POSHAN
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Partnerships and Opportunities to Strengthen and Harmonize Actions for Nutrition in India
Policy Note
No. 9 | AUGUST 2017

Improving Nutrition in Maharashtra: Insights from Examining Trends in Outcomes, Determinants and Interventions between 2006 and 2016

INTRODUCTION

India has made considerable progress in child nutrition outcomes in the last decade. These rates of improvement, however, have been highly variable across the states, likely due to variabilities 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 in 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 Maharashtra.

Maharashtra, situated in the western region of India, has a long coastline to the west. It is the third largest state in the country with an area of about 0.3 million squared kilometers and a population of approximately 110 million. The sex ratio is 929 and the state has a literacy rate of 82 percent (Census of India 2011). The state is divided into 36 districts in six divisions (Konkan, Nashik, Pune, Aurangabad, Amravati and Nagpur) (Government of Maharashtra 2017).

The purpose of this *Policy Note* is to examine the trends in undernutrition in Maharashtra 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 key areas for actions to improve nutrition in Maharashtra.

METHODS

We use 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 2005–6 to compare trends in outcomes, determinants and interventions over a decade (International Institute for Population Sciences 2008). We also use information from fact sheets of the Rapid Survey on Children (RSoC 2013–2014) (Ministry of Women and Child Development 2015) for indicators that are currently not available in NFHS-4 fact sheets. We used summary data reported in the NFHS-4 district-level fact sheets to examine inter-district variability.

For outcome indicators, we examine 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 breast-feeding, child overweight and anemia status among women of reproductive age.

We also examined levels and changes in several immediate, underlying and basic determinants (Black et al. 2013). For intervention coverage, we chose a set of nutrition-specific interventions across the lifecycle, including interventions affecting pregnant women, newborn babies, infants, and children.

FINDINGS

Trends in nutrition outcomes and variability in outcomes by district

Overall, there have been improvements in nutrition and health outcomes in Maharashtra between 2006 and 2016 (Figure 1). Stunting prevalence among children under five years declined from 46.3 percent to 34.4 percent which is below the national average. Low birth weight reduced marginally from 22.1 percent to 20.6 percent. Exclusive breastfeeding (EBF) for children under six months increased slightly from 53 percent to 56.6 percent. Anemia among women of reproductive age remains a key area of concern; anemia levels, at 48 percent, remained stagnant between 2006 and 2016. Wasting among children under five years increased by 9.1 percentage points (from 16.5 percent to 25.6 percent) and severe wasting by 4.2 percentage points (from 5.2 percent to 9.4 percent) (IIPS 2008 and IIPS 2017). Both anemia and wasting, especially severe wasting, are therefore significant public health challenges for Maharashtra.

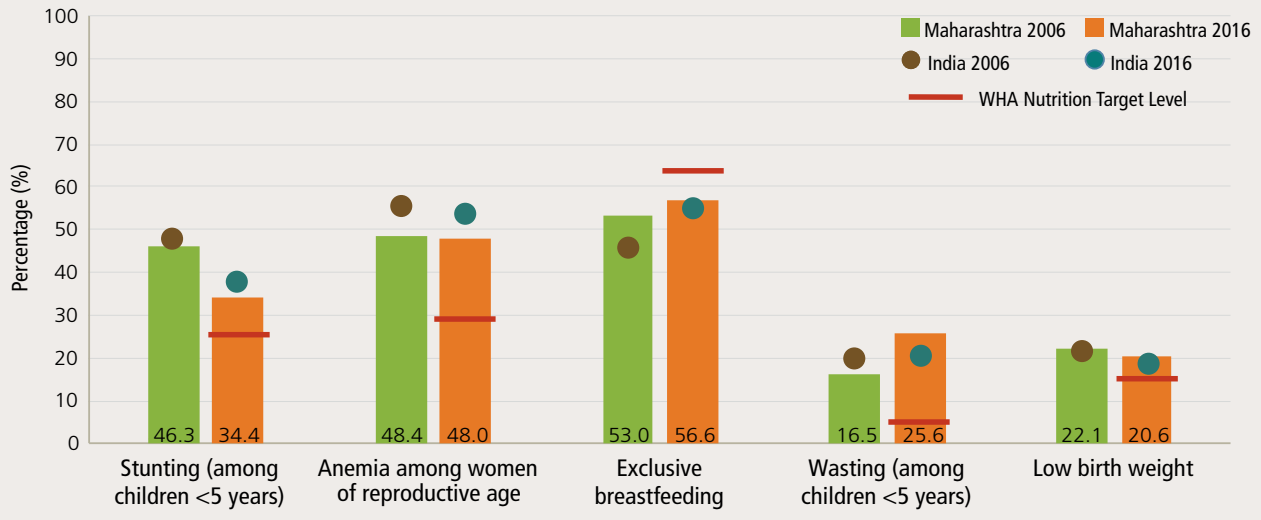
With regard to variability within the state, stunting among children under five years of age varies widely across districts, ranging from 21.3 percent to 47.6 percent (Map 1). Suburban Mumbai has the lowest level of stunting and Nandurbar has the highest level. More than half of the districts have levels of stunting that are higher than the state average. In nearly a third of the districts, 40 percent of the children under five years of age are stunted.

Anemia among women of reproductive age also varies considerably among districts, with the lowest level in Washim (35.5 percent) and the highest in Nandurbar (60.2 percent). In most districts, more than 40 percent of the women of reproductive age are anemic (Map 2).

Every single district in Maharashtra has wasting levels higher than 15 percent (rated as very high) (Map 3). Eleven districts have high levels of severe wasting, and 3 of the 35 districts have very high levels of severe wasting. Gadchiroli district has the highest level of wasting (45.8 percent) and severe wasting (22.2 percent) (Map 4) while Bhandara had the lowest level of both wasting and severe wasting (16.2 percent and 2.9 percent, respectively). Severe wasting (above 15 percent) is also seen in Nandurbar (15.1 percent) and Chandrapur (16.1 percent) (Map 4). Nandurbar district is affected by multiple burdens of undernutrition– high levels of stunting, wasting and anemia.

Exclusive breastfeeding data is available for only 12 out of 35 districts (Map 5), making it difficult to assess district-level variability for the entire state. Among

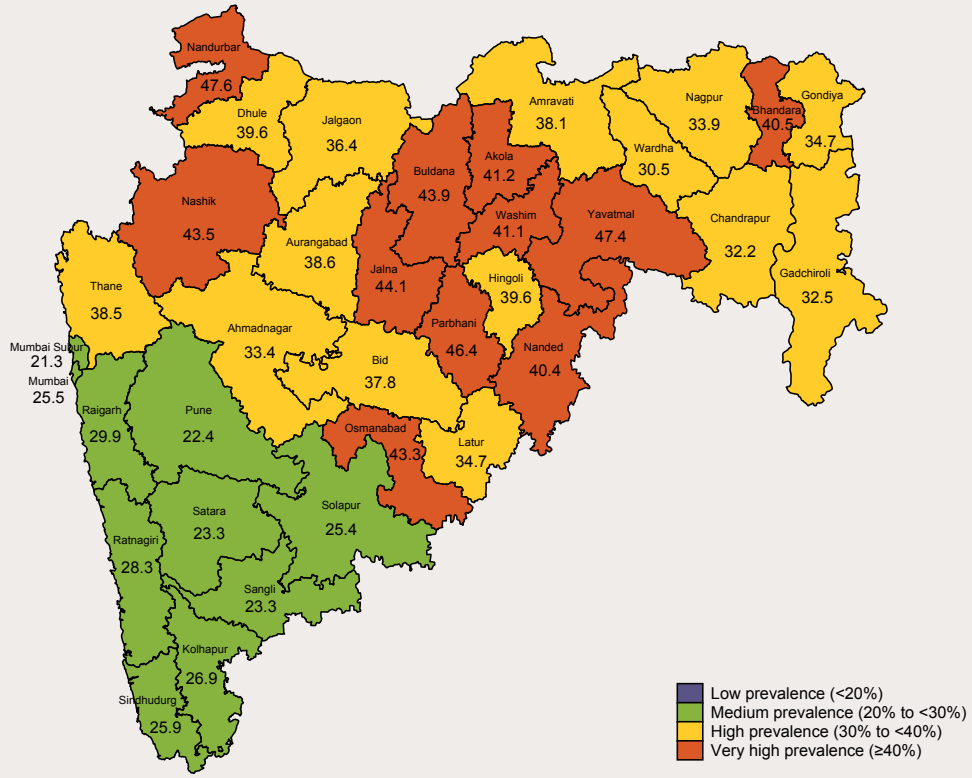
FIGURE 1 Trends in nutrition outcomes in Maharashtra, 2006 to 2016



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

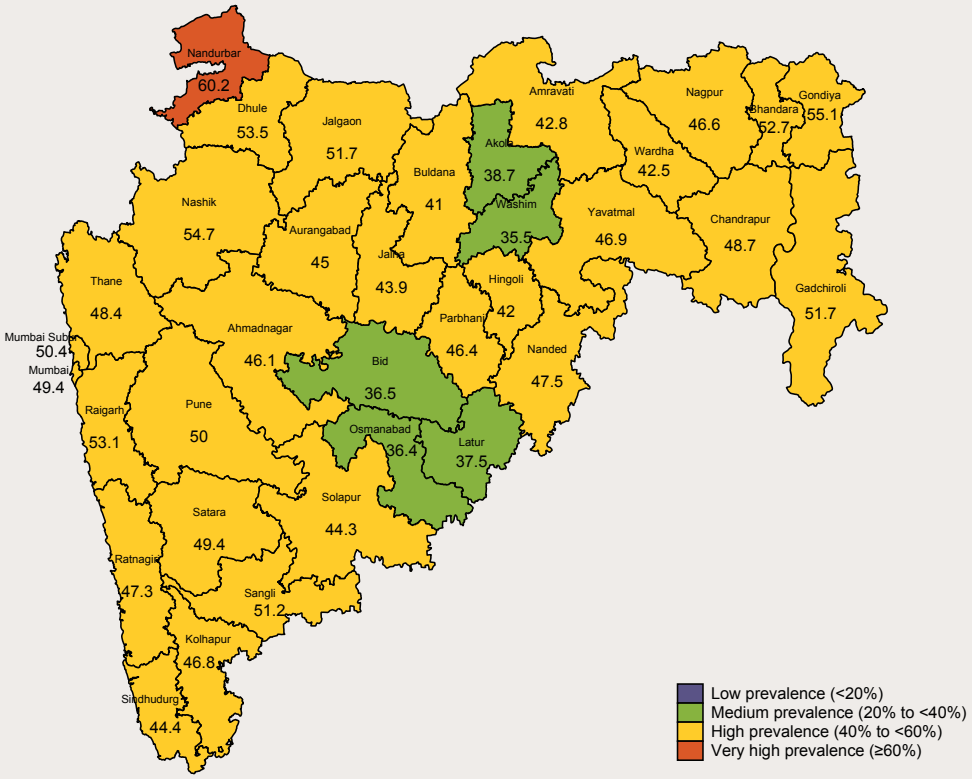
Note: A set of global nutrition targets for maternal, infant and young child nutrition were endorsed by the World Health Assembly (WHA) in 2012. The red lines represent the WHA targets to be achieved by the state, by 2025. The baseline reference year for these targets is 2012. The state baseline estimates are based on the 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 Maharashtra in 2016, by district



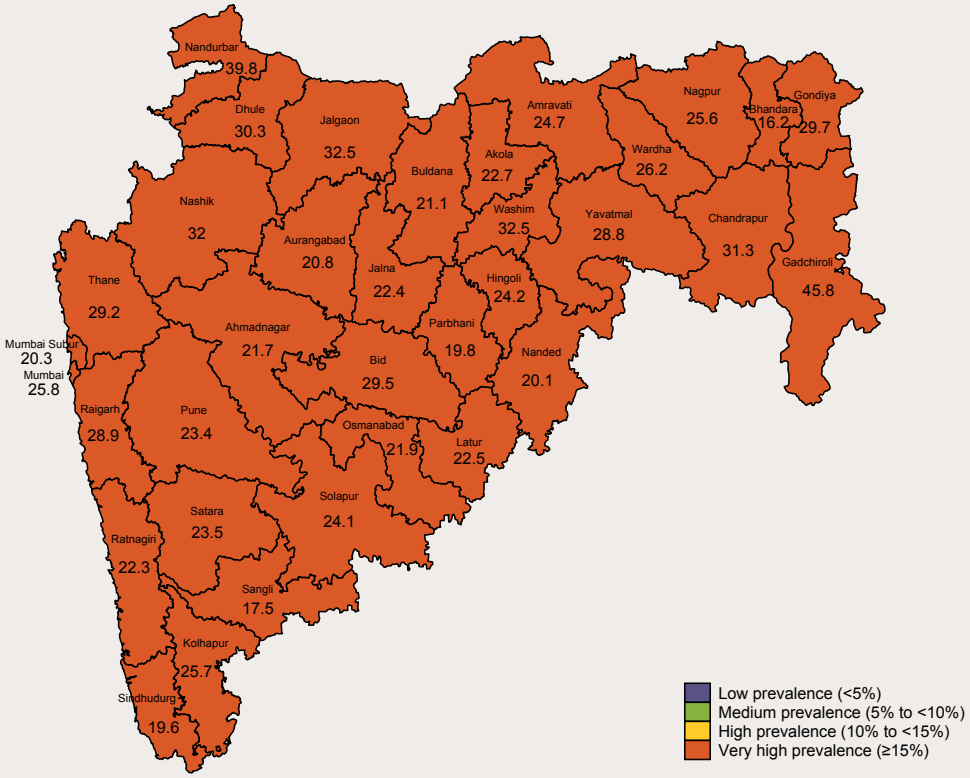
Source: NFHS-4.

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



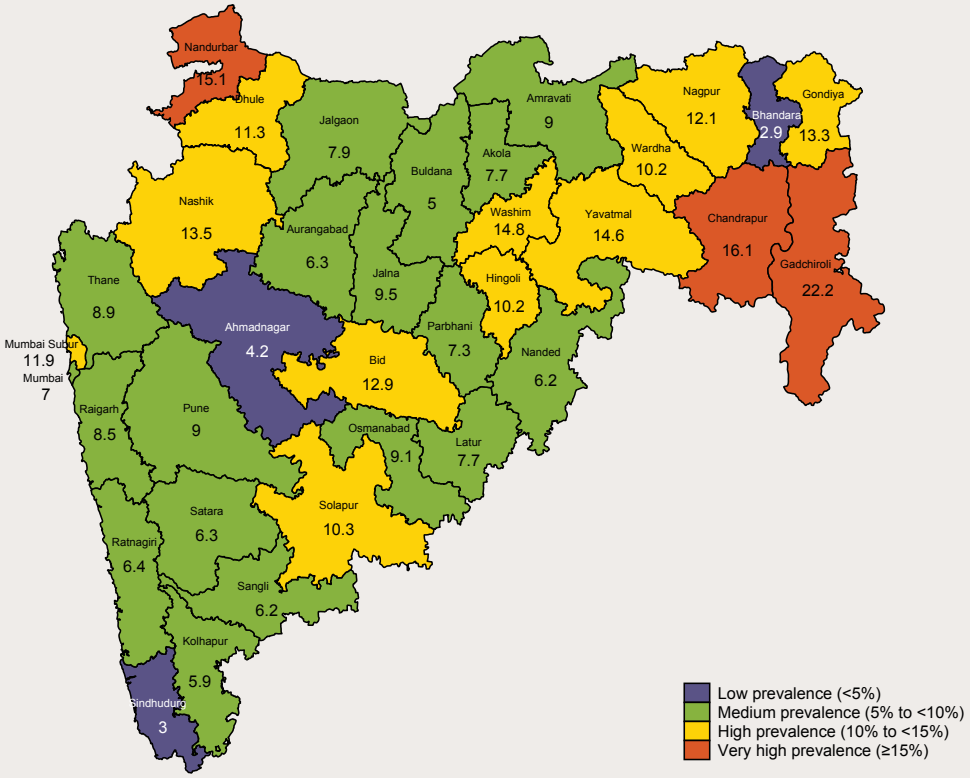
Source: NFHS-4.

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



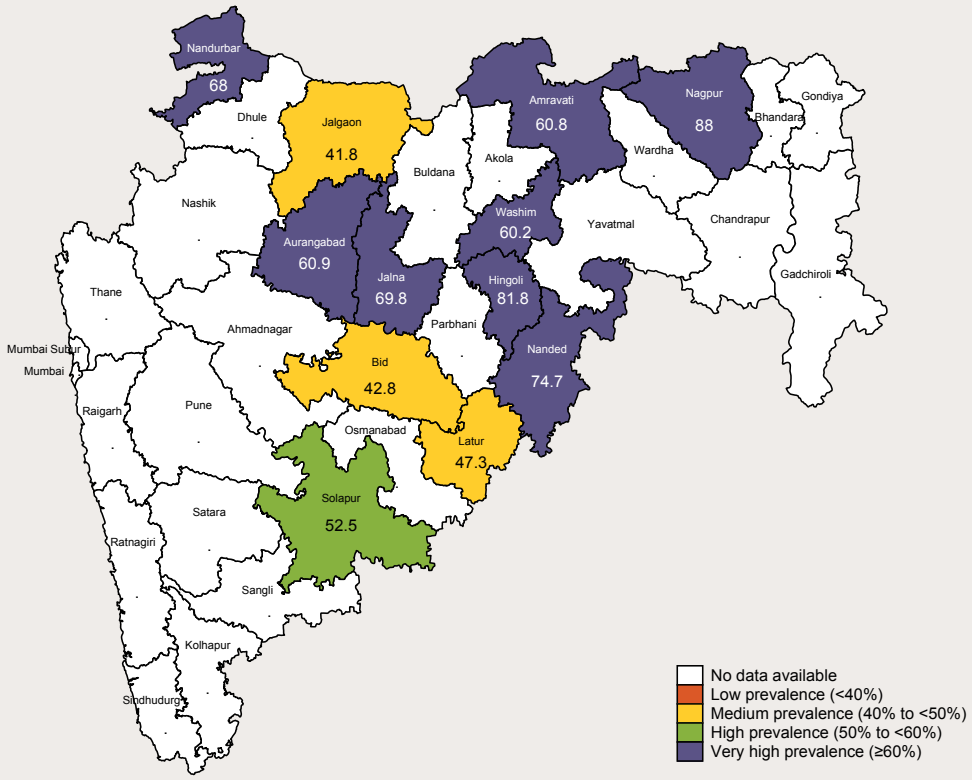
Source: NFHS-4.

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



Source: NFHS-4.

MAP 5 Exclusive breastfeeding in Maharashtra in 2016, by district



Source: NFHS-4.

these 12 districts, Jalgaon (41.8 percent) and Nagpur (88 percent) have the lowest and highest prevalence of exclusive breastfeeding, respectively.

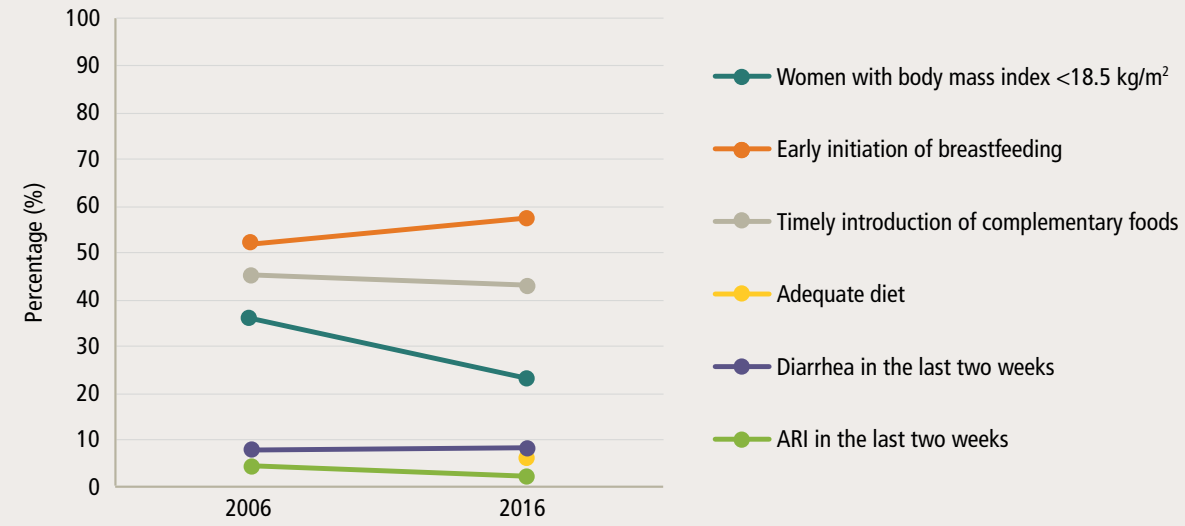
Changes in the determinants of undernutrition

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 are not available at this time.

Changes in the ***immediate determinants*** of nutrition are described in Figure 2. Early initiation of breastfeeding increased from 51.8 percent to 57.5 percent and the proportion of women with body mass index less than 18.5 kg/m^2 decreased from 36.2 percent to 23.5 percent. Both of these are encouraging trends. However, timely introduction of complementary foods for children between 6 and 8 months of age fell by 2.2 percentage points to 43.3 percent and only 6.5 percent of children (between 6 and 23 months of age) received an adequate diet. Disease burden in the last ten years portrays a mixed picture. Diarrhea increased slightly from 8.1 percent to 8.5 percent while acute respiratory infection (ARI) declined from 4.6 percent to 2.4 percent.

Changes in ***nutrition-specific interventions*** in Maharashtra are presented in Figure 3. Coverage of interventions related to pregnancy has improved over the last ten years. The proportion of women who received antenatal care (ANC) during the first trimester increased slightly from 62.1 percent to 67.7 percent. The proportion of women who received four or more ANC increased from 59.8 percent to 72.7 percent. Although proportion of women reporting consumption of 100 or more iron and folic acid (IFA) supplements increased from 18.6 percent to 40.6 percent, it is still far from optimal. Mothers who were immunized against tetanus during the prenatal period also increased from 25.8 percent to 47.4 percent.

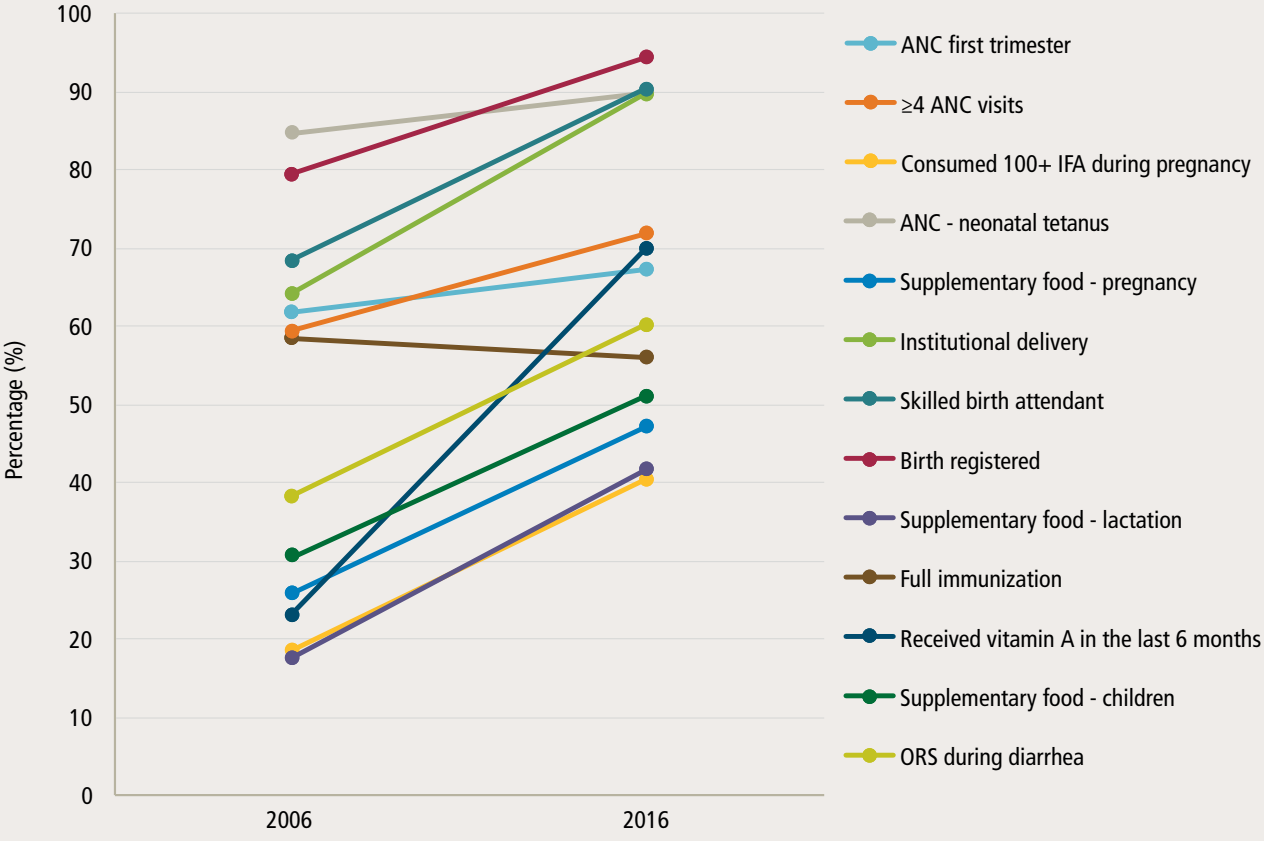
FIGURE 2 Changes in immediate determinants of nutrition in Maharashtra, 2006 to 2016



Sources: NFHS-3 and NFHS-4.

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

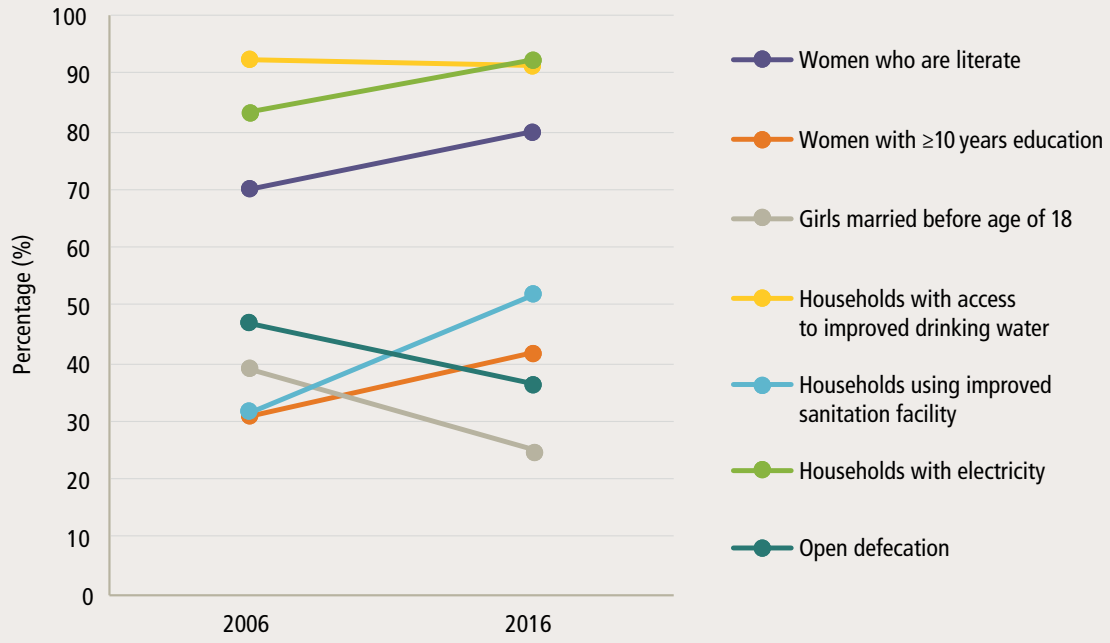
FIGURE 3 Changes in coverage of nutrition-specific interventions along the continuum of care in Maharashtra, 2006 to 2016



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. Refer to endnotes for indicator definitions.

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



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

Note: Refer to endnotes for indicator definitions.

Interventions related to delivery, such as the proportion of women who delivered in health facilities and women whose births were assisted by skilled birth attendants, improved remarkably, reaching above 90 percent in 2016.

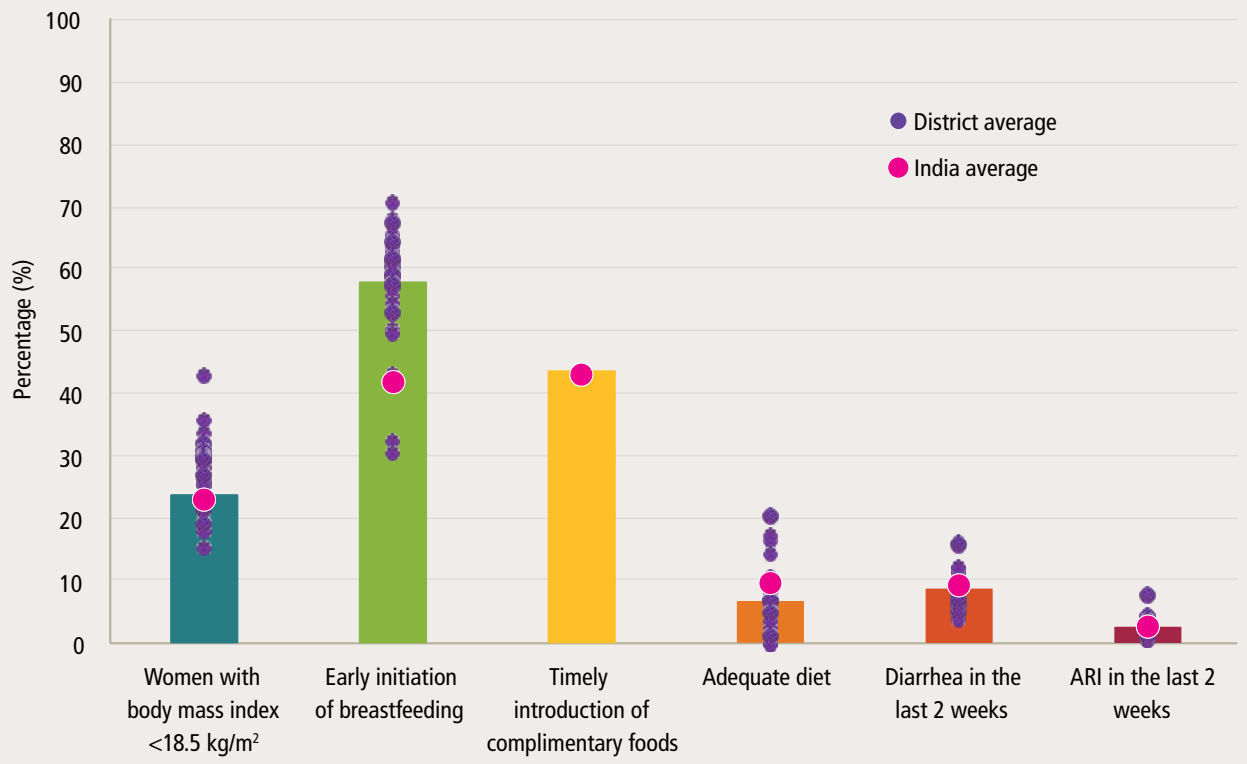
Coverage of most nutrition focused interventions for children have increased in from 2006 to 2016. The proportion of children receiving vitamin A supplements increased remarkably from 23.3 percent to 70.5 percent. The proportion of children reported to have received oral rehydration salts (ORS) during diarrhea improved substantially from 38.5 percent to 60.5 percent. Receipt of supplementary food from the Integrated Child Development Services for children increased from 30.5 percent to 51.4 percent and receipt of supplementary food for lactating mothers increased from 17.5 percent to 42 percent. However, immunization coverage, which was only 58.8 percent in 2005, further declined to 56.3 percent in 2016.

In the last decade, progress was seen in the underlying determinants of nutrition in Maharashtra (Figure 4). The proportion of literate women increased by 10 percentage points to 80.3 percent and proportion of women with more than ten years of education increased by 11.3 percentage points to 42 percent. Over 90 percent of the households have access to electricity and improved drinking water. Use of improved sanitation facilities increased (from 31.6 percent to 51.9 percent) but nearly half of the population still do not have access to improved sanitation facilities.

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

In Figures 5, 6, and 7 below, we highlight the district variability in immediate determinants (Figure 5), coverage of health and nutrition interventions (Figure 6) and underlying determinants (Figure 7). Among the 35[1] districts in Maharashtra, there is a high degree of inter-district variability for many key determinants (low body mass index for women, early initiation of breastfeeding, ANC, IFA during pregnancy, newborn check-up, full immunization, ORS and zinc during diarrhea). In contrast, there is little inter-district variability for some other determinants (mother and child protection card, 4 or more ANC, institutional delivery, skilled birth attendant and birth registration) except for districts like Nadurbar, Dhule and Bhulda which are outliers.

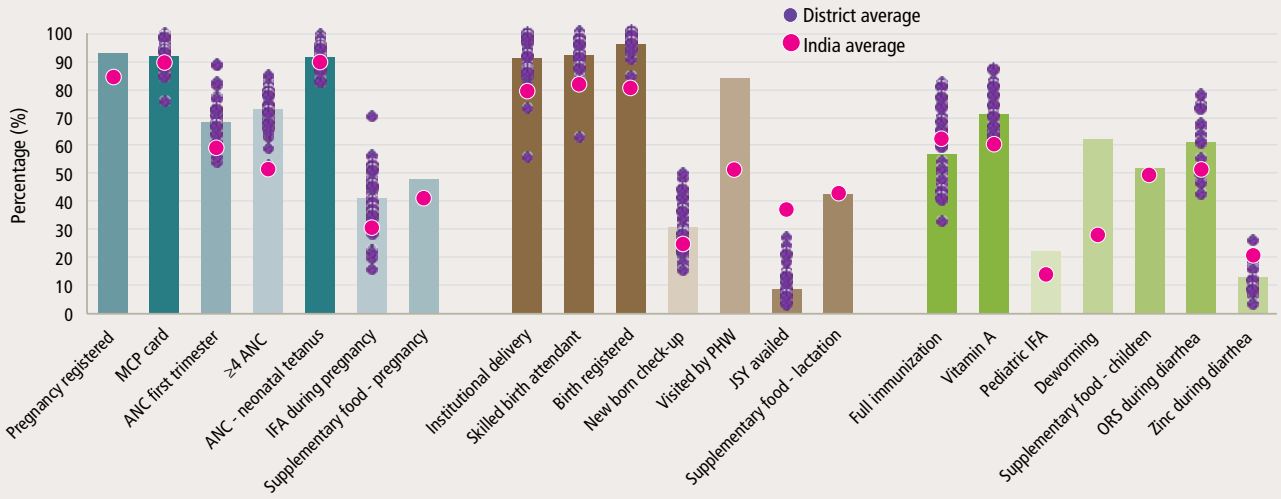
FIGURE 5 Inter-district variability in immediate determinants in Maharashtra, in 2016



Source: NFHS-4.

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

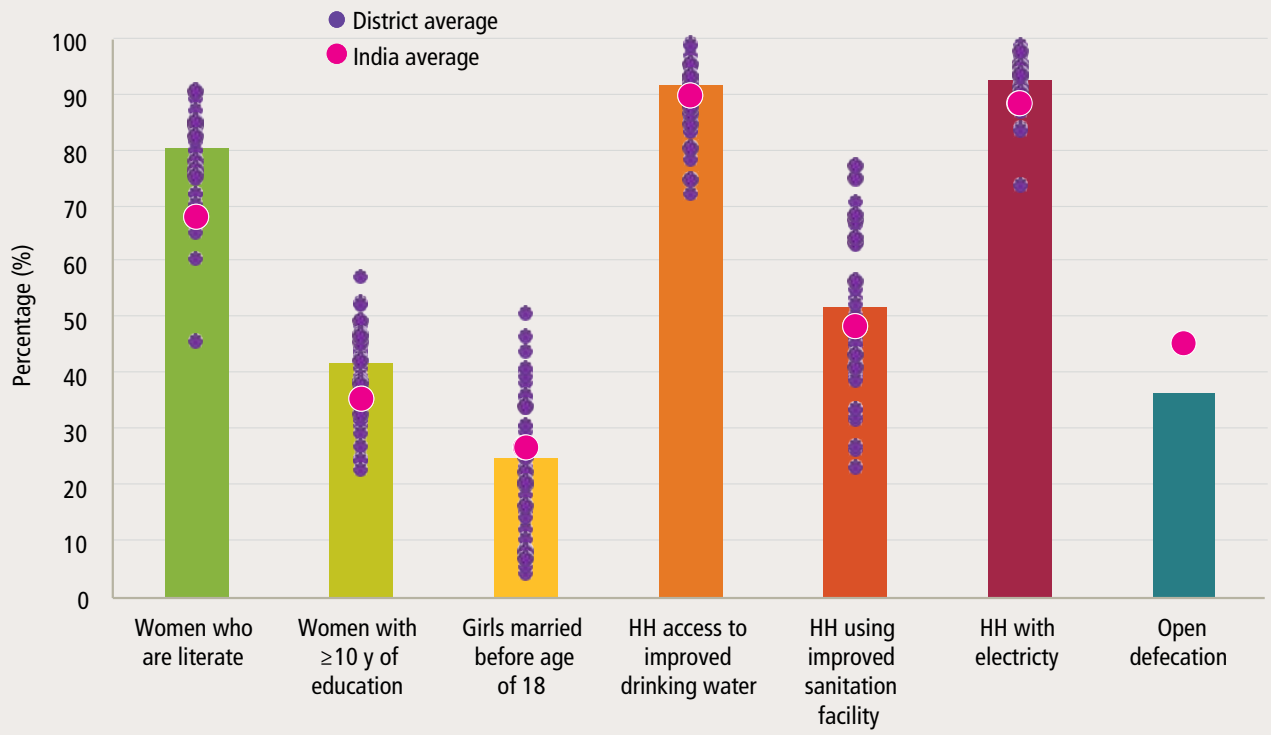
FIGURE 6 Inter-district variability in coverage of selected interventions in Maharashtra, in 2016



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

Notes: 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 Maharashtra, in 2016



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

Notes: HH= Household. Refer to endnotes for indicator definitions.

For some indicators like early initiation of breastfeeding, ANC and delivery care, and vitamin A supplementation, almost all districts in Maharashtra are doing better than the India average. For most other indicators, districts within Maharashtra fall around the India average, except for coverage of cash transfers during pregnancy (via the *Janani Suraksha Yojana* program) which fall below the national average.

LOOKING FORWARD: IMPLICATIONS & RECOMMENDATIONS

In the era of India's commitment to global nutrition targets, it is an opportune time for Maharashtra to set its own nutrition targets to be achieved by 2025, to examine progress within and across the state, and to accelerate actions necessary to improve all forms of malnutrition. Maharashtra's leadership on establishing and managing a state nutrition mission that focused on child undernutrition is well documented (Haddad et al. 2014) and overall, the improvements in nutrition and health outcomes in Maharashtra are encouraging.

However, there are some clear challenges ahead for the state, particularly the issue of anemia among women of reproductive age which has stagnated at 48 percent in the last decade. Special attention is needed to identify factors contributing to anemia and to put in place solutions to tackle this public health problem. Efforts are also required to understand and address the increase in the prevalence of wasting, which is more than 15 percent in all districts. Maharashtra now needs to put in place a strategy that considers all forms of malnutrition captured in the WHA indicators (Figure 1).

To achieve progress on undernutrition, Maharashtra should continue investments in improving the coverage of interventions targeting the first one thousand days of life. On nutrition-specific interventions, during the prenatal phase, emphasis is needed to increase the current levels of IFA consumption and supplementary food, both of which are far from universal. It is also important to sustain the achieved

progress on institutional delivery and skilled birth attendance during delivery. Coverage of the JSY program is not very high and should be examined to ensure that those women that need the cash benefit of the JSY program are receiving it.

Significant efforts are needed to strengthen coverage of several postnatal interventions, especially on reversing the declining trend in immunization and improving the coverage of newborn check-ups, supplementary food for children and lactating women and pediatric IFA. This needs to be complemented with efforts to support infant and young child feeding practices and improve child health. On underlying determinants, women's education, early age of marriage and sanitation requires immediate intention. Maharashtra should also focus in on districts like Nandurbar, Dhule and Bhulda, which suffer from multiple burdens, and address issues across the entire spectrum of nutrition-specific interventions and other determinants in these districts.

Focus on the emerging challenge of non-communicable diseases in Maharashtra is required alongside investments in early nutrition. Nearly a quarter of adult men and women in the state are overweight or obese. As Figure 8 below shows, the challenges related to high blood sugar and high blood pressure are also developing. Compared to the Indian average, Maharashtra does not perform well on these forms of malnutrition, thus highlighting the pressing need to simultaneously address undernutrition and these emerging non-communicable diseases related to nutrition.

NOTES

1. Maharashtra currently has 36 districts but because the National Family Health Survey was sampled based on the Census 2011 data, the older demarcation of 35 districts was maintained.

2. Indicator definitions, in alphabetical order:

Access to electricity: Percentage of households with electricity.

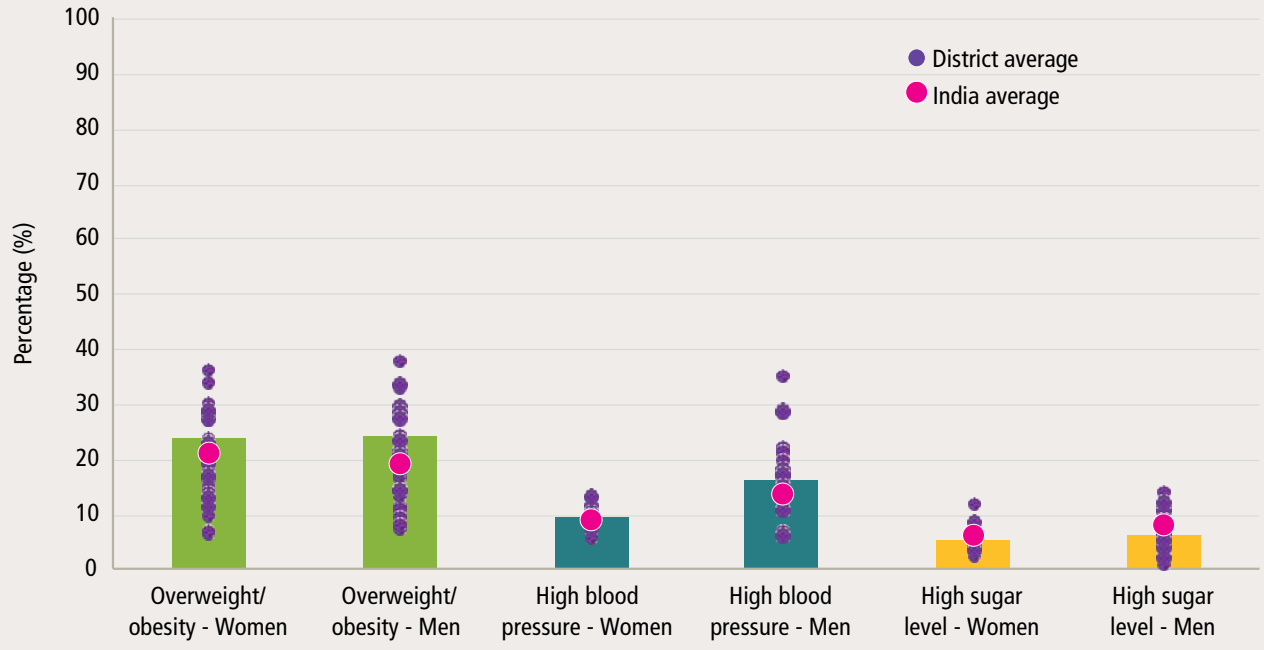
Adequate diet: Percentage of children 6–23 months old who received 4 or more food groups and a minimum meal frequency.

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

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.

ANC (first trimester): Percentage of mothers who received ANC during the first trimester of pregnancy for the last birth in the last 5 years.

FIGURE 8 Levels of non-communicable diseases in Maharashtra, in 2016



Source: NFHS-4.

Note: Refer to endnotes for indicator definitions.

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.

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

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

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.

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

Improved sanitation: 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.

Open defecation: Percentage of household having no sanitation facilities.

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

Overweight/obesity: 15–49 year old men and women with body mass index ≥25 kg/m^2.

Prevalence of acute respiratory infection (ARI): Percentage of children below 5 years of age with symptoms of ARI in 15 days preceding the survey.

Prevalence of diarrhea: Percentage of children below 5 years of age who had diarrhea in 15 days preceding the survey.

Severe Wasting: Percentage of children 0–59 months old who are below <-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 AWC who received supplementary food provided at the AWC in the last 12 months.

Supplementary food (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.

Supplementary food (pregnancy): Percentage of mothers with children under age 6 years in areas covered by an Anganwadi center (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.

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 below <-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 schooling.

Women with low body mass index (BMI): Percentage of women 15–49 years old with BMI less than 18.5 kg/m^2.

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

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SUGGESTED CITATION

Please cite this Note as: Mani, S., P.H. Nguyen, R. Avula, and P. Menon. 2017. *Improving Nutrition in Maharashtra: Insights from Examining Trends in Outcomes, Determinants and Interventions between 2006 and 2016*. POSHAN Policy Note #9. New Delhi: International Food Policy Research Institute.

ACKNOWLEDGEMENTS

Financial support for this paper was provided by the Bill & Melinda Gates Foundation through POSHAN, led by International Food Policy Research Institute. The funder played no role in decisions about the scope of the analysis or the contents of the report. We thank Abhilasha Vaid (IFPRI) for her help in reviewing the Note.

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 decisionmaking. 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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