkim, and Chhattisgarh experienced a decline of less than 0.5 percent per year. Mizoram

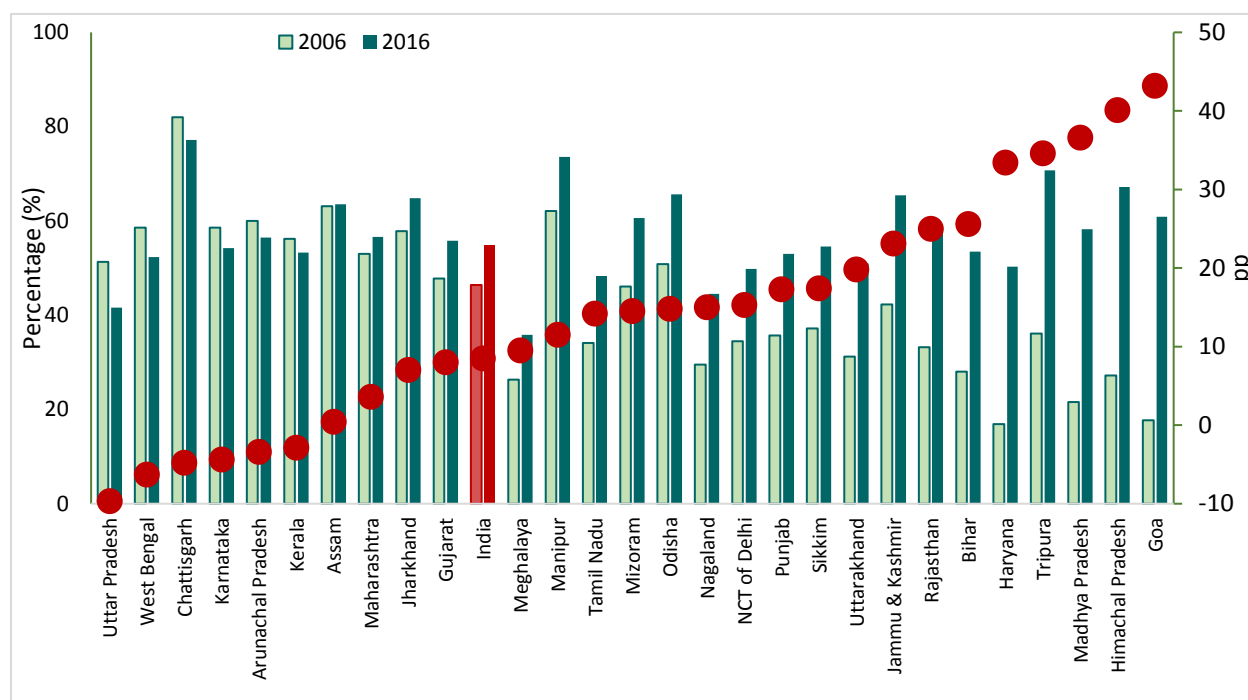
had the lowest LBW rates in 2006 (7.6 percent) and the greatest rate of decline (AARR of 14.3 percent). In total, 18 states saw AARR rates of at least 1.7 percent, which is above the national rate. In 2014, Rajasthan had the highest LBW rate (23.2 percent), closely followed by Madhya Pradesh (23.1 percent), and Uttar Pradesh (22.5 percent). Northeastern states showed lower LBW prevalence than other states: Arunachal Pradesh (11.5 percent), Meghalaya (10.45), Sikkim (10 percent), Manipur (7.3 percent), and Mizoram (2.2 percent).

FIGURE 10. LOW BIRTHWEIGHT BETWEEN 2006 AND 2014, BY STATE



Sources: NFHS-3 and RSOC.

FIGURE 11. EXCLUSIVE BREASTFEEDING BETWEEN 2006 AND 2016, BY STATE



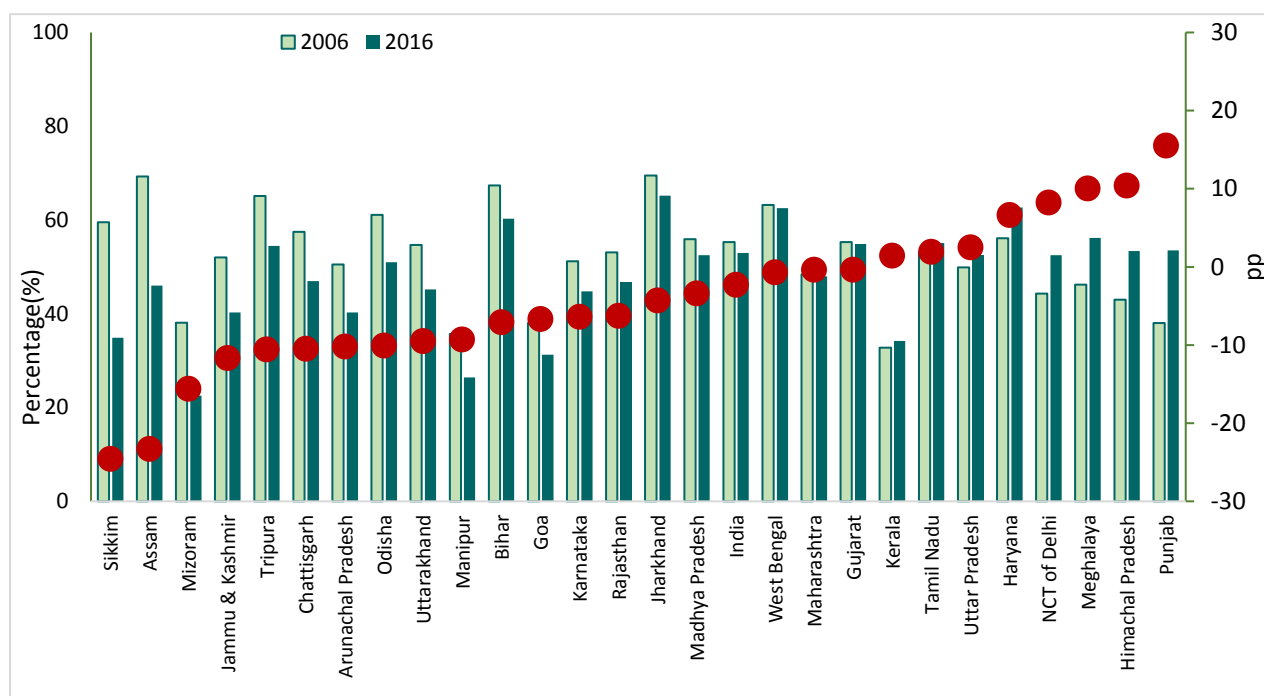
Sources: NFHS-3 and NFHS-4.

EXCLUSIVE BREASTFEEDING

Over the last decade, the percentage of infants (under 6 months) who were exclusively breastfed (EBF) in India increased from 46.4 percent to 54.9 percent (**Figure 11**). At the state level, most states saw an increase in EBF, with the exceptions of Uttar Pradesh (-9.7 pp), West Bengal (-6.3 pp), Chhattisgarh (-4.8 pp), Karnataka (-4.4 pp), Arunachal Pradesh (-3.4 pp), and Kerala (-2.9 pp). The EBF increase was highest in Goa (43.2 pp), followed by Himachal Pradesh (40.1 pp) and Madhya Pradesh (36.6 pp). Among the states experiencing a positive shift, EBF increased by more than 10 pp in 17 states. In 2016, Chhattisgarh had the highest EBF at 77.2 percent, followed by Manipur (73.6 percent), Dadra and Nagar Haveli (72.7 percent), Tripura (70.7 percent), and Andhra Pradesh (new, 70.2 percent). In contrast, Meghalaya had the lowest EBF level at 35.8 percent.

ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE

FIGURE 12. ANEMIA AMONG WOMEN OF REPRODUCTIVE AGE BETWEEN 2006 AND 2016, BY STATE

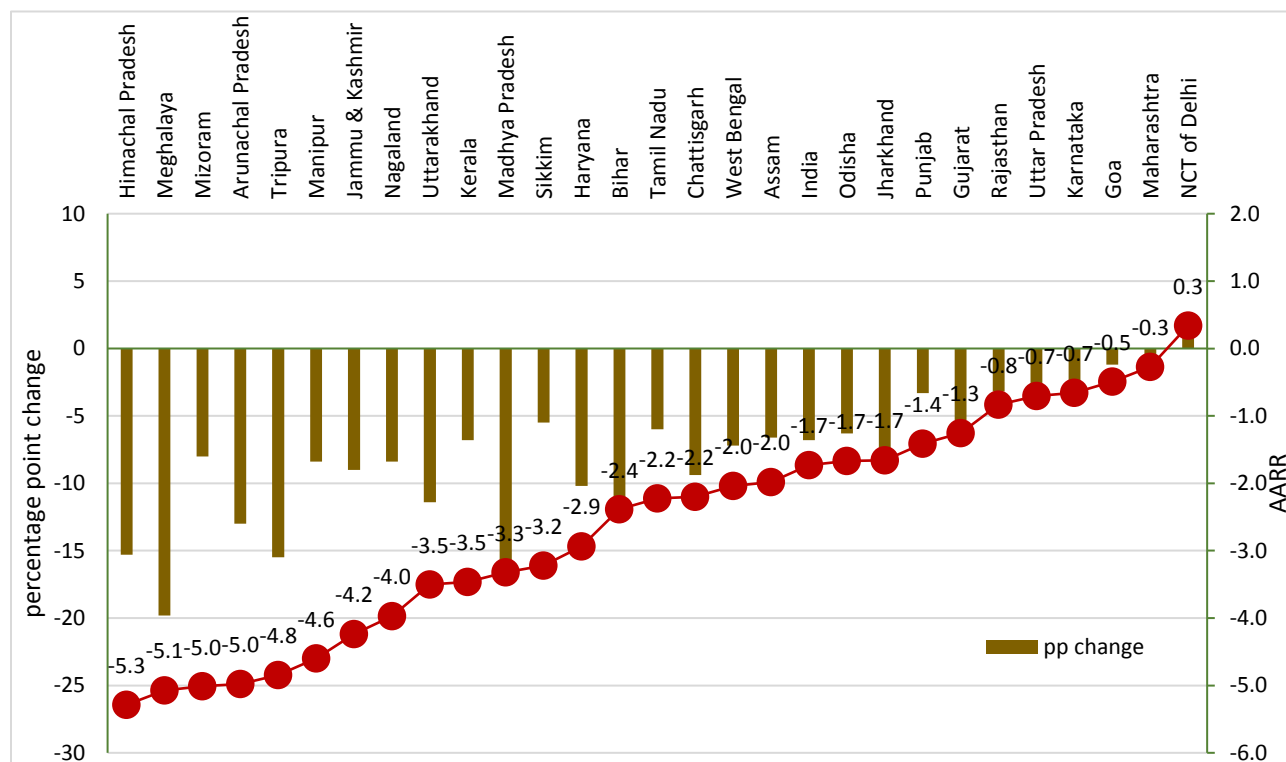


Sources: NFHS-3 and NFHS-4.

Anemia among women of reproductive age declined slightly, from 55 percent to 53 percent nationwide. The rate of anemia reduction varied by state (**Figure 12**). Some states (Sikkim and Assam) experienced a reduction of more than 20 pp while others (Himachal Pradesh and Punjab) saw an increase of more than 10 pp. In 2016, categorizing states based on WHO recommended cut-off values, in 30 states and union territories anemia is classified as a “severe” public health problem (≥ 40 percent) and in 6 other states as a “moderate” public health problem (20–39.9 percent).

UNDERWEIGHT

FIGURE 13. UNDERWEIGHT REDUCTION BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

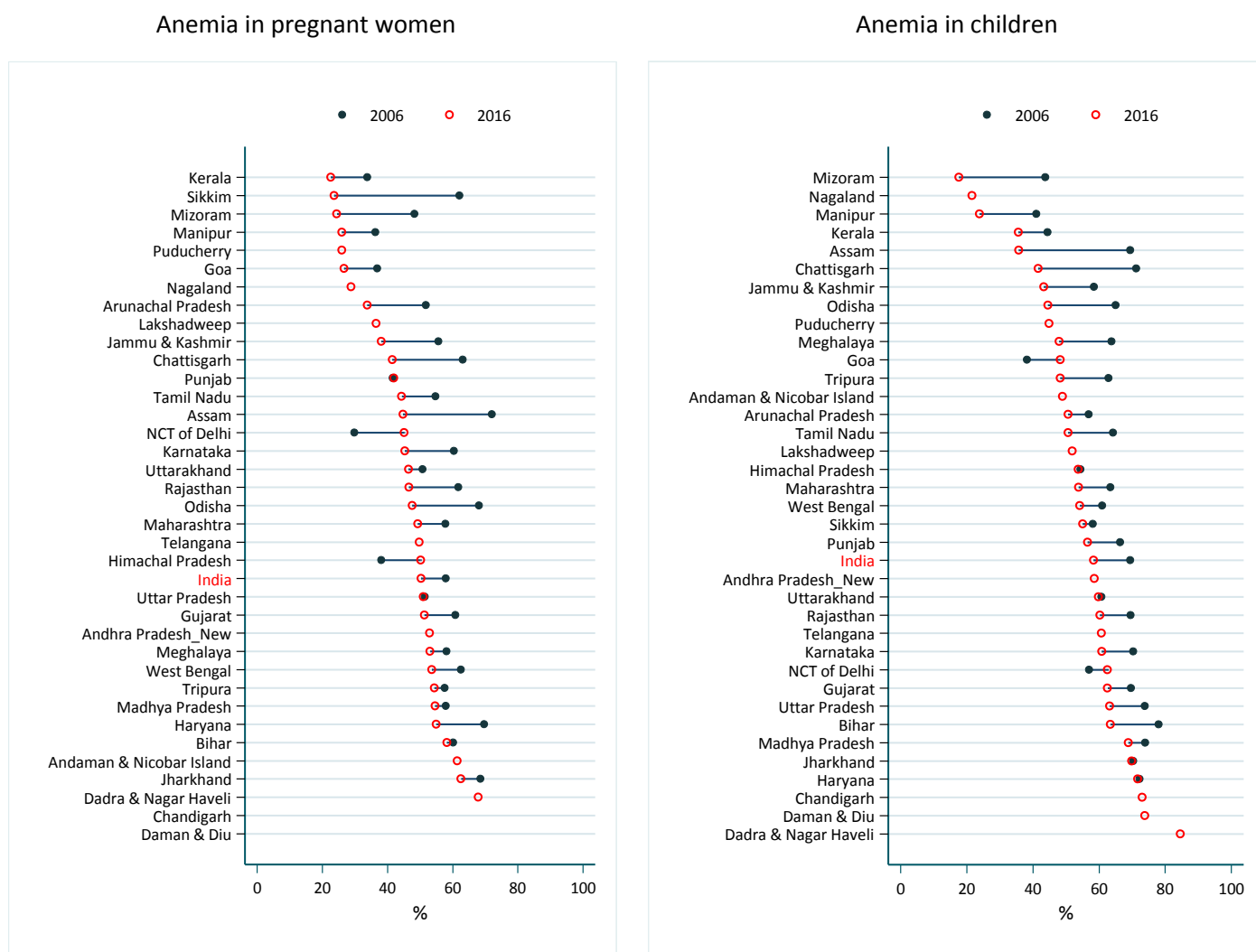
The prevalence of underweight among children under 5 years declined in the last decade, from 42.5 percent in 2006 to 35.7 percent in 2016 (**Map 3**), with an AARR of 1.7 percent per year. Underweight reduction was seen in all states (except NCT Delhi), but the magnitude varied (**Figure 13**). The largest reductions in underweight occurred in those states that had a higher underweight prevalence in 2006: Himachal Pradesh (AARR 5.3 percent), Meghalaya (AARR 5.1 percent), Arunachal Pradesh (AARR 5.0 percent), and Tripura (AARR 4.8 percent). In 2016, Jharkhand had the highest percentage of underweight children (47.8 percent), followed by Bihar (43.9 percent) and Madhya Pradesh (42.8 percent), while Mizoram had the lowest (11.9 percent). Based on WHO recommended cut-off values for public health significance, 13 states fall into the category of very high prevalence (≥ 30 percent) of underweight, 16 states have high (20–29 percent) prevalence, and 7 states medium prevalence (10–19 percent). None of the Indian states have acceptable levels of underweight among children.

country. Such interstate differences highlight the need for further examination of the determinants of the problem in order to design strategies to reduce anemia among pregnant women.

ANEMIA IN CHILDREN

At the national level, anemia among children declined from 69.4 percent to 58.4 percent between 2006 and 2016, with considerable interstate variability (**Figure 14**). Goa and NCT of Delhi are the only two states where anemia rates increased (10 pp and 5.6 pp, respectively). The highest decline was in Assam, where anemia among children was nearly halved, from 69.4 percent to 35.7 percent, followed by Chhattisgarh, with a nearly 30 pp decline. In contrast, Jharkhand had the lowest decline in anemia, from 70.3 percent to 69.9 percent, followed by Haryana (72.3 to 71.7 percent) and Himachal Pradesh (54.4 to 53.7 percent). Despite the decline, anemia rates are still over 50 percent among children in 24 states.

FIGURE 14. ANEMIA IN PREGNANT WOMEN AND CHILDREN BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

STATE TRENDS IN IMMEDIATE DETERMINANTS

Improving maternal and child nutrition requires investments in changing the determinants of poor nutrition. Here, we examine interstate variability in changes in the immediate determinants as well as in nutrition-specific interventions designed to address those determinants. We begin with the immediate determinants: women's nutrition (measured as BMI), indicators pertaining to child feeding (early initiation of breastfeeding, timely introduction of complementary foods among children age 6–8 months, adequate diet among children age 6–24 months), and morbidity (ARI, diarrhea). We could not include indicators of child diet diversity because they were not available in NFHS-4.

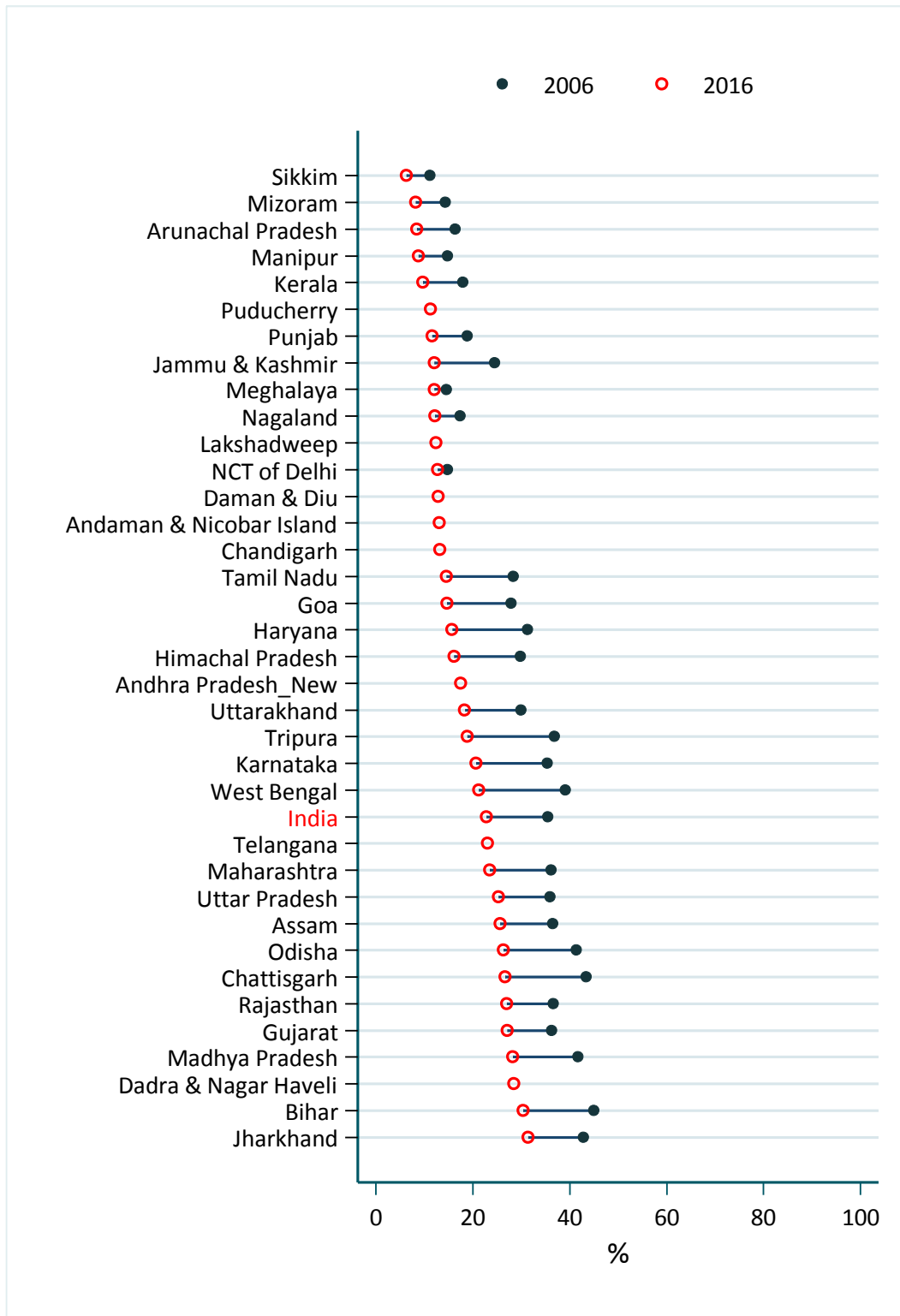
LOW BODY MASS INDEX AMONG WOMEN

The percentage of women with low BMI improved in all states between 2006 and 2016, with declines of more than 10 pp in 17 states (**Figure 15**). The states with the highest proportion of women with low BMI (>40%) in 2006 included Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, and Odisha. These states saw significant declines, between 11 pp and 17 pp. In 2016, the proportion of women with low BMI was highest in Jharkhand and Bihar (>30%) and lowest in Sikkim (6.4 percent). Nagaland and NCT of Delhi have seen a marginal decline (~2 pp) in the proportion of women with low BMI in 2016, but they were also among the states with a small proportion of women with low BMI in 2006.

EARLY INITIATION OF BREASTFEEDING (EIBF)

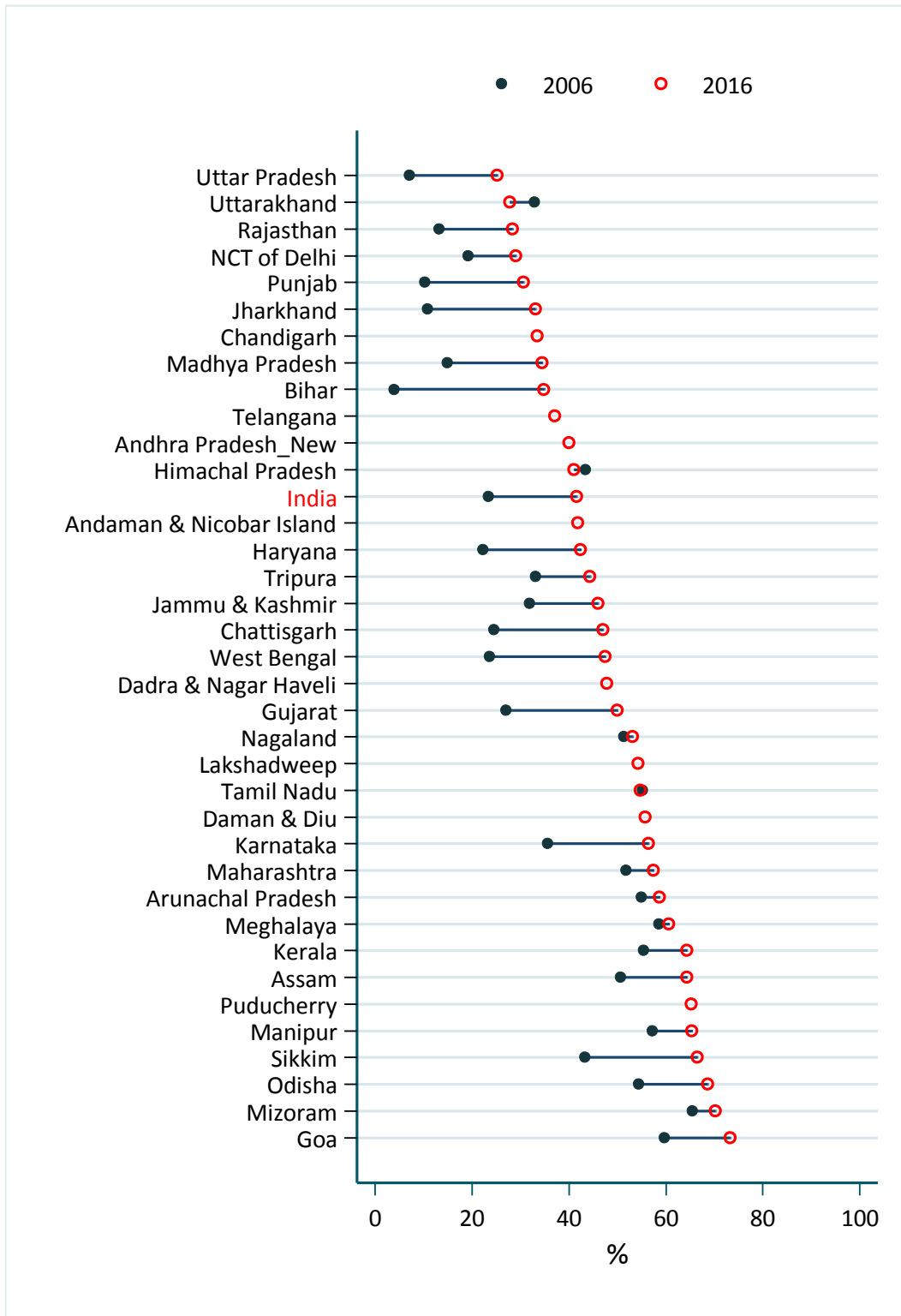
The percentage of children breastfed within the first hour after birth in India increased from 23.4 percent in 2006 to 41.6 percent in 2016. EIBF rates increased across the country (**Figure 16**), with the exceptions of Uttarakhand, Himachal Pradesh and Tamil Nadu where it has decreased by 1–5 pp. States that witnessed the largest increase were the low-performing states of 2006. In 2016, the states that performed best in EIBF included Goa and Mizoram (>70 percent). Rajasthan, Uttarakhand, Uttar Pradesh, and NCT of Delhi had the lowest levels of EIBF, at less than 30 percent.

FIGURE 15. LOW BODY MASS INDEX BETWEEN 2006 AND 2016, BY STATE



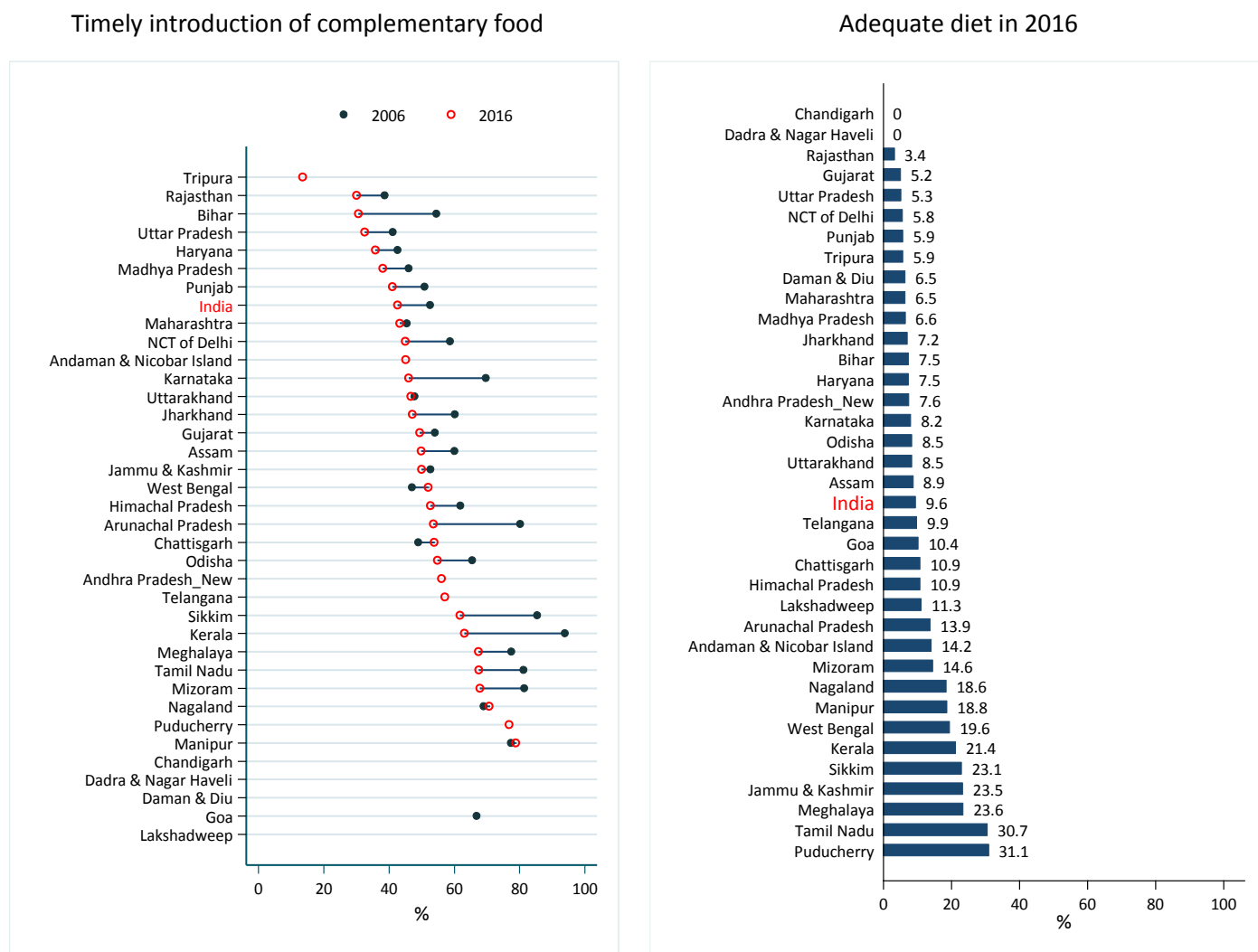
Sources: NFHS-3 and NFHS-4.

FIGURE 16. EARLY INITIATION OF BREASTFEEDING BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

FIGURE 17. TIMELY INTRODUCTION OF COMPLEMENTARY FOOD AND ADEQUATE DIET BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

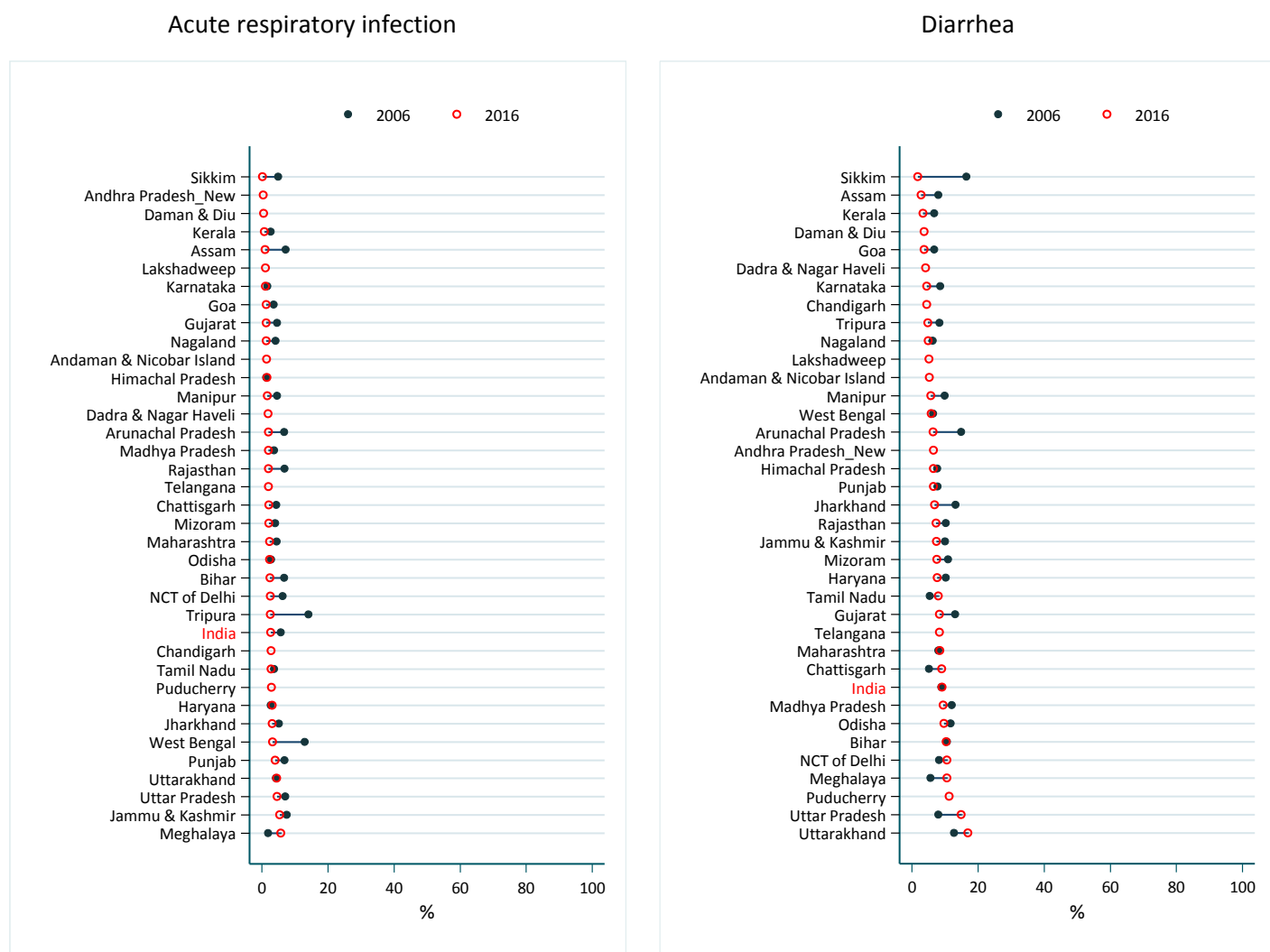
TIMELY INTRODUCTION OF COMPLEMENTARY FOODS

The percentage of young children (6–8 months) who were fed complementary foods declined in India, from 52.6 percent in 2006 to 42.7 percent in 2016. The decline was seen in most states, with the exceptions of Manipur, Nagaland, Chhattisgarh, and West Bengal, where there was a slight increase (between 1pp and 5 pp) (Figure 17). Kerala saw a decline of over 30 pp, and Arunachal Pradesh, Bihar, Karnataka, and Sikkim saw declines of 24–27 pp. In 2016, the rate of timely introduction of complementary food in 15 states was below 50 percent level.

ADEQUATE DIET

Data on adequate diet are only available for 2016 (**Figure 17**). The proportion of children age 6–23 months who received adequate diet in 2016 was very low, ranging from 0 to 31 percent. Only in Tamil Nadu and Puducherry did more than 30 percent of children receive an adequate diet.

FIGURE 18. ACUTE RESPIRATORY INFECTION AND DIARRHEA BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4

ACUTE RESPIRATORY INFECTION

Nationally, the percentage of children who had experienced symptoms of ARI in the last two weeks decreased from 5.8 percent in 2006 to 2.7 percent in 2016. Twenty-four states saw a decline in the prevalence of ARI, including Tripura and West Bengal, which saw large declines of 11.6 and 9.7 pp,

respectively (**Figure 18**). Three states (Uttarakhand, Himachal Pradesh, Haryana) observed a slight increase, and Meghalaya saw a larger increase of 4 pp.

DIARRHEA

The percentage of children who had experienced symptoms of diarrhea in the last two weeks remained unchanged in India at ~9 percent. While 21 states saw a decline in diarrhea prevalence (-0.3 pp to -14.7 pp), 7 other states observed an increase, particularly Uttar Pradesh (increase from 8.1 percent to 15 percent), Meghalaya (5.7 percent to 10.6 percent), Uttarakhand (12.8 percent to 17 percent), and Chhattisgarh (5.2 percent to 9.1 percent) (**Figure 18**).

STATE TRENDS IN COVERAGE OF NUTRITION-SPECIFIC INTERVENTIONS

In this section, we examine state-level trends in several nutrition-specific interventions across the continuum of care, including ANC and use of IFA supplements during pregnancy, use of JSY cash transfers, institutional delivery and skilled birth attendance, full immunization, and vitamin A supplementation among children. Interventions not covered here are exposure to IFA supplements in pregnancy and in childhood, and exposure to food supplements during pregnancy, lactation, and childhood, as data were not available in the NFHS-4 factsheets. For other interventions, such as counseling to support optimal nutrition behaviors, there are no coverage indicators available to examine trends or current levels.

EARLY ANTENATAL CARE

At the national level, there has been an increase in the percentage of women who received ANC during the first trimester, from 44 percent in 2006 to 58.6 percent in 2016. Nearly all states showed improvements in the coverage of early ANC visits, except Tamil Nadu, Karnataka, Nagaland, Goa, and NCT of Delhi, where there has been a decline (-0.5 pp to -11.3 pp) (**Figure 19**). States including Arunachal Pradesh, Uttar Pradesh, and Bihar, where coverage was below 25 percent in 2006, saw the greatest improvements. However, Nagaland, which performed poorly in 2006 at only 29 percent coverage, declined further to 25 percent. Of the 36 states and union territories, 11 states achieved more than 75 percent coverage in 2016, and 15 other states achieved 60–74 percent coverage.

ANTENATAL CARE (4 OR MORE VISITS)

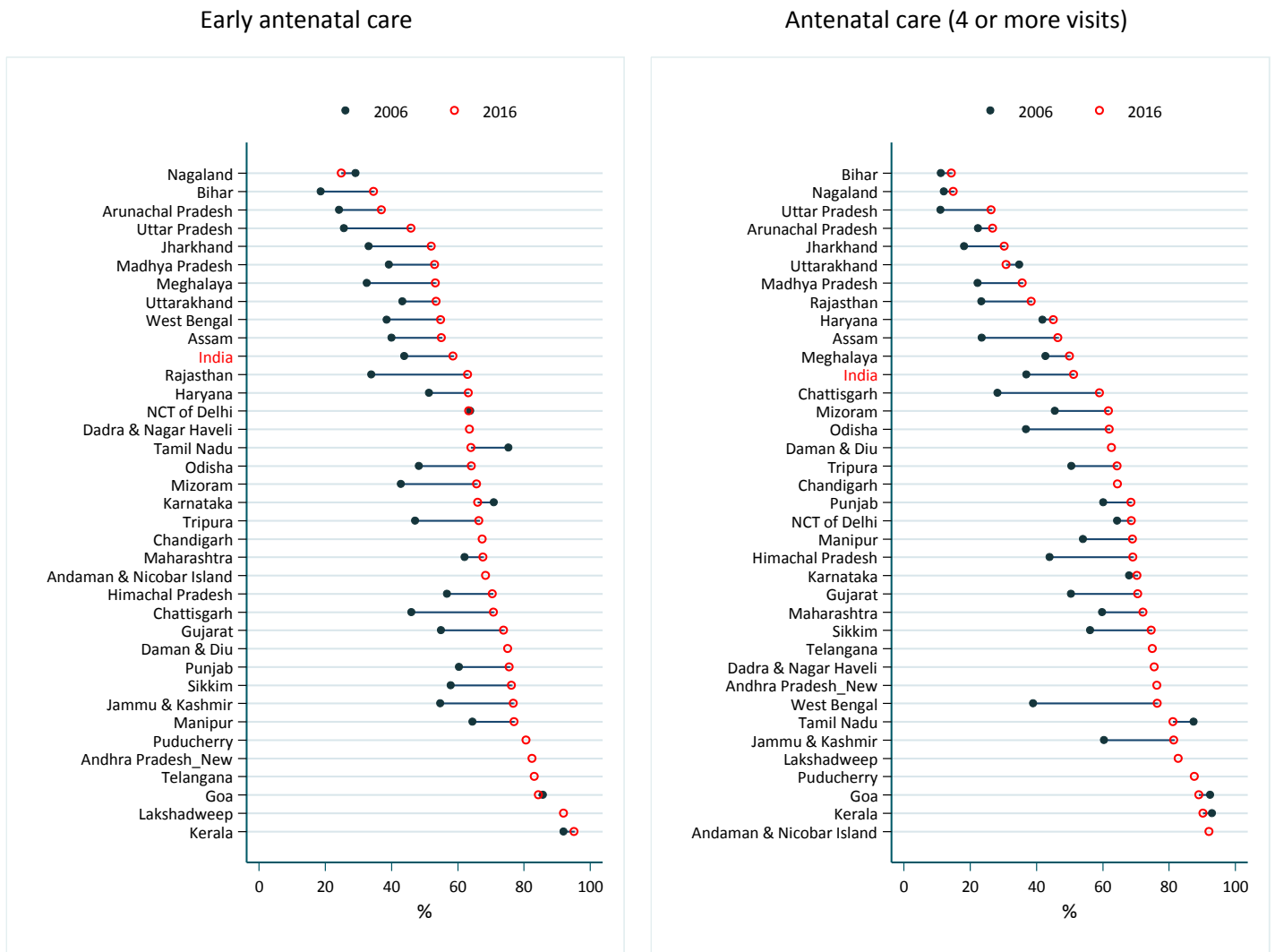
At the national level, the percentage of women who received 4 or more ANC visits increased from 37 percent in 2006 to 51.2 percent in 2016. While a majority of the states showed improvements in coverage, 4 states (Tamil Nadu, Uttarakhand, Goa, and Kerala) showed a declining trend (-2.8 pp to -6.2

pp) (**Figure 19**). In total, coverage increased by more than 10pp in 16 states. The greatest improvements were seen in Chhattisgarh and West Bengal, with increases of more than 30 pp, followed by Himachal Pradesh and Odisha with 25.1 pp increases. In 2016, 15 states had achieved more than 70 percent coverage, 11 states had coverage of 50–70 percent, and 10 states had coverage of less than 50 percent. Bihar and Nagaland had the lowest coverage at 14–15 percent in 2016.

USE OF IFA SUPPLEMENTS (AT LEAST 100 DAYS)

The proportion of pregnant women consuming IFA supplements remained low despite a slight improvement at the national level, from 15.2 percent in 2006 to 30.3 percent in 2016. All states but Kerala observed an improvement in coverage, ranging from 1 pp to 36 pp (**Figure 20**). Kerala had the highest coverage in 2006 (70.1 percent), but saw a slight decline in the percentage of women who consumed IFA supplements (-3 pp) in 2016. Meghalaya and Manipur had low coverage in 2006 (6–7 percent) but strong improvement (more than 30 pp). Tamil Nadu saw the greatest improvement in coverage (36 pp), reaching 64 percent in 2016. But in 2016, only 10 states had more than 50 percent coverage of IFA consumption.

FIGURE 19. ANTENATAL CARE BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

JANANI SURAKASHA YOJANA

Coverage of JSY was over 40 percent in 11 states in 2016 (**Figure 20**). The highest coverage was seen in Odisha (72.6 percent), Chattisgarh and Assam (66 percent). In total, there were 24 states with low coverage (below 30 percent).

SKILLED ATTENDANT AT BIRTH

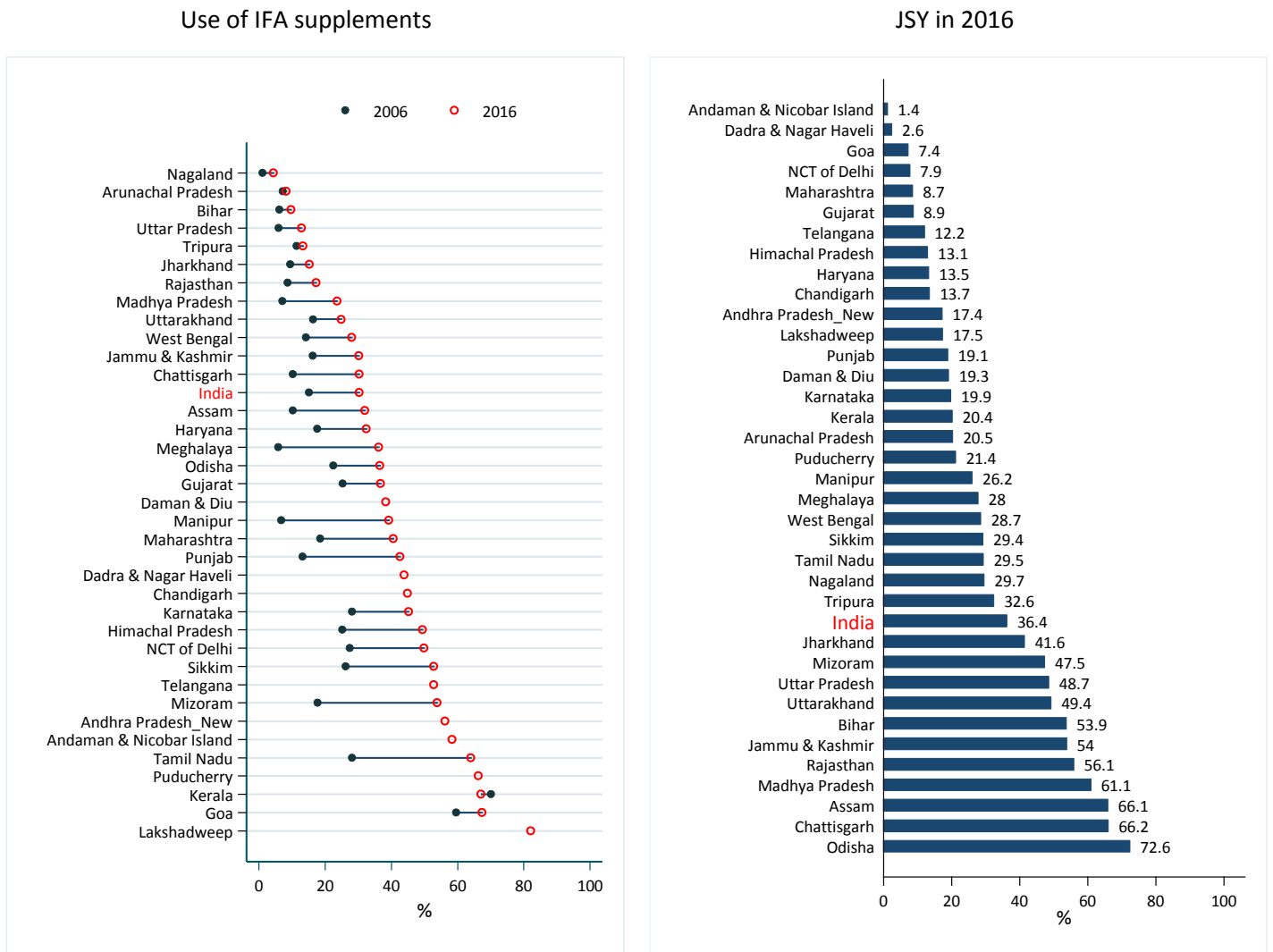
At the national level, there has been a very significant increase in the coverage by skilled attendants at birth, from 47 percent in 2006 to 81.4 percent in 2016. Eight states, including those that had low coverage in 2006 (Uttar Pradesh, Bihar, Assam, Jharkhand, and Madhya Pradesh), increased coverage

by more than 40 pp (**Figure 21**). In 2016, 23 states had attained coverage of over 80 percent and 9 other states had attained coverage of 70–79 percent.

INSTITUTIONAL DELIVERY

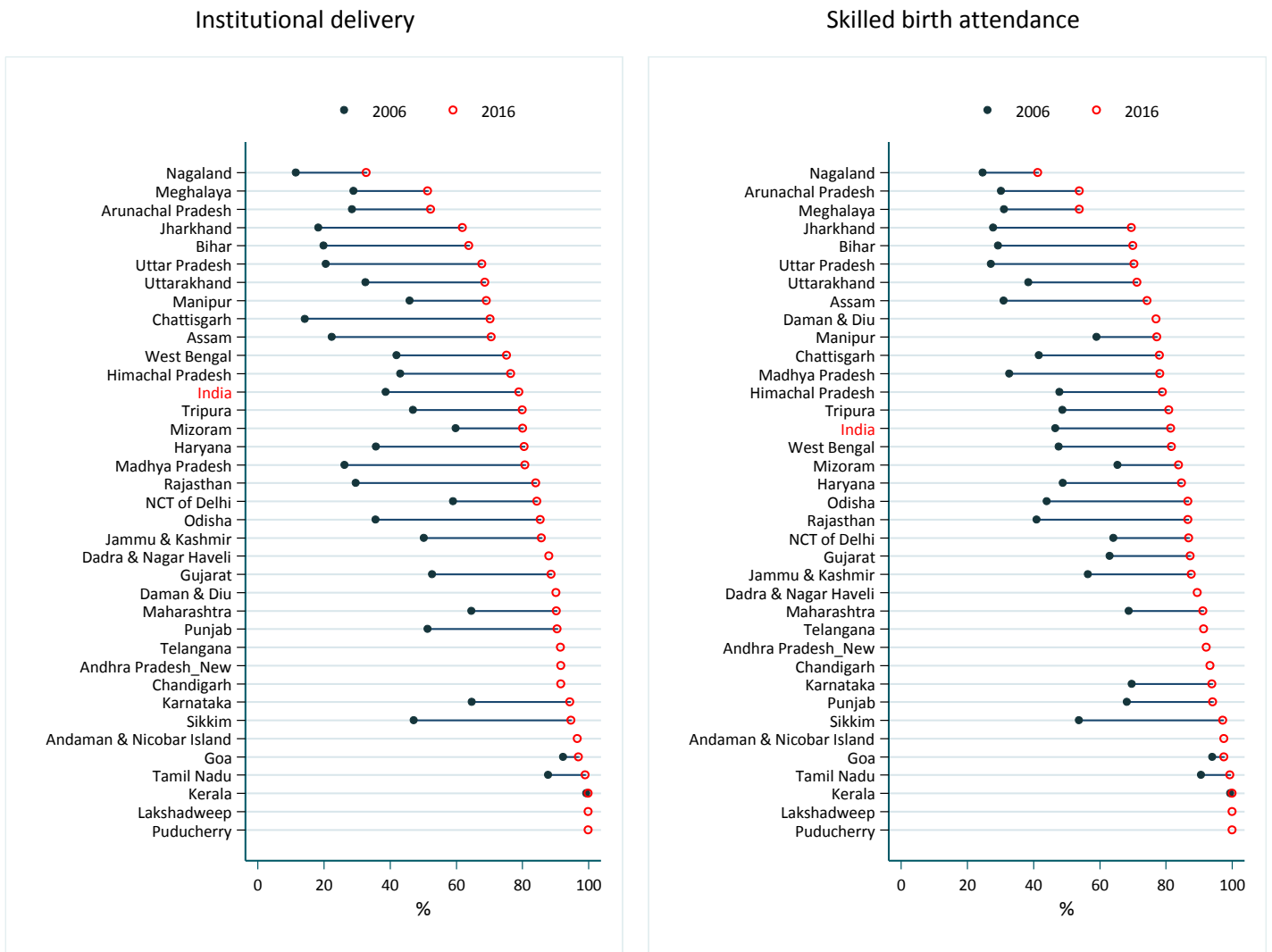
At the national level, the share of institutional deliveries increased considerably from 39 percent in 2006 to 79 percent in 2016. All states saw large improvements in the share of deliveries in health facilities, and 17 states saw an increase of over 30 pp between 2006 and 2016 (**Figure 21**). Except for Nagaland, considerable improvements are seen in institutional deliveries in states that had low coverage in 2006. In Nagaland, where the share was as low as 12 percent in 2006, institutional deliveries increased by only 21 pp over the 10-year period. Kerala, Goa, Tamil Nadu, Lakshadweep, and Puducherry had close to full coverage of institutional deliveries in 2016. In 2016, 14 states had coverage above 90 percent, and 14 other states had coverage between 70 percent and 90 percent. The data suggest that with many of the states showing considerable improvements between 2006 and 2016, and with over 70 percent coverage in the majority of states, India is not far from achieving full coverage in institutional deliveries.

FIGURE 20. USE OF IFA SUPPLEMENTS AND JSY IN 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

FIGURE 21. DELIVERY CARE BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

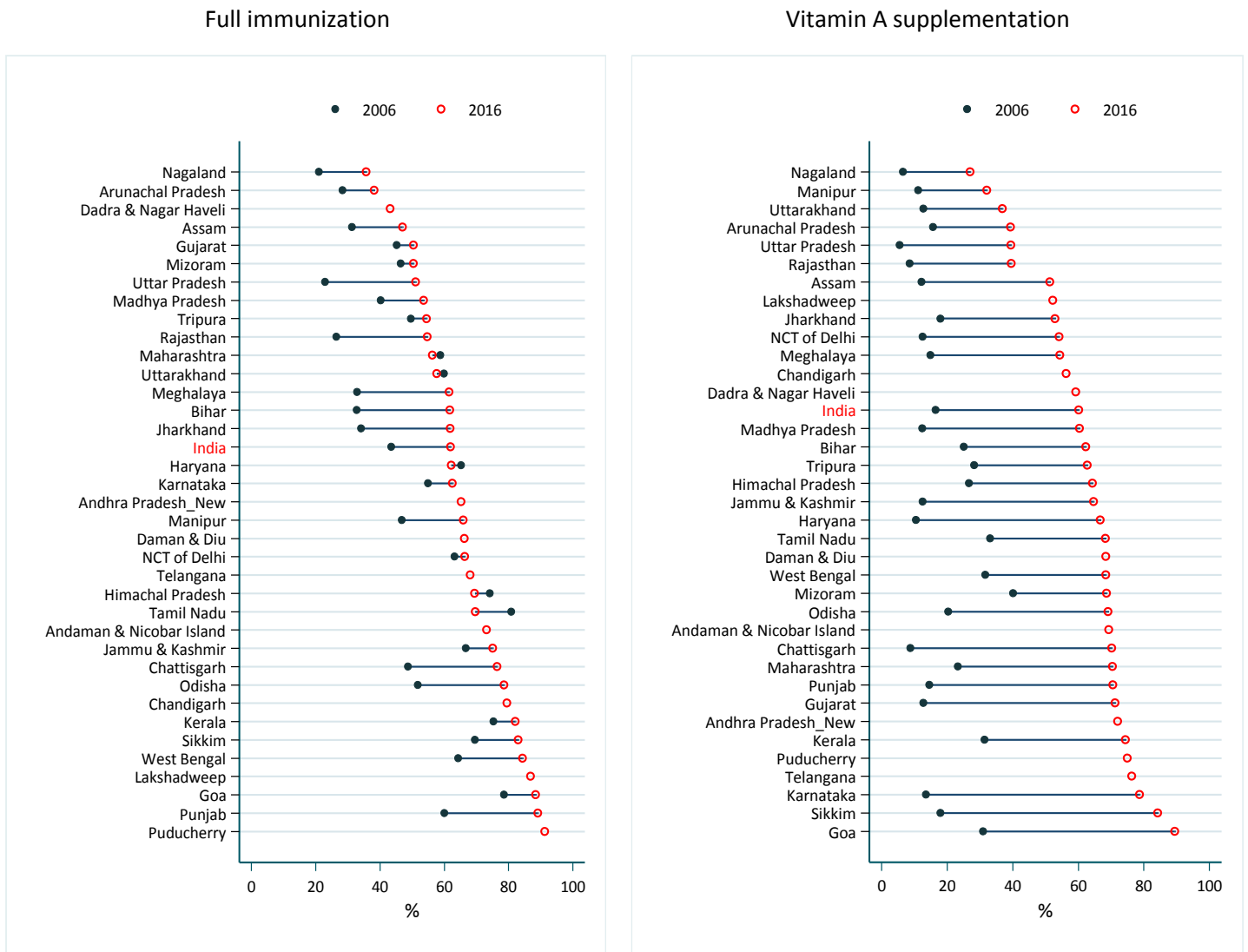
FULL IMMUNIZATION

The proportion of children age 12–23 months who received full immunization (BCG, measles, 3 doses each of DPT and polio vaccine) increased from 43.5 percent in 2006 to 62 percent in 2016 at the national level. Improvements in coverage of full immunization were seen in most states (**Figure 22**), including 5 states that saw an increase between 10 pp and 20 pp and 9 states that saw an increase of over 20 pp. The greatest improvements were in Uttar Pradesh, Rajasthan, Meghalaya, Bihar, and Punjab (28–29 pp). In contrast, 5 states saw a decline in coverage in 2016: Tamil Nadu (-11.2 pp), Himachal Pradesh (-4.7 pp), Haryana (-3.1 pp), Maharashtra (-2.5 pp), and Uttarakhand (-2.3 pp). In 2016, 7 states had coverage over 80 percent, and 17 states had coverage between 60 and 80 percent. Assam, Dadra and Nagar Haveli, Arunachal Pradesh, and Nagaland were the only states with coverage below 50 percent.

VITAMIN A SUPPLEMENTATION

The proportion of children age 6–59 months who received a vitamin A dose in the 6 months preceding the survey increased from 17 percent in 2006 to 60 percent in 2016 at the national level. Coverage of vitamin A supplementation improved in all states (**Figure 22**), including 15 states where coverage increased between 20 pp and 40 pp and 10 states where coverage increased between 40 pp and 60 pp. The greatest improvements were in Sikkim (66.3pp), Karnataka (65 pp), and Chhattisgarh (61.3 pp). Among the states where coverage was below 10 percent in 2006, Chhattisgarh (9 percent) saw the most improvement (61 pp) and Uttar Pradesh (6 percent) saw an increase of 34 pp. In 2016, the majority of states had coverage over 50 percent and the highest coverage was 90 percent (Goa).

FIGURE 22. FULL IMMUNIZATION AND VITAMIN A SUPPLEMENTATION BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

STATE TRENDS IN UNDERLYING DETERMINANTS

Several pieces of research have highlighted the importance of changes in underlying determinants of nutrition, such as women's education, sanitation, and poverty, which contribute to reductions in stunting over time. In this section, we examine the state trends in underlying determinants, including women's education (literacy and proportion achieving at least 10 years of education), girls married before age 18, and household access to sanitation. We also assess changes in infrastructure, such as the proportion of households with access to improved sources of drinking water and electricity.

WOMEN WITH AT LEAST 10 YEARS OF EDUCATION

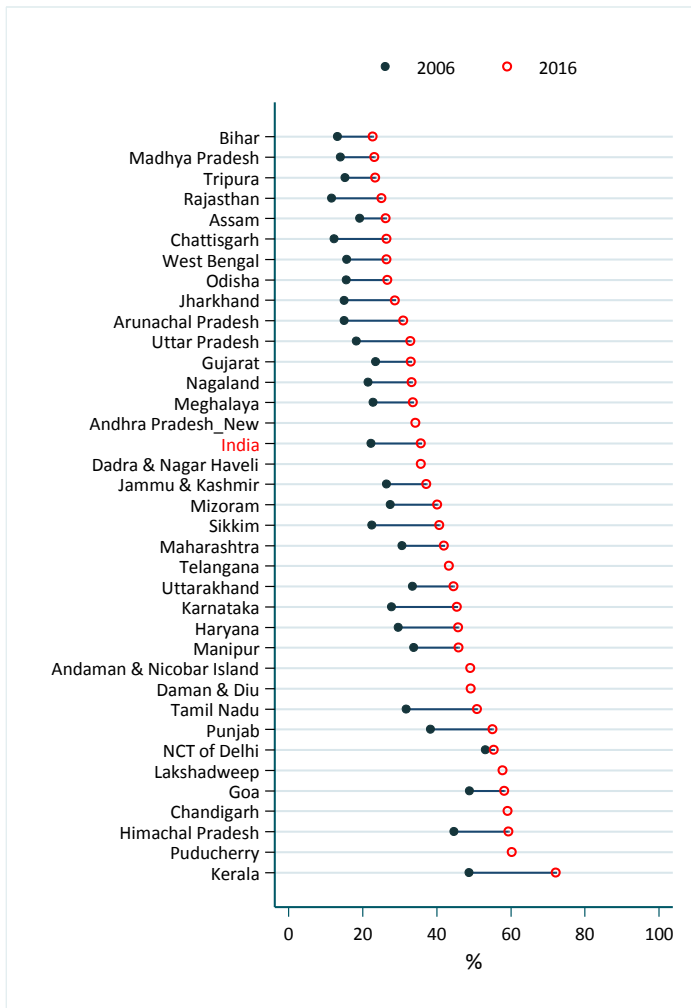
At the national level, the percentage of women having attained at least 10 years of education increased from 22.3 percent in 2006 to 35.7 percent in 2016. Most states saw an improvement of more than 10 pp (**Figure 23**). The greatest improvements were in the states of Kerala (23.5 pp), Tamil Nadu (19 pp), and Sikkim (18.2 pp). In contrast, NCT of Delhi saw only marginal improvement (2.2 pp). In 2016, the share of women with at least 10 years of education was over 50 percent in only 9 states.

GIRLS MARRIED BEFORE AGE 18

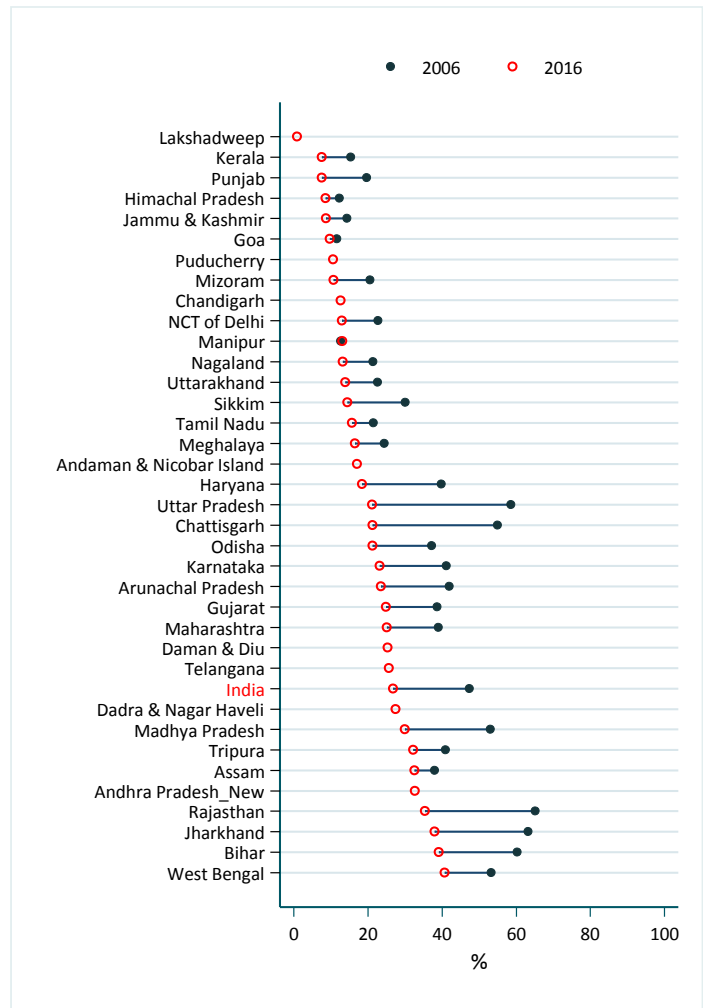
At the national level, the percentage of girls married before age 18 declined substantially, from 47 percent in 2006 to 27 percent in 2016. Excepting Manipur, all states saw declines in early marriage, and 15 saw a decline of over 10 pp (**Figure 23**). In Himachal Pradesh and Goa, the decline was low (less than 4 pp). In 2016, the proportion of girls married before age 18 was below 10 percent in only 6 states; it was above 30 percent in 7 states.

FIGURE 23. WOMEN WITH AT LEAST 10 YEARS OF EDUCATION AND GIRLS MARRIED BEFORE AGE 18 BETWEEN 2006 AND 2016, BY STATE

Women with at least 10 years of education



Girls married before age 18



Sources: NFHS-3 and NFHS-4.

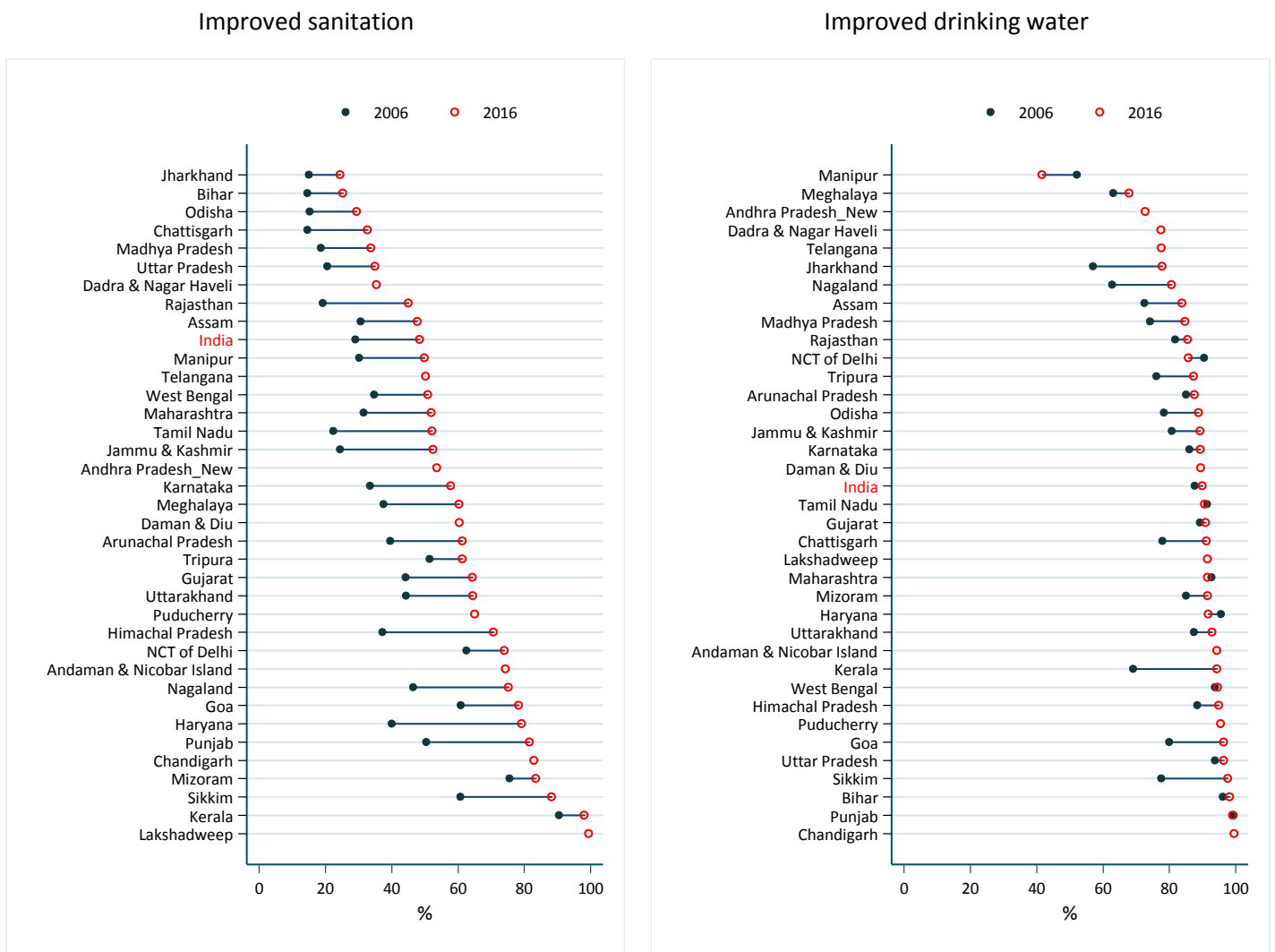
IMPROVED SANITATION

At the national level, the percentage of households using improved toilets remains below 50 percent despite a 19.3 pp increase between 2006 and 2016. The majority of states have seen at least a 10 pp increase in use of improved sanitation (**Figure 24**). The largest improvement was seen in Punjab, Himachal Pradesh, and Haryana (31–39 pp). In 2016, 12 states had coverage of over 70 percent, but 10 states still had coverage of less than 50 percent.

IMPROVED DRINKING WATER

The proportion of households with access to any improved source of drinking water increased from 88 percent in 2006 to 90 percent in 2016 at the national level. Coverage of improved drinking water improved in all states except for Manipur, NCT of Delhi, Haryana, Tamil Nadu, Maharashtra, and Punjab (Figure 24). The largest improvements were in Sikkim, Jharkhand, and Kerala (>20 pp) and the largest decline was in Manipur (-10.5 pp). All states had coverage above 50 percent in both 2006 and 2016 except Manipur (41.6 percent in 2016).

FIGURE 24. IMPROVED SANITATION AND IMPROVED DRINKING WATER BETWEEN 2006 AND 2016, BY STATE



Sources: NFHS-3 and NFHS-4.

SUMMARY OF FINDINGS ON STATE TRENDS

Our analysis indicates that several states in India have made considerable progress on several of the **nutrition outcomes** in the last decade, but the progress has not been uniform. Between 2006 and 2016, stunting declined across all states. In contrast, wasting declined in only 12 states and increased in 16 states. While the prevalence of anemia declined in most states, it increased in 8 states. The prevalence of LBW declined in all states except Nagaland. Between 2006 and 2016, EBF rates increased in most states, but declined in 6 states. In a majority of the states, EBF is over 50 percent, suggesting an overall positive picture.

Despite a positive trend in nutrition outcomes, the prevalence of stunting is still very high (>30 percent) in 18 states. As of 2016, most states and union territories (28 states) fall in the category of very high wasting levels (≥ 15 percent). In addition, 30 states and union territories can be classified as having a severe public health problem (≥ 40 percent) of anemia among women of reproductive age. Among other nutrition outcomes, underweight among children declined across India. The prevalence of anemia among pregnant women and children declined, but prevalence remains high and is a key concern. These interstate differences and the current high levels of undernutrition highlight the need to further examine the determinants of the problem and the need to design robust strategies for reducing undernutrition and anemia among women and children, taking into account state-level successes, challenges, and needs.

Considerable progress has been made in **immediate determinants** across the states, but with high interstate variability. Women's BMI and EIBF rates improved in a majority of the states. Complementary feeding is particularly of concern as the rate of timely introduction of complementary foods declined in nearly all states. Diet quality and frequency, as measured by adequate diet among children age 6–23 months, remain very low. In 20 states, less than 10 percent of children receive adequate diet. There have been mixed improvements in the morbidity burden among children. The proportion of children with ARI declined in a majority of the states, excepting a few where prevalence increased; the decline in the incidence of diarrhea has been negligible overall, and incidence increased in 7 states and union territories.

High interstate variability characterizes the coverage of **nutrition-specific interventions**. The coverage of ANC (during the first trimester and 4 ANC visits) increased in most states with a few exceptions where it declined. Consumption of IFA supplements improved between 2006 and 2016 in most states. In 10 states and union territories, more than 50 percent of women reported consuming IFA for 100 days during pregnancy. Because JSY was introduced in 2005, there are no data on JSY in NFHS-3. We find that

coverage of JSY in 2016 was highly variable across the states, ranging from just 1.4 percent in Andaman & Nicobar Island up to 73 percent in Odisha; in 11 states, over 40 percent of women reporting receiving JSY. Between 2006 and 2016, nearly all states showed considerable improvement in the coverage of institutional deliveries and births assisted by health professionals. With more than 70 percent coverage of delivery care in 2016 in several states, India is set to achieve full coverage soon.

There is a similar interstate variability in coverage of the early childhood interventions. Immunization coverage has improved in most states, reaching over 60 percent in a majority of the states and union territories. Coverage of vitamin A supplementation also improved across all the states, with over 50 percent coverage in a majority of the states in 2016.

Overall, there have been improvements in the **underlying determinants** of nutrition in India and across the states, including improvements in women's education and age at marriage. In all states, the proportion of women with 10 or more years of education increased between 2006 and 2016, although the magnitude of change varied among the states. On a similar positive note, the proportion of women getting married before age 18 declined substantially, a trend observed in all states except Manipur. However, there is scope for improvement in several states where more than a quarter of women are still married before age 18.

The availability of basic facilities at the household level has also improved. In most states, the use of improved sanitation facilities has increased. However, there is scope for improvement; in several states less than 50 percent use such facilities. With the exception of 6 states, access to improved drinking water sources has increased. Despite a decline in access to water in 6 states, coverage was still high, at or above 90 percent, in 4 of those states.

CONCLUSIONS

India is a major contributor to the global burden of undernutrition. In the last decade, there have been significant reductions in child undernutrition in the country. However, reductions have not been uniform across the states of India. Although all states operate under a similar broad national policy and programmatic environment, interstate variability in the outcomes points to state-specific factors affecting progress. An understanding of such factors can facilitate cross-state learning and identification of state-specific areas for strategic investments to improve nutrition outcomes and help India accelerate improvements in nutrition.

Our analysis of the trends in **nutrition outcomes** shows that India achieved improvements in some dimensions of undernutrition between 2006 and 2016, but that others are stagnated. Stunting declined from 48 percent to 38.4 percent among children under 5 years, while underweight declined from 42.5 percent to 37.5 percent. However, wasting among children and anemia rates among women showed little change. Although exclusive breastfeeding improved, the rate remains low at 55 percent at the national level.

There have been modest improvements in the **immediate determinants** of nutritional outcomes. The proportion of women with low BMI declined from 35.5 percent to 22.9 percent and early initiation of breastfeeding nearly doubled. However, complementary feeding is a major concern, with a decline in timely introduction of semi-solid foods for children age 6–8 months and extremely low levels of adequate diet among children age 6–23.9 months. The incidence of diarrhea among children remained unchanged, but ARI declined.

Intervention coverage data shows positive trends for most interventions, likely reflecting efforts made in programs delivering interventions. The scale and reach of maternal interventions was particularly successful in the last decade: coverage of ANC during the first trimester increased from 44 percent in 2006 to 59 percent in 2016; and coverage of four or more ANC visits increased from 37 percent to 51 percent. Consumption of IFA during pregnancy doubled but still remained very low (from 15 percent in 2006 to 30 percent in 2016). Delivery at health facilities and use of skilled birth attendants also improved, achieving ~80 percent coverage. However, immunization of children and vitamin A supplementation remained moderate at ~60 percent. Finally, despite legal edicts and programmatic guidance for universalization of food supplements for children, the national-level change in coverage was low.

Over the last decade, data on **underlying determinants** show improvements in women’s education (22.3 percent to 35.7 percent) and girls getting married before age 18 (47 percent to 27 percent). On another promising note, nearly 90 percent of households now have access to drinking water and electricity. Although access to sanitation facilities has also improved, coverage is still low at 48 percent.

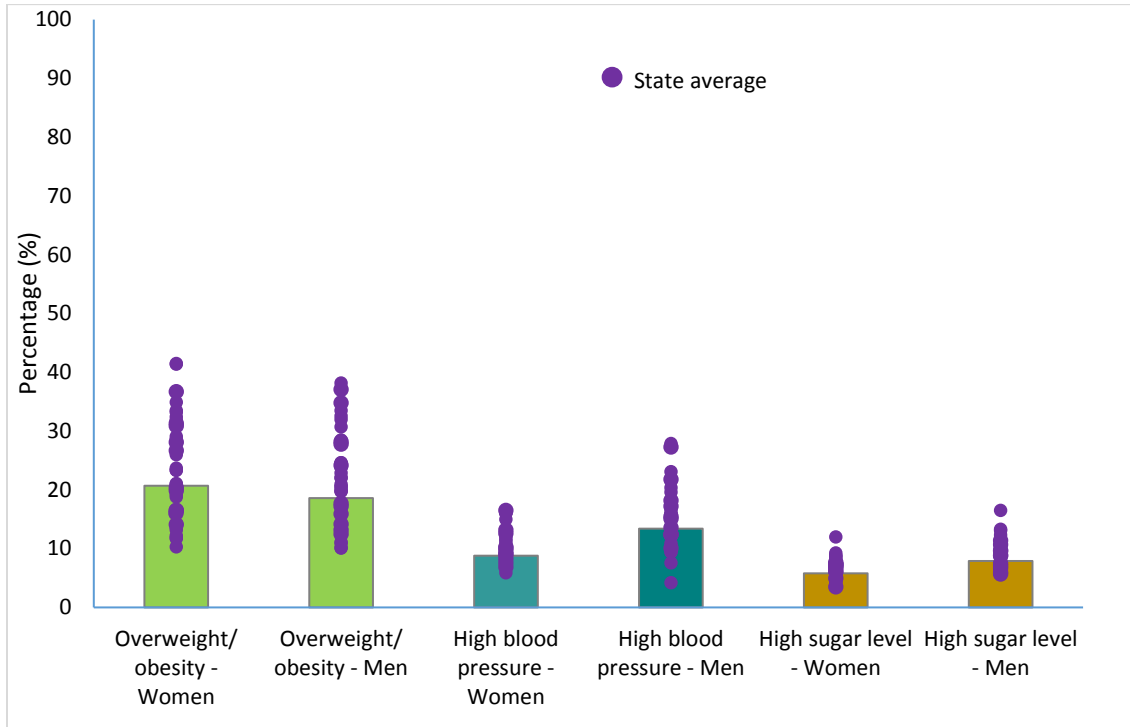
Most importantly, our analyses of **state-level variability** in changes in nutrition outcomes and determinants and the levels achieved in 2016 provides important insights. No one state is demonstrating success across all domains examined; and no one state is demonstrating failures across all domains. This is promising because it suggests that there is potential for change despite the varied governance, political, financial, cultural, and economic fabric of India’s states. It does indicate, however, that a state-by-state analysis of trends, changes, and internal variability, by district, can help signal specific areas for state-level strategic investments. What is essential is that states focus action on those determinants of nutrition where gaps are the largest.

Looking forward, in a global context of commitments to nutrition as a critical development investment and as a human right, India should continue to deliver well—sustaining coverage and improving quality—for those interventions for which it has achieved the highest coverage already (for example, interventions during pregnancy). Efforts are most urgent for strengthening those determinants and interventions for which coverage has been lagging. A special focus is required on continuing support breastfeeding, investing immediately in improving complementary feeding, strengthening immunization and vitamin A supplementation for children, and improving sanitation for households.

As we look ahead to improved nutrition for India, it is also important to acknowledge that **malnutrition takes multiple forms**. While continuing to focus on reducing stunting and wasting among children, efforts are also essential to address anemia among women and children. Alongside investments in improving early nutrition, it is also important for India to acknowledge and act on the challenge of noncommunicable diseases. As **Figure 25** shows, the challenge is substantial, with close to 21 percent of women and 19 percent of men in India overweight or obese, and as with other outcomes, high variability across states. High blood pressure and high blood sugar are also emerging challenges.

Health and nutrition are human rights, and healthy populations are a major prerequisite for productive economies. With both these goals in mind, India and all states within India need to develop strategies to simultaneously address these multiple forms of malnutrition. Their determinants vary by state, and even by district, but with several robust policy instruments already in place, India is well-positioned to strengthen and solidify actions without undue delay.

FIGURE 25. LEVELS OF NONCOMMUNICABLE DISEASES IN INDIA IN 2016



Source: NFHS-4.

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