Data for Decisions in Nutrition

International Food Policy Research Institute (IFPRI) and icddr,b

# ONE NUTRITION COVERAGE SURVEY (ONCS)

## DATA ANALYSIS PLAN

**January 2026**

**Project Note**

DataDENT (Data for Decisions in Nutrition, www.datadent.org) aims to transform the availability and use of nutrition data by addressing gaps in nutrition measurement and advocating for stronger nutrition data systems. This work was carried out by the following DataDENT partner: International Food Policy Research Institute (IFPRI). Collaborator includes the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b). This work was funded by the Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the Gates Foundation.

This analysis plan describes the methodological approach for processing and analyzing population-based survey data to assess coverage, co-coverage, and equity of multisectoral nutrition interventions. The approach goes beyond single-intervention coverage estimates by examining how well individuals and households receive packages of essential nutrition services across the life course, and across sectors.

The plan outlines the full analytical workflow, including initial data processing and cleaning, dataset preparation, indicator construction, weighting, co-coverage estimation, inequality assessment, and reporting. While the methods are illustrated using the Bangladesh context, the approach is designed to be adaptable for use in other country settings and survey platforms with similar data structures.

**Figure 1: Steps for data processing and analysis**


# I. Data Processing and Preparation

This section describes the procedures used to transform raw survey data into analysis-ready datasets. As illustrated in Figure 1, Steps 1–4 focus on data processing, cleaning, preparation, and archiving prior to indicator construction and statistical analysis.

1. **Clean variable names:** Data will be exported from Open Data Kit (ODK) CAPI software and labelled as raw data. Variable names will be cleaned to follow naming convention based on the question number from the questionnaire.

2. **Final data cleaning:** The following steps for data cleaning will be completed:

   a. Label variables.

   b. Label values.

   c. Assess system/administrative variables and discuss and finalize which to drop.

   d. Check dates as century month/day code.

   e. Check that response option codes are correct and recode (i) multi-response option questions and (ii) binary variables from 1/2 to 0/1 as appropriate.

   f. Carry out basic data quality checks (non-sampling errors).

   g. Complete consistency checks:

      - Check for survey completeness and calculate response rates (In the sample design for the survey, a target number of households and individual respondents was specified. Check the number of households and respondents that were successfully interviewed. Were the targets achieved? If not, were there particular regions or areas with unusually low response rates? Make note of the major reasons for non-response).

- Identify and remove any duplicate records.
- Identify incomplete records.
- Check for variables with a large number of missing values (Identify if they are a result of data entry/ editing errors. And variables with 10% or more missing values should be used with caution).
- Check for variables with a large number of "Don't know" or "Other." Depending on the question, "Don't know" responses can indicate that the respondents had difficulty understanding the question. High proportions of "Other" answers often indicate that the questionnaire did not account for the most common responses. Sometimes interviewers mistakenly code questions as "Other" when the response actually fits into a category listed on the questionnaire. For variables with many "Other" responses, some of the responses can be recoded into existing categories.
- Check skip patterns have been consistently followed.
- Check responses are within range based on the questionnaire.
- Check GPS coordinates are within range of country, region, and district.
- Check for expected patterns in the data. Some variables are expected to follow certain patterns. If the data deviates significantly from these expected patterns, try to ascertain the reasons and be cautious in the analysis and interpretation. Unexpected patterns may result from faulty sample design, improper implementation of the sample, interviewer errors, or respondents' inaccurate answers.

All data will be linked via a unique household and respondent ID autogenerated by ODK.

**3. Data preparations:** Datasets need to be organized, and analytic variables generated. This process will include:

a. Merging datasets: include modules/variables from household questionnaires across women, child and adolescent datasets.
b. Calculating wealth index (asset-based using DHS guidance).
c. Creating categorical variables such as age, education, marital status.
d. Creating survey design variables.

**4. Archiving datasets:** Once data cleaning and preparation are completed, the final datasets should be archived for future use. This process includes:

a. Removing personal identifiers from the datasets (e.g.: names, dates of birth, displacing/removing GPS coordinates).
b. Exporting the datasets to STATA formats (and excel if necessary).
c. Creating a ReadMe file explaining the contents of the datasets (refer to **PoSHAN Community Studies ReadMe file**s).
d. Saving each dataset, ReadMe file and questionnaire in clearly labeled folders.
e. Securing datasets with identifiers on IFPRI server with password protection.
f. Making datasets publicly available when ready.

# II. Indicator generation

This section describes the conceptual framework, selection, organization, and construction of multisectoral nutrition indicators.

### 1. Indicator selection and mapping

Indicators used to assess co-coverage of multisectoral nutrition interventions were selected based on a conceptual framework informed by global guidance and national priorities. Specifically, interventions were mapped using the WHO Essential Nutrition Actions (ENA) framework, which emphasizes: a) A life-course approach, addressing nutritional needs from adolescence through pregnancy, early childhood, and beyond; and b) Coordinated, multisectoral actions to address immediate, underlying, and basic determinants of malnutrition Indicators span key sectors relevant to nutrition outcomes, including:

- Health and nutrition services
- Social protection
- Food systems and industry (large-scale food fortification)
- Water, sanitation, and hygiene (WASH)

### 2. Organization of indicators

Indicators were organized using two complementary approaches:

**a. Life-stage approach**, reflecting the continuum of care:

- Adolescents (10–19 years)
- Women of reproductive age (15–49 years)
- Currently pregnant women
- Women with recent pregnancies
- Children under five years

**b. Public health objective approach**, grouping interventions that jointly address major nutrition problems, such as:

- Stunting prevention
- Anemia control
- Vitamin A deficiency control

**Example 1: Coverage indicators by life stages**

| INDICATOR | Sector | Target population | Weight |
|---|---|---|---|
| **LIFE STAGE: Adolescents** | | | |
| Received iron-containing supplement in last 3 months- girls* | Health | 10–19 years | 1 |
| Information received on diverse diet | Health | 10–19 years | 0.5 |
| Information received on unhealthy foods | Health | 10–19 years | 0.5 |
| Deworming (school or out of school) | Health | 10–19 years | 1 |
| HH - Cash/food transfer | Social Protection | HH w/ 10–19 years | 1 |
| HH - Improved water source | WASH | HH w/ 10–19 years | 1 |
| HH - Improved sanitation | WASH | HH w/ 10–19 years | 1 |
| HH - Handwashing facility access§ | WASH | HH w/ 10–19 years | 1 |
| HH - Fortifiable oil available | Food processing | HH w/ 10–19 years | 0.5 |
| HH - Fortifiable wheat flour available | Food processing | HH w/ 10–19 years | 0.5 |
| HH - Iodized salt available | Food processing | HH w/ 10–19 years | 0.5 |
| **Preconception** | | | |
| Used model contraception method | Health | WRA 15–49 years | 1 |
| Received iron-containing supplement* | Health | WRA 15–49 years | 1 |
| HH - Cash/food transfer† | Social Protection | HH w/ WRA 15–49 years | 1 |
| HH - Improved water source | WASH | HH w/ WRA 15–49 years | 1 |
| HH - Improved sanitation | WASH | HH w/ WRA 15–49 years | 1 |
| HH - Handwashing facility access§ | WASH | HH w/ WRA 15–49 years | 1 |
| HH - Fortifiable oil available | Food processing | HH w/ WRA 15–49 years | 0.5 |
| HH - Fortifiable wheat flour available | Food processing | HH w/ WRA 15–49 years | 0.5 |
| HH - Iodized salt available | Food processing | HH w/ WRA 15–49 years | 0.5 |
| **LIFE STAGE: Pregnancy** | | | |
| 4+ ANC visits | Health | Women with a birth (live/still) in the past 2 years | 0.5 |
| ANC <4 months of pregnancy | Health | Women with a birth (live/still) in the past 2 years | 0.5 |
| Preventive deworming | Health | Women with a birth (live/still) in the past 2 years | 1 |
| 2+ Tetanus shots | Health | Women with a birth (live/still) in the past 2 years | 1 |
| Received iron-containing supplement* | Health | Women with a birth (live/still) in the past 2 years | 1 |
| Received calcium | Health | Women with a birth (live/still) in the past 2 years | 1 |
| Vitamin A supplementation during pregnancy | Health | Women with a birth (live/still) in the past 2 years | 1 |
| Nutrition counseling from health worker | Health | Women with a birth (live/still) in the past 2 years | 1 |

| INDICATOR | Sector | Target population | Weight |
|---|---|---|---|
| Weighed during ANC visit | Health | Women with a birth (live/still) in the past 2 years | 0.5 |
| Counseling about weight during ANC visit | Health | Women with a birth (live/still) in the past 2 years | 0.5 |
| Received counseling on iron supplementation | Health | Women with a birth (live/still) in the past 2 years | 1 |
| Received cash/food transfer during pregnancy | Social Protection | HH w/ women with a birth (live/still) in the past 1 year | 1 |
| HH - Cash/food transfer - other members targeted‡ | Social Protection | HH w/o women with a birth (live/still) in the past 2 years | 1 |
| HH - Improved water source | WASH | HH w/ women with a birth (live/still) in the past 2 years | 1 |
| HH - Improved sanitation | WASH | HH w/ women with a birth (live/still) in the past 2 years | 1 |
| HH - Handwashing facility access§ | WASH | HH w/ women with a birth (live/still) in the past 2 years | 1 |
| HH - Fortifiable oil available | Food processing | HH w/ women with a birth (live/still) in the past 2 years | 0.5 |
| HH - Fortifiable wheat flour available | Food processing | HH w/ women with a birth (live/still) in the past 2 years | 0.5 |
| HH - Iodized salt available | Food processing | HH w/ women with a birth (live/still) in the past 2 years | 1 |
| **LIFE STAGE: Child 0–23 months** | | | |
| Iron tablet/syrup/sprinkle* | Health | Children 0–23 months | 1 |
| Vitamin A supplementation | Health | Children 0–23 months | 1 |
| Preventive deworming | Health | Children 0–23 months | 1 |
| Age-appropriate immunization# | Health | Children 0–23 months | 1 |
| Full immunization (12–23 months)** | Health | Children 12–23 months | |
| Age appropriate IYCF counseling | Health | Children 0–23 months | 1 |
| Growth monitoring | Health | Children 0–23 months | 1 |
| HH - Cash/food transfer₹ | Social Protection | HH w/ children 0–23 months | 1 |
| HH - Improved water source | WASH | HH w/ children 0–23 months | 0.5 |
| HH - Improved sanitation | WASH | HH w/ children 0–23 months | 1 |
| HH - Handwashing facility access§ | WASH | HH w/ children 0–23 months | 0.5 |
| HH - Fortifiable oil available | Food processing | HH w/ children 0–23 months | 0.5 |
| HH - Fortifiable wheat flour available | Food processing | HH w/ children 0–23 months | 0.5 |
| HH - Iodized salt available | Food processing | HH w/ children 0–23 months | 0.5 |

Note: *Includes iron supplements, iron-folic acid, multiple micronutrient supplements; § includes running water and soap; † = adolescent data are excluded from this estimation; ¶ = % of women (ages 15–49) with a live birth in the last two years preceding the survey who received two or more tetanus shots during pregnancy; ‡ = pregnant women are excluded from this estimation; # = % of children (0–23m) who received one dose of BCG, three doses of DPT-containing vaccine, three doses of polio, and one dose of measles-containing vaccine; **% of children (12–23m) who received one dose of BCG, three doses of DPT-containing vaccine, three doses of polio, and one dose of measles-containing vaccine; ₹ = households with <2y children that received cash/food transfers.

## 3. Construction of coverage indicators

Coverage indicator variables will be constructed following predefined variable definitions (see ONCS List of Indicators_09-14-2024). For each indicator, careful attention will be paid to:

- Appropriate denominators (e.g., eligible population by age, pregnancy status)
- Recall periods aligned with program design and survey questions
- Logical linking of survey questions to indicator definitions

Dummy tables for all key coverage indicators will be developed in advance, along with corresponding Stata .do files. These will be used both for final analysis and for data quality checks during pre-testing and data collection.

## 4. Indicator weighting for Co-coverage

For co-coverage analysis, each indicator is assigned a weight reflecting its relative contribution and implementation modality.

- **Default weighting:** All indicators are assigned a weight of 1, assuming equivalent importance across sectors and intervention types.
- **Exceptions:** For antenatal care (ANC), early initiation of ANC and attendance of four or more ANC visits were each assigned a weight of 0.5, recognizing that these indicators represent complementary components of adequate ANC. Similarly, food fortification indicators were weighted based on their regulatory status and mode of delivery. Availability of iodized salt was assigned a weight of 1, as it is a mandatory national intervention, while fortification of edible oil and wheat flour were each assigned a weight of 0.5 to reflect their voluntary, market-based implementation and comparatively variable population reach.

# III. Data analysis

## 1. Survey design specification and coverage analysis

All analyses will account for the complex survey design, including sampling weights, clustering, and stratification. The dataset will be set accordingly prior to analysis. Coverage indicators for individual interventions will be tabulated following a predefined tabulation plan. Analyses will include:

- Overall coverage estimates
- Cross-tabulations by:
  - District
  - Urban–rural residence
  - Maternal education
  - Household wealth quintile
  - Life stage (e.g., women of reproductive age, currently pregnant women, women with a recent pregnancy)

Descriptive statistics will be presented as percentages or means with standard deviations, as appropriate. Where relevant, statistical tests comparing mean values across groups will be conducted using a conventional significance level ($\alpha = 0.05$).

**Example 2: Coverage of multisectoral nutrition interventions during adolescence**

| INDICATOR | Total | By residence | | By wealth | | By education | | By district | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rural | Urban | Q1 | Q5 | No education | ≥10y of education | 1 | 2 | 3 | 4 |
| Received iron-containing supplement in last 3 months- girls* | | | | | | | | | | | |
| Information received on diverse diet | | | | | | | | | | | |
| Information received on unhealthy foods | | | | | | | | | | | |
| Deworming (school or out of school) | | | | | | | | | | | |
| HH - Cash/food transfer | | | | | | | | | | | |
| HH - Improved water source | | | | | | | | | | | |
| HH - Improved sanitation | | | | | | | | | | | |
| HH - Handwashing facility access§ | | | | | | | | | | | |
| HH - Fortifiable oil available | | | | | | | | | | | |
| HH - Fortifiable wheat flour available | | | | | | | | | | | |
| HH - Iodized salt available | | | | | | | | | | | |

## 2. Co-coverage analysis

Raw co-coverage scores are calculated by summing the weights of all interventions received by an individual or household. The total number of interventions varies by life stage and programmatic focus, ranging from approximately eight to 20 interventions. To enable comparison across life stages and public health programs, raw scores are standardized to a 0–100 scale:

$$\text{Standardized co-coverage} = \frac{\text{Number of interventions received}}{\text{Total recommended interventions}} \times 100$$

Based on standardized scores, co-coverage is categorized into four groups:

- 0% (no interventions)
- <30%
- 30–<60%
- ≥60% of recommended interventions

These categories are used to summarize coverage patterns and assess inequalities.

## 3. Equity analysis

Equity analyses will be conducted for both individual coverage and co-coverage indicators.

### a. Stratifiers

Standard equity stratifiers will include:

- Household wealth quintile (derived using principal component analysis)
- Maternal education level
- Place of residence (urban/rural)
- District

**Example 3: Co-coverage of multisectoral nutrition interventions by residence, wealth, education, and district (% of population receiving ≥60% of recommended interventions)**

| INDICATOR | Total | By residence | | By wealth | | By education | | By district | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Rural | Urban | Q1 | Q5 | No education | ≥10y of education | 1 | 2 | 3 | 4 |
| Co-coverage by life stage | | | | | | | | | | | |
| Adolescent | | | | | | | | | | | |
| Preconception | | | | | | | | | | | |
| Pregnancy | | | | | | | | | | | |
| Child 6–23 months | | | | | | | | | | | |
| Co-coverage by public health | | | | | | | | | | | |
| Stunting control | | | | | | | | | | | |
| Anemia control | | | | | | | | | | | |
| Vitamin A deficiency control | | | | | | | | | | | |

**b. Inequality measures**

Both absolute and relative inequalities will be assessed:

- Simple measures:
  - Absolute gap (Q5–Q1)
  - Relative ratio (Q5/Q1)
- Regression-based measures:
  - Slope Index of Inequality (SII)
  - Concentration Index (CIX)

These measures capture inequalities across the entire socioeconomic distribution rather than focusing only on extreme groups.

All analyses will account for survey sampling weights. Statistical analyses will be conducted using Stata version 18.5.

**Example 4: Summary of wealth-based inequalities in co-coverage across life stages and public health programs (% receiving ≥60% of interventions)**

| | Q1 [95%CI] | Q5 [95%CI] | Q1-Q5 [95%CI] | SII | Q5/Q1 | CIX | P-values |
|---|---|---|---|---|---|---|---|
| Co-coverage by life stage | | | | | | | |
| Adolescent | | | | | | | |
| Preconception | | | | | | | |
| Pregnancy | | | | | | | |
| Child 6–23 months | | | | | | | |
| Co-coverage by public health | | | | | | | |
| Stunting control | | | | | | | |
| Anemia control | | | | | | | |
| Vitamin A deficiency control | | | | | | | |

## 4. Data Visualization and Reporting

Data visualization products (e.g., bar charts, heatmaps, equity plots) will be developed to communicate key findings clearly and accessibly. Visualizations will emphasize:

- Coverage gaps across geographic and socioeconomic groups
- Differences across life stages
- Patterns of service delivery across sectors

**In summary**, this data analysis plan provides a systematic and transparent framework for transforming population-based survey data into actionable evidence on the coverage, co-coverage, and equity of multisectoral nutrition interventions. By integrating rigorous data processing procedures with life-course and multisectoral analytical approaches, the plan enables a more comprehensive understanding of how nutrition services are delivered and experienced by different population groups.

The application of standardized co-coverage and equity metrics supports comparability across life stages, public health priorities, and socioeconomic groups, while highlighting gaps in service integration and reach. Overall, this approach aims to inform evidence-based program design, monitoring, and policy dialogue, and can be adapted for use in other country contexts to strengthen nutrition systems and advance equitable nutrition outcomes.