

Improving Nutrition in Assam

Insights from Examining Trends in Outcomes, Determinants and Interventions between 2006 and 2016

INTRODUCTION

India has made considerable progress on child nutrition outcomes in the last decade. These rates of improvement, however, have been highly variable across the states, mostly due to variability in state-level changes in the determinants of nutrition and in the coverage of health and nutrition interventions. Although all of the states operate under a similar national policy and programmatic environment, the variability in trends in nutritional outcomes points to state-specific factors. An understanding of such factors can facilitate both state-specific learning and cross-state learning, and help to identify strategies to help India accelerate progress on nutrition. In a series of *Policy Notes*, we examine state-specific trends in nutrition outcomes, determinants and the coverage of interventions, with the overall goal of supporting the state. This *Policy Note* focuses on Assam.

Assam, situated in the north-east of India, accounts for 2.4 percent of the area of the country and includes 33 districts (Government of Assam 2017). The state is home to more than 31 million people (2.5 percent of the population of India), of which 72.2 percent are literate (Census of India 2011). Assam has a sex ratio of 958 females per 1,000 males (Census of India 2017). The state is largely forested and is culturally diverse with over 24 tribal groups (Assam State Biodiversity Board 2017).

The purpose of this *Policy Note* is to examine the trends in undernutrition in Assam and to document trends and geographic variability in the major determinants of nutrition and the coverage of key nutrition and health interventions. In doing this analysis, we aim to highlight the key areas of action to improve nutrition in Assam.

METHODS

We used summary data from the recently released National Family Health Survey-4 (NFHS-4 2015–16) fact sheets (International Institute for Population Sciences 2017) and data from the NFHS-3 from 2005–06 to compare trends in outcomes, determinants and interventions over a decade (International Institute for Population Sciences 2008). We also used information from fact sheets of the Rapid Survey on Children (RSoc 2013–14) (Ministry of Women and Child Development 2015) for indicators that are currently not available in NFHS-4. We used summary data reported in NFHS-4 district-level to examine inter-district variability. Since NFHS-4 used the Census 2011 district boundaries, this *Policy Note* reports information for only 27 districts.

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 birth weight,

exclusive breastfeeding, and anemia status among women of reproductive age.

We also examined levels and changes in several immediate, underlying and basic determinants of nutrition (Black et al. 2013). For intervention coverage, we chose to examine a set of nutrition-specific interventions across the lifecycle for which data are currently available. These include interventions affecting pregnant women, newborn babies, infants, and children.

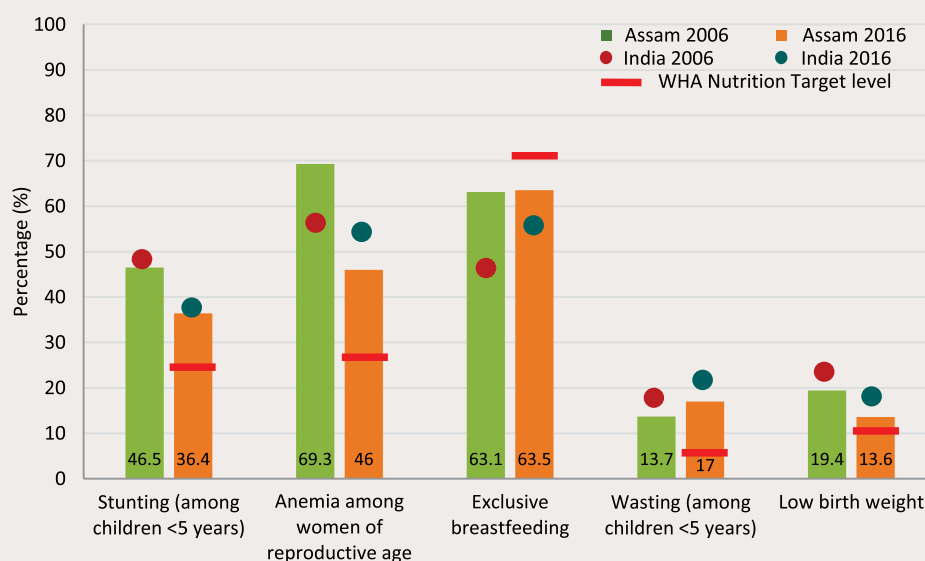
FINDINGS

Trends in nutrition outcomes and variability in outcomes by district

Overall, changes in nutrition outcomes in Assam between 2006 and 2016 have been mixed. While stunting prevalence fell from 46.5 percent to 36.4 percent (Figure 1), wasting increased from 13.7 percent to 17 percent. Anemia among women of reproductive age reduced from 69.3 percent to 46 percent in the last ten years. The prevalence of low birth weight decreased by 5.8 percentage points, from 19.4 percent in 2006 to 13.6 percent in 2016. The prevalence of exclusive breastfeeding increased slightly from 63.1 percent to 63.5 percent in the same period.

Stunting among children less than 5 years varies moderately among districts, ranging from 24.6 percent in Kamrup Metropolitan to 47.4 percent in Dhubri (Map 1) and is higher than 40 percent for 5 other districts (Chirang, Barpeta, Karimganj, Goalpara, and Darrang). The prevalence of anemia among women of reproductive age is higher than 40 percent for 20 districts and higher than 50 percent for 9 districts in Assam (Map 2). Anemia among women has moderate variability across districts with the highest prevalence (54.8 percent) in Udalguri and lowest (35.2 percent) in Sivasagar. The prevalence of wasting ranges from 6.2 percent (Dhemaji) to 30.6 percent (Cachar) (Map 3), and 15 districts have very high wasting prevalence (>15 percent). Severe wasting ranges from 0.8 percent (Dhemaji) to 12.7 percent (Bongaigaon) (Map 4). Exclusive breastfeeding (EBF) rates are missing for Kamrup Metropolitan district. Among the remaining 26 districts, EBF varies widely and is the highest (86.2 percent) in Tinsukia and lowest (28.6) in Cachar in (Map 5).

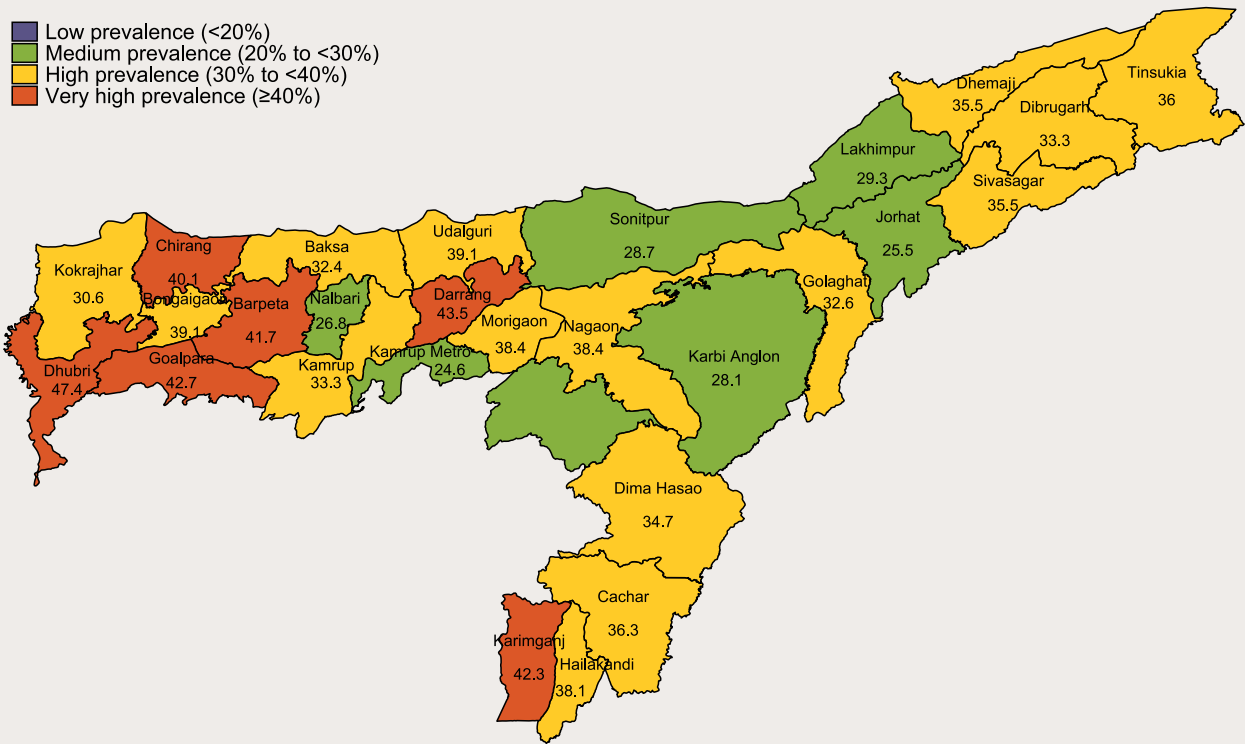
FIGURE 1 Trends in key nutrition outcomes in Assam, 2006 to 2016



Source: NFHS-3 and NFHS-4; RSoC data used for low birth weight.

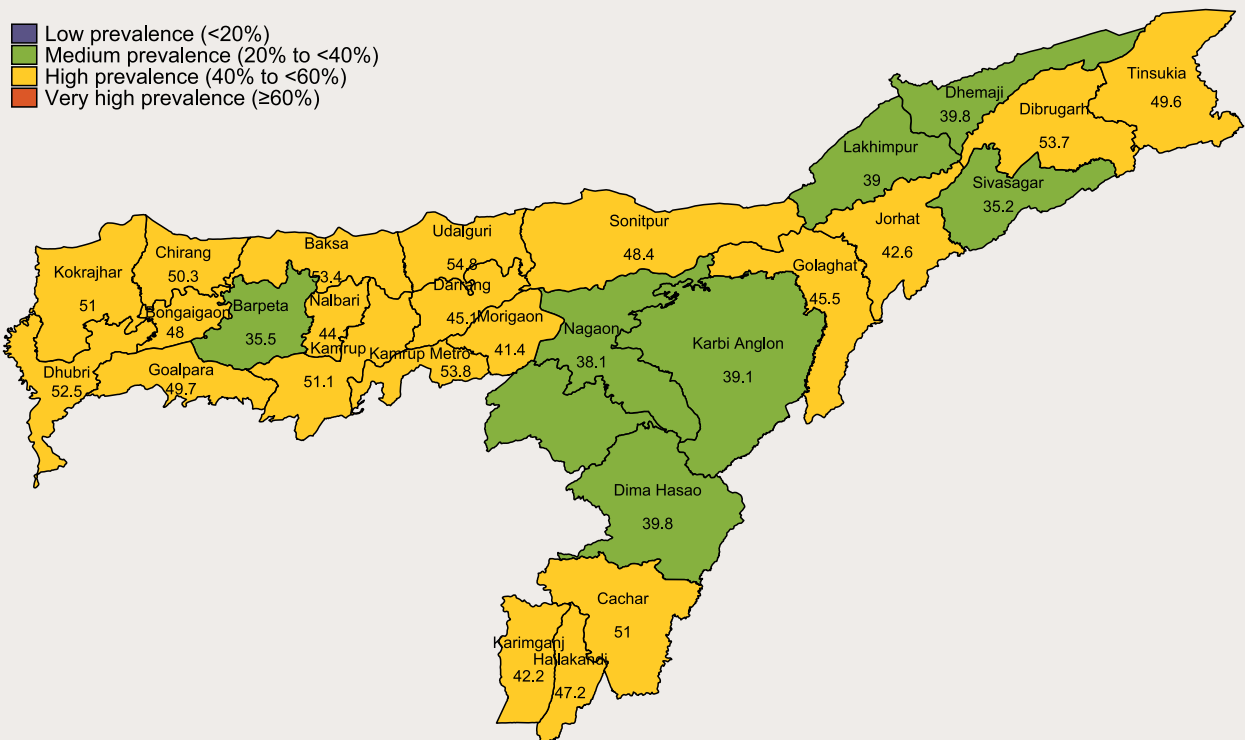
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates are based on NFHS-4 (2016) as there is no survey data for 2012; Child overweight data is not available; Refer to endnotes for indicator definitions.

MAP 1 Stunting (among children <5 years) in Assam in 2016, by district



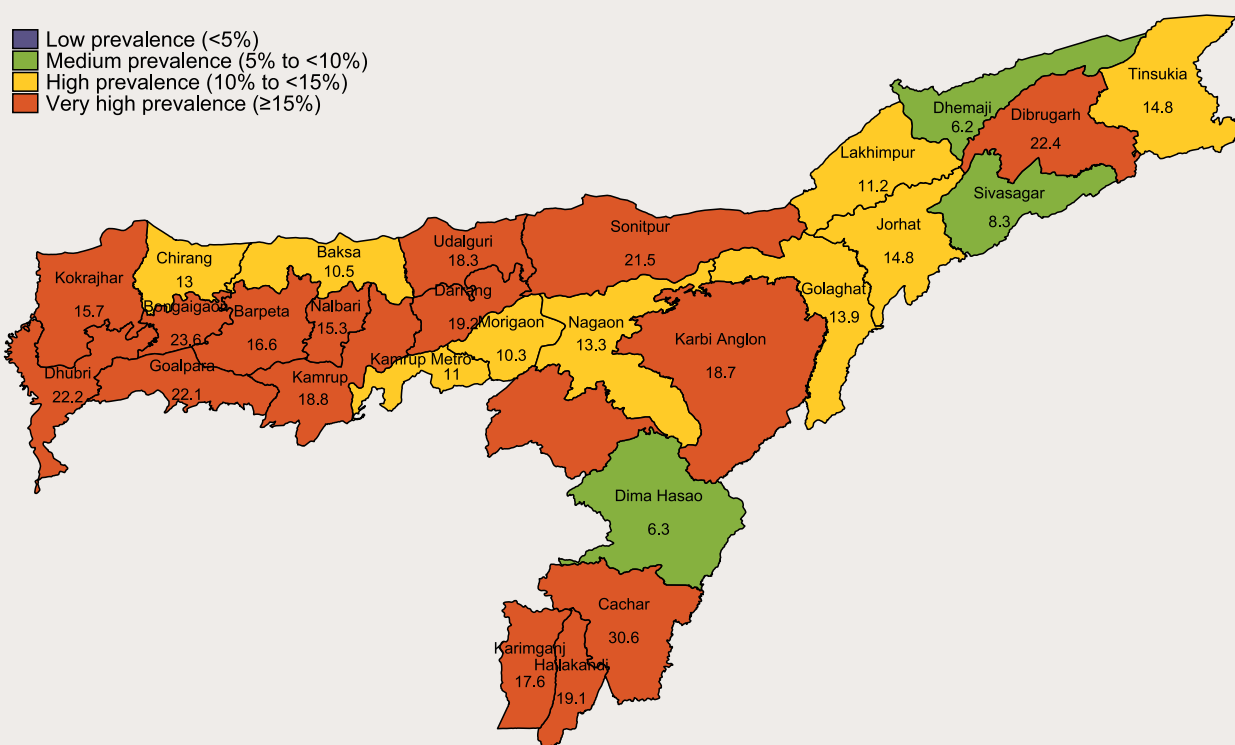
Source: NFHS-4.

MAP 2 Anemia (among women of reproductive age) in Assam in 2016, by district



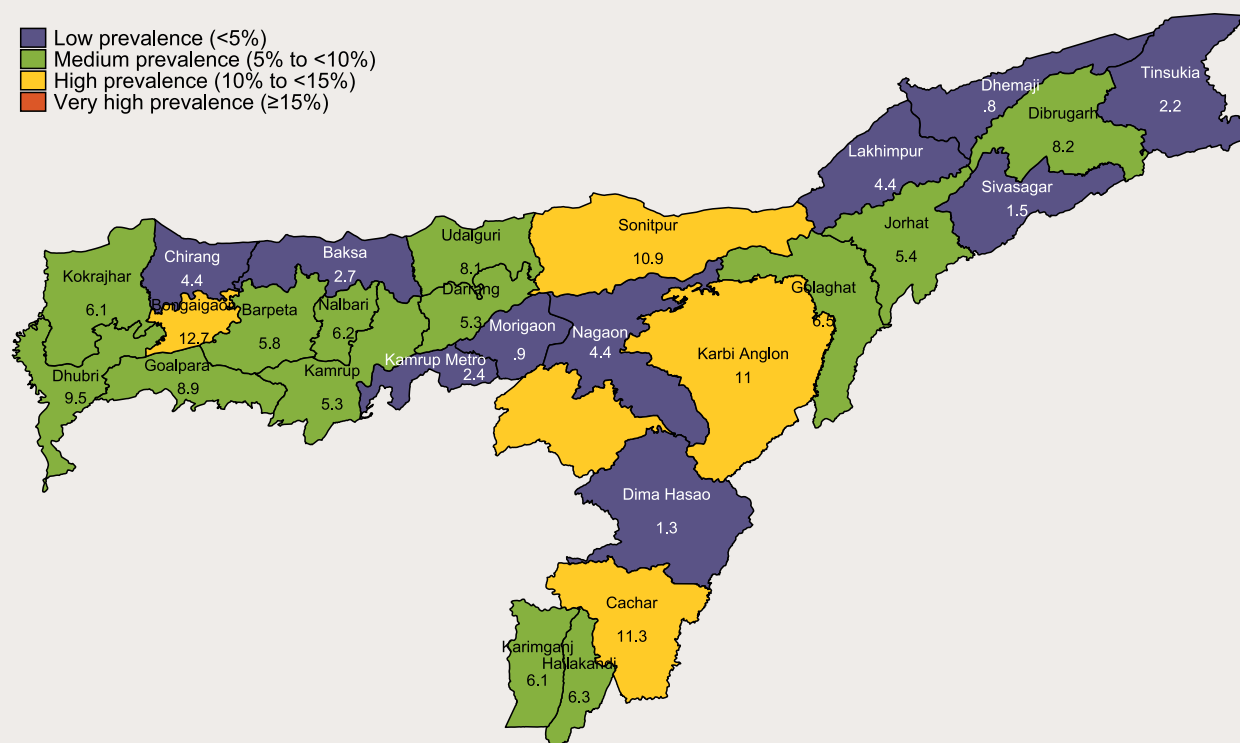
Source: NFHS-4.

MAP 3 Wasting (among children <5 years) in Assam in 2016, by district



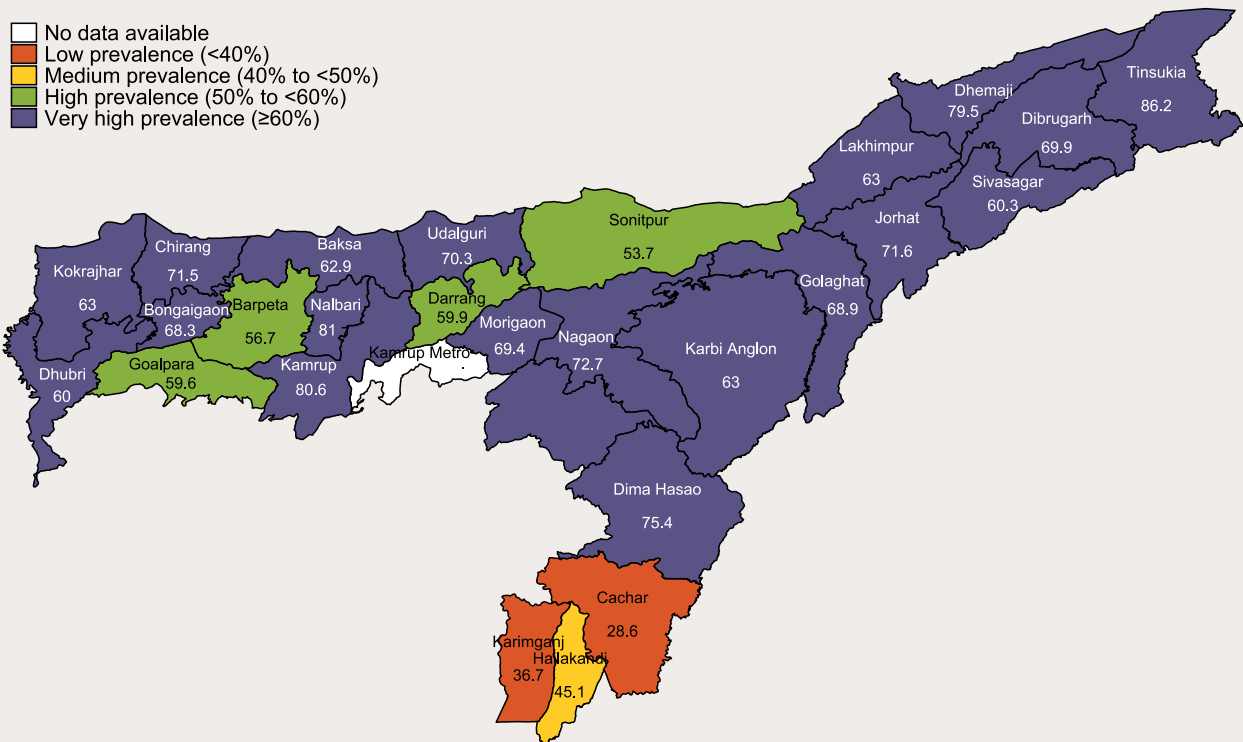
Source: NFHS-4.

MAP 4 Severe wasting (among children <5 years) in Assam in 2016, by district



Source: NFHS-4.

MAP 5 Exclusive breastfeeding in Assam in 2016, by district



Source: NFHS-4.

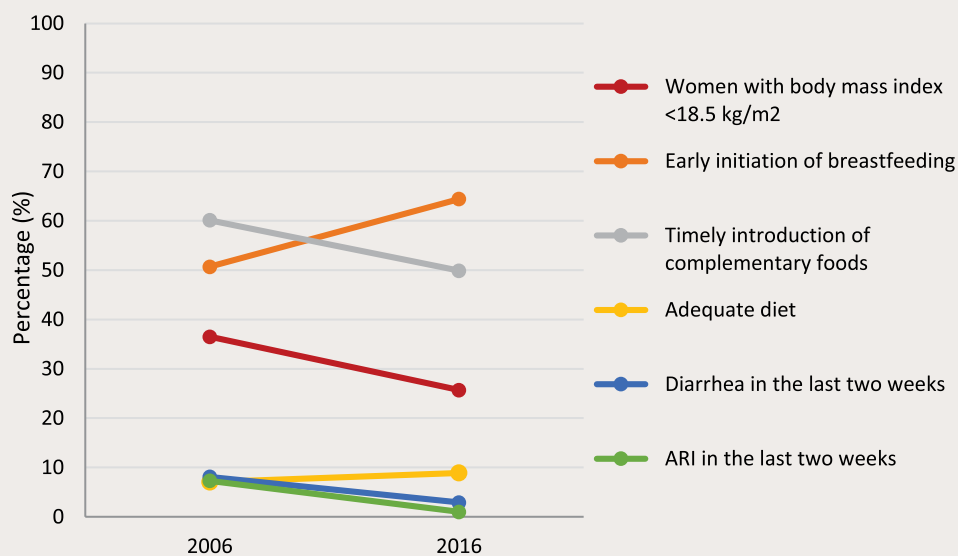
Changes in the determinants of nutrition

Improving nutrition for women and children requires that investments be made in changing the determinants of poor nutrition, using a variety of policy instruments and other efforts. Here, we examine changes in the immediate determinants and of nutrition-specific interventions to address those determinants. We also describe changes in the underlying determinants of nutrition. We do not examine coverage data on programs to improve the underlying determinants in this Note because data on those are not available at this time.

Changes in the **immediate determinants** of nutrition in Assam are described in Figure 2. The proportion of women with low body mass index (BMI <18.5 kg/m²) decreased from 36.5 percent in 2006 to 25.7 percent in 2016. Early initiation of breastfeeding improved in the last decade from 50.7 percent to 64.4 percent, but around 36 percent of children are still not breastfed within an hour of birth. Child morbidity reduced considerably in the last ten years, from 8.1 percent to 2.9 percent for diarrhea, and from 7.3 percent to 1 percent for acute respiratory infection (ARI).

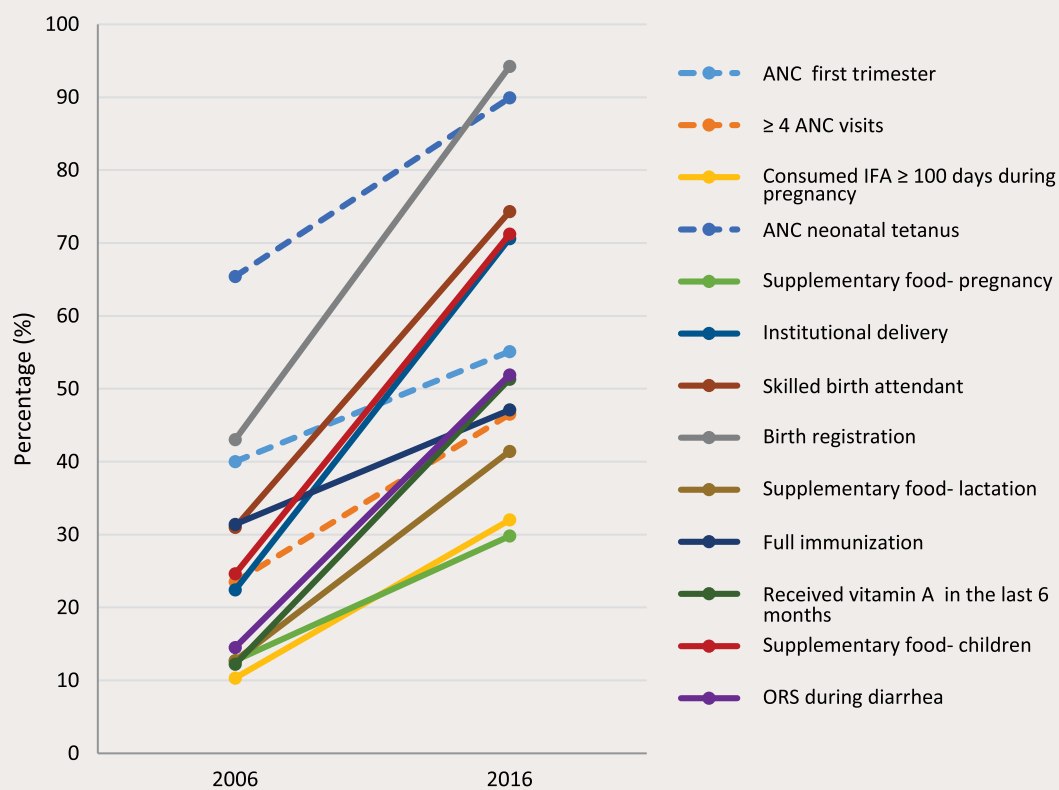
Complementary feeding is still far from adequate in Assam, as it is for India. Timely introduction of complementary foods (between 6 and 8 months of age) declined over the last decade (from 60.1 percent to 49.9 percent). In 2016, only 8.9 percent of children (between 6 and 23 months of age) received an adequate diet.

The coverage of all **nutrition-specific interventions** in Assam improved during the last decade (Figure 3). During pregnancy, the proportion of women who received antenatal care (ANC) during first trimester improved by 15.1 percentage points, reaching 55.1 percent in 2016. The proportion of women who received at least 4 ANC visits increased from 23.5 percent to 46.5 percent. Iron and folic acid (IFA) consumption during pregnancy improved from 10.3 percent in 2006 to 32 percent in 2016, but it is still far from optimal. Interventions related to delivery, such as institutional delivery, births assisted by health professionals and birth registration improved substantially with 43 to 51 percentage points increase, reaching between 70-75 percent (over 90 percent in

FIGURE 2 Changes in immediate determinants of nutrition in Assam, 2006 to 2016


Source: NFHS-3 and NFHS-4.

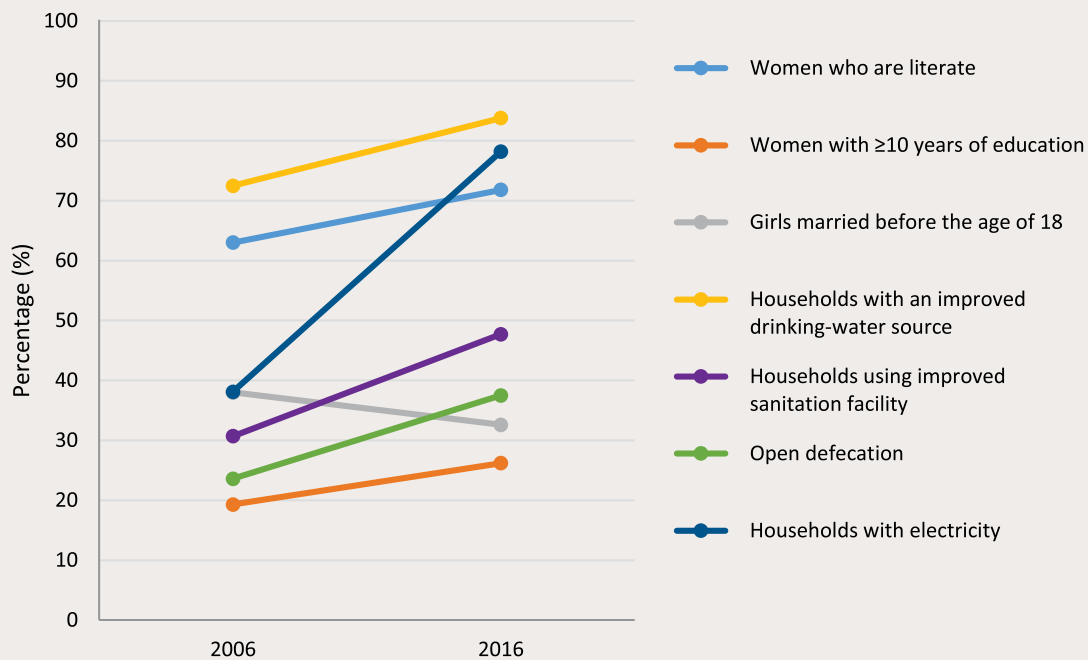
Note: ARI = Acute respiratory infection; Refer to endnotes for indicator definitions.

FIGURE 3 Changes in coverage of nutrition-specific interventions along the continuum of care in Assam, 2006 to 2016


Source: NFHS-3 and NFHS-4; RSoC data used for food supplementation.

Note: ANC = Antenatal care; IFA = Iron and folic acid; ORS = Oral rehydration salts; Refer to endnotes for indicator definitions.

FIGURE 4 Changes in underlying determinants of nutrition in Assam, 2006 to 2016



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

Note: Refer to endnotes for indicator definitions.

the case of birth registration) in 2016. For pregnant women, the coverage of food supplementation increased from 12.7 percent in 2006 to 29.8 percent in 2016. The improvement was even greater for lactating women (from 12.7 percent to 41.4 percent) and children (from 24.6 percent to 71.2 percent). Nutrition interventions focused on children have improved in the last ten years. The proportion of children receiving vitamin A supplementation increased substantially from 12.2 percent to 51.3 percent, and children with diarrhea who received Oral rehydration salts (ORS) also increased from 14.5 percent to 51.9 percent. The proportion of children who were fully immunized increased from 31.4 percent to 47.1 percent, but more than half of the children still do not receive full immunizations in the state.

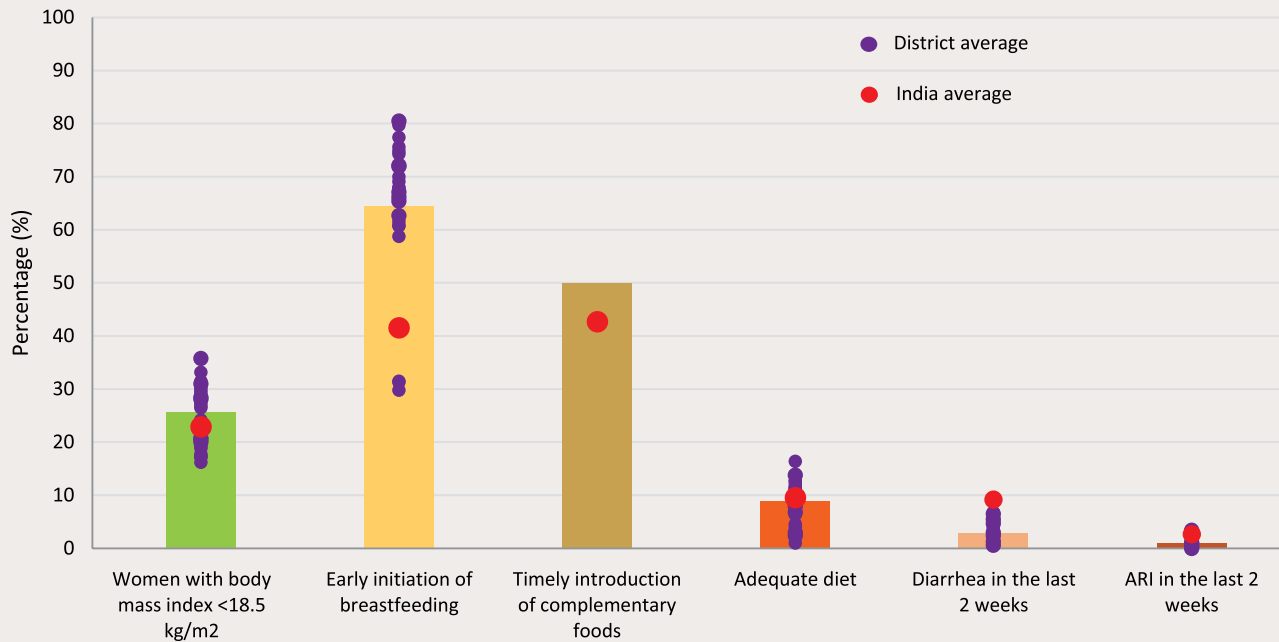
Changes in **underlying determinants** of nutrition are presented in Figure 4. Between 2006 and 2016, there has been an increase in the proportion of women who are literate (from 63 percent to 71.8 percent) and the proportion of women with more than 10 years of education (from 19.3 percent to 26.2 percent). Early marriage in girls reduced by only 5.4 percentage points, from 38 percent in 2006 to 32.6 percent in 2016.

In Infrastructure, households with an improved drinking-water source increased from 72.5 percent in 2006 to 83.8 percent in 2016 and households with access to electricity improved substantially from 38.1 percent to 78.2 percent. Households using improved sanitation facility during this period increased from 30.7 percent to 47.7 percent. Assam has an open defecation rate of 37.5 percent, which is lower than the national average (RSoC 2013–14).

Inter-district variability in selected determinants and coverage of interventions in Assam, in 2016

The 27 districts of Assam for which NFHS-4 data is available, cover a range of socio-economic characteristics. As seen in Figures 5-7, among these districts there is a high degree of inter-district variability for many determinants (that is, women with low BMI, early initiation of breastfeeding, care during pregnancy, care during delivery, use of Janani Suraksha Yojana (JSY), vitamin A supplementation, full immunization, adequate diet among children, infrastructure, and women's education). There is less inter-district variability for coverage of Mother and Child Protection (MCP) card, which is above 95 percent for majority of the districts; and for prevalence of diarrhea and ARI in children, which are uniformly low across districts.

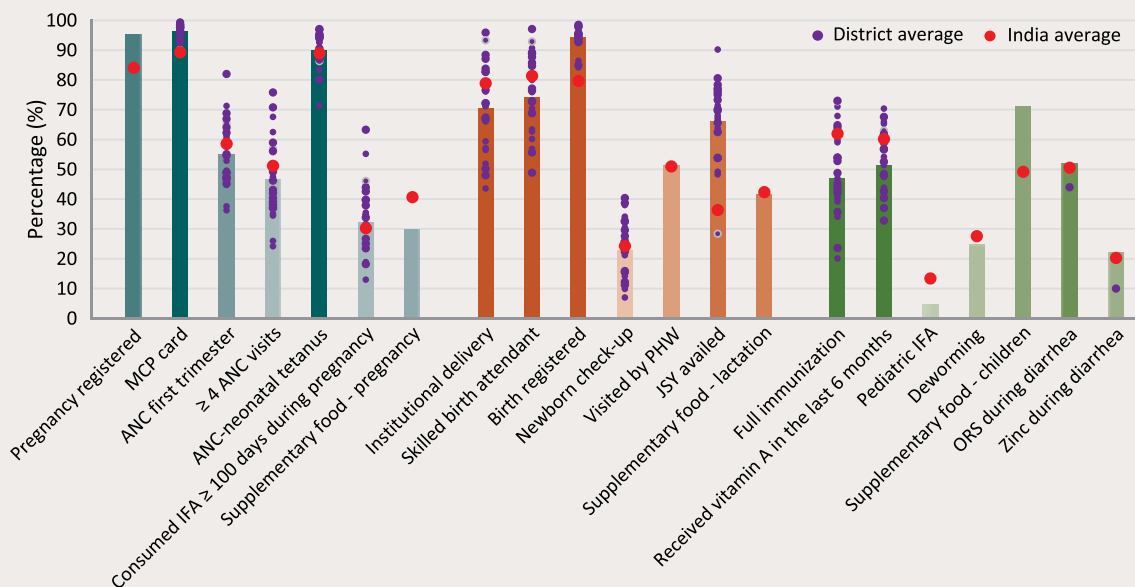
FIGURE 5 Inter-district variability in immediate determinants in Assam, in 2016



Source: NFHS-4.

Note: Bars represent state averages; ARI= Acute respiratory infection; Refer to endnotes for indicator definitions.

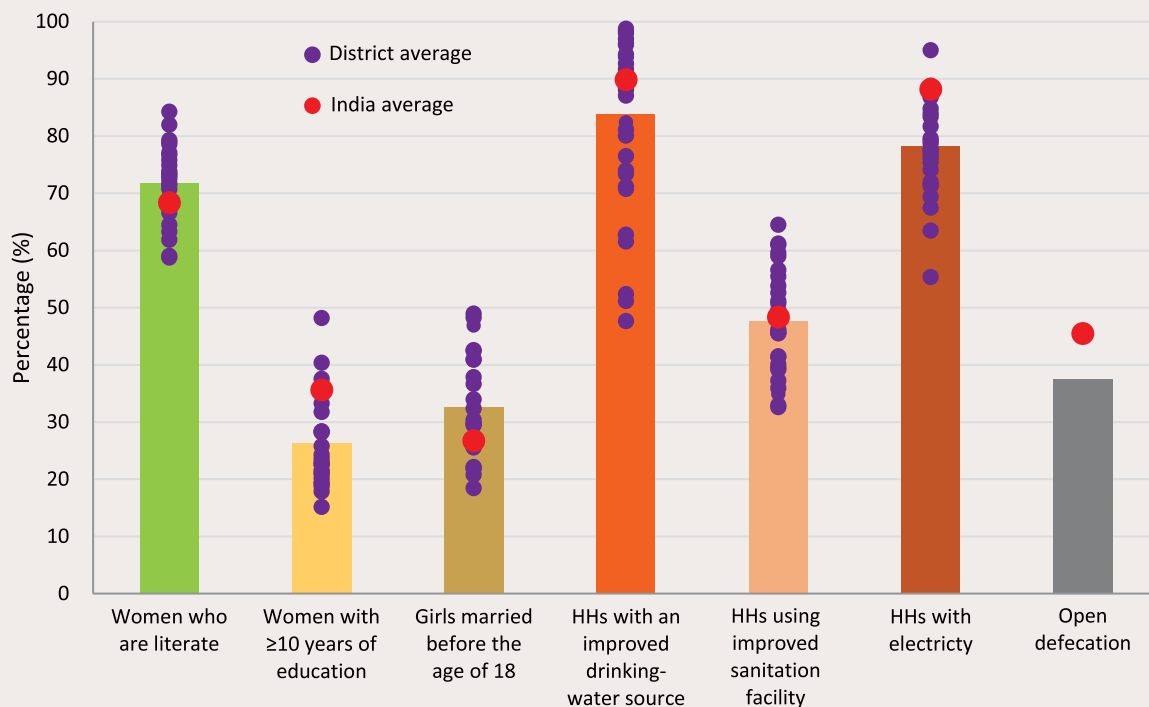
FIGURE 6 Inter-district variability in coverage of selected interventions in Assam, in 2016



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

Note: Bars represent state averages; As RSoC data is not representative at the district-level, district variability is unavailable for these indicators; ANC= Antenatal care; IFA= Iron and folic acid; JSY= Janani Suraksha Yojana; ORS= Oral rehydration salts; MCP= Mother and child protection; PHW= Primary health worker; Refer to endnotes for indicator definitions.

FIGURE 7 Inter-district variability in underlying determinants in Assam, in 2016



Source: NFHS-4; RSoC data is used for indicator for open defecation.

Note: Bars represent state averages; HHs= Households; Refer to endnotes for indicator definitions.

For many indicators, for example, women with low body mass index (BMI <18.5 kg/m²), ANC, IFA during pregnancy, institutional delivery, skilled birth attendant, newborn check-up, full immunization, vitamin A supplementation, children with adequate diet, women who are literate, and households using improved sanitation facility, the coverage for most of the districts is around the national average. For some indicators, for example, early initiation of breastfeeding, use of MCP card, births registered, use of JSY, and girls married before 18 years of age, most districts in Assam are doing better than the national average. For few others, for example, women with over ten years of education, households with an improved drinking-water source and electricity, most districts in Assam are doing worse than the national average.

LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

In the era where India has now embraced the sustainable development goals, it is an opportune time for Assam to set its own nutrition targets to be

achieved by 2025 and to set in motion accelerated actions for improved nutrition. In the last ten years, the state has seen improvements in the coverage of most nutrition-specific interventions such as care during pregnancy and delivery, postnatal care and care for children. These improvements seem to commensurate with the progress in reduction of stunting, anemia among women and low birth weight. However, the state has not made improvements in wasting, which has shown a reverse trend in the last ten years and is currently very high (>15 percent) in more than half of the districts in the state.

To achieve progress in nutrition, the state should invest in improving the coverage of interventions targeting the first 1000 days of life. On nutrition-specific interventions during pregnancy, significant efforts are needed to improve ANC visits as the coverage is still low (46-55 percent). In addition, special attention is required to improve the low coverage of IFA consumption (32 percent), and supplementary food for pregnant women (29.8 percent). Interventions related to delivery have made considerable progress

in the last ten years but it is important for Assam to make further improvements as institutional deliveries and births assisted by health professionals are still not optimal (below 75 percent).

Significant investments are needed to strengthen the coverage of several postnatal interventions, particularly infant and young child feeding practices, where the coverage is very low (8.9 percent for adequate diet), has remained unchanged (exclusive breastfeeding) or has become worse (timely introduction of foods) in the last 10 years. For other postnatal care related interventions, such as full immunization, vitamin A supplementation and ORS during diarrhea, further improvements are required as the coverage is still low (47-52 percent). Assam has made tremendous progress in improving the coverage of supplementary food for mothers during lactation and children, but efforts need to continue as the coverage is still not optimal. On underlying determinants, the state has seen modest improvements in female literacy, women's education, early marriage in girls and sanitation. However, much more effort is required, especially in improving the status of women with over ten years of education, early marriage in girls and

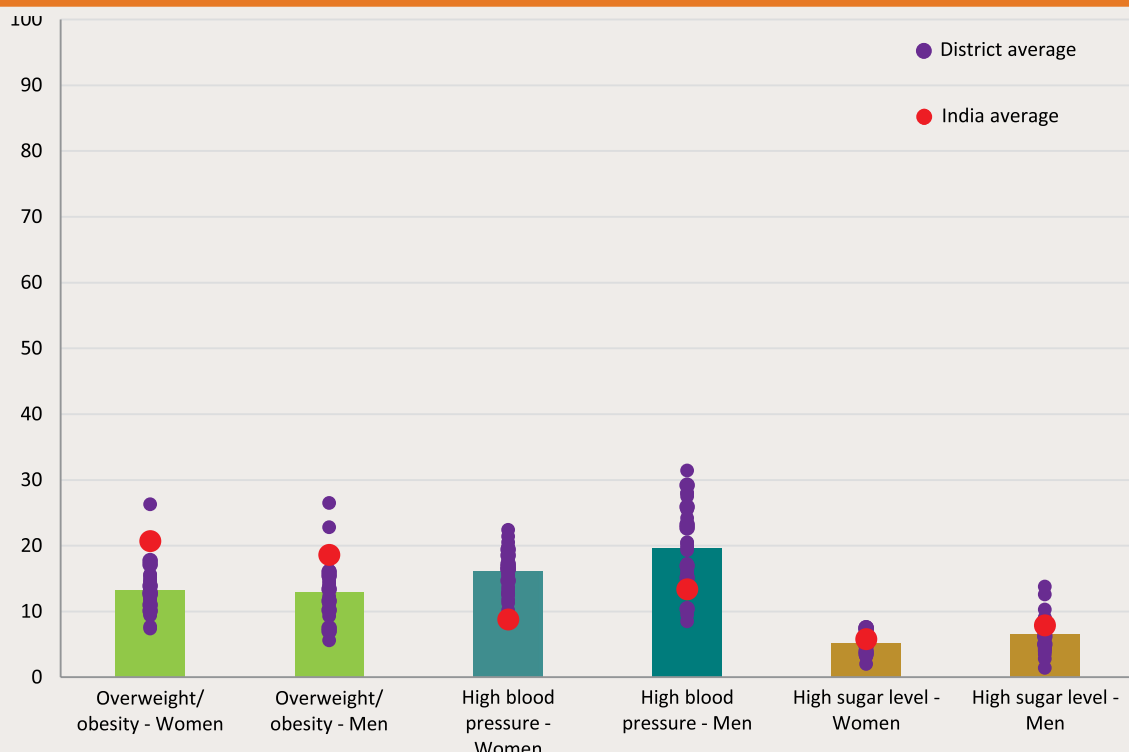
sanitation. Finally, the inter-district variability across outcomes and multiple determinants calls for district-specific strategies to bridge these gaps.

Alongside investments in improving early nutrition, it is also important for Assam to consider the challenge of non-communicable diseases. As Figure 8 below shows, the challenge is slowly emerging in Assam, with 13.2 percent of women and 12.9 percent of men being overweight or obese. High blood pressure and high blood sugar are other significant public health challenges in Assam. High blood pressure among both men and women in Assam is higher than the national average. This suggests that Assam needs to consider ways to simultaneously address undernutrition and emerging non-communicable diseases related to nutrition.

NOTE

1. Assam currently has 33 districts. Since NFHS-4 used the Census 2011 district boundaries, this Policy Note reports information for only 27 districts.
2. Indicator definitions, in alphabetical order:

FIGURE 8 Levels of non-communicable disease in Assam and India in 2016



Source: NFHS-4.

Note: Bars represent state averages; Refer to endnotes for indicator definitions.

Acute respiratory infection (ARI) in the last two weeks:

Percentage of children below 5 years of age with symptoms of ARI in 15 days preceding the survey.

Adequate diet: Percentage of children 6–23 months old who received 4 or more food groups and a minimum meal frequency.

ANC (4 or more visits): Percentage of mothers receiving at least 4 ANCs for the last birth in the last 5 years.

ANC (first trimester): Percentage of mothers who received antenatal care during the first trimester of pregnancy 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.

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).

Birth registered: Percentage of children under age 5 years whose birth was registered.

Consumed IFA \geq 100 days during pregnancy: Percentage of mothers who took iron and folic acid supplements for at least 100 days for the last birth in the last 5 years.

Deworming: Percentage of children 6–59 months old who were given deworming medication in the last 6 months.

Diarrhea in the last two weeks: Percentage of children below 5 years of age who had diarrhea in 15 days preceding the survey.

Early initiation of breastfeeding: Percentage of children who were breastfed within one hour of birth.

Exclusive breastfeeding: Percentage of infants 0–5 months old who were exclusively breastfed.

Full immunization: Percentage of children 12–23 months old who received BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).

Girls married before the age of 18 years: Percentage of women 20–24 years old married before the age of 18 years.

High blood pressure: 15–49 years old men and women with systolic \geq 140 mm of Hg and/or diastolic \geq 90 mm of Hg.

High blood sugar: 15–49 years old men and women with blood sugar level >140 mg/dl.

Households with an improved drinking-water source: Percent distribution of households with an improved drinking water source.

Households with electricity: Percentage of households with electricity.

Households using improved sanitation facility: Percent distribution of households using improved sanitation facilities.

Institutional delivery: Percentage of births delivered in a health facility for births in the last 5 years.

Janani Suraksha Yojana (JSY) availed: Percentage of women who received financial assistance under JSY for births delivered in an institution for the last birth in the last 5 years.

Low birth weight: Percentage of live births in the last 5 years weighing less than 2,500 grams at birth.

Mother Child Protection (MCP) card: Percentage of registered pregnancies for which the mother received an MCP card.

Newborn check-up: Percentage of children who received a health check after birth from a doctor/nurse/LHV/ANM/midwife/other health personnel within 2 days of birth.

Open defecation: Percentage of households having no sanitation facilities.

ORS during diarrhea: Percentage of children below 5 years of age who received ORS during diarrhea.

Overweight/obesity: 15–49 years old men and women with body mass index \geq 25 kg/m².

Pediatric IFA: Percentage of children 6–59 months old who received iron and folic acid supplement in the last 6 months.

Pregnancy registered: Percentage of pregnancies registered among women who had a live birth in the 35 months preceding the survey.

Severe wasting: Percentage of children 0–59 months old who are <-3SD from median weight for height of the WHO Child Growth Standards.

Skilled birth attendant: Percentage of births assisted by a doctor/nurse/LHV/ANM/other health personnel.

Stunting: Percentage of children 0–59 months old who are <-2SD from median height for age of the WHO Child Growth Standards.

Supplementary food (children): Percentage of children 6–35 months old covered by an *Anganwadi* center (AWC) who received supplementary food provided at the AWC in the last 12 months.

Supplementary food (lactation): Percentage of mothers with children under the age of 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during lactation.

Supplementary food (pregnancy): Percentage of mothers with children under the age of 6 years in areas covered by an AWC who received supplementary nutrition from the AWC during pregnancy.

Timely introduction of complementary foods: Percentage of infants 6–8 months old who received solid and semi-solid foods and breastmilk.

Visited by primary health worker (PHW): Percentage of women who were visited by a primary health worker (AWW/ASHA/ANM) at home within one week of delivery/discharge from health institution, among those who had a live birth in 35 months preceding the survey.

Vitamin A: Percentage of children 9–59 months old who received vitamin A supplements in the last six months.

Wasting: Percentage of children 0–59 months old who are <-2SD from median weight for height of the WHO Child Growth Standards.

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 of schooling.

Women with body mass index (BMI) <18.5kg/m²: Percentage of women 15–49 years old with BMI less than 18.5 kg/m².

Zinc during diarrhea: Percentage of children below 5 years of age who received zinc during diarrhea.

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ABOUT POSHAN

Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India (POSHAN) 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.

ABOUT POLICY NOTES

POSHAN Policy Notes aim to provide evidence-based guidance to support policy and program actions for nutrition in India.

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