GOVERNMENT OF MONGOLIA **MINISTRY OF HEALTH**

NATIONAL CENTER FOR PUBLIC HEALTH

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NUTRITION STATUS OF THE POPULATION OF MONGOLIA

Fifth National Nutrition Survey Report

Ulaanbaatar, Mongolia
2017

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FOREWORD

Mongolia is one of the countries that successfully achieved the Millennium Development Goals through the adoption and implementation of policy documents to address health, nutrition and food safety issues of the population.

The World Sustainable Development Goal for 2016-2030 and "Concept of Sustainable Development of Mongolia-2030" are aimed to end hunger, improve the food safety and nutrition status, and promote sustainable agriculture.

The Mongolian national nutrition surveys were conducted in 1992, 1999, 2004 and 2010 and were the key argument of the Government's policy on nutrition and main evidences for implementing projects and programs to improve nutrition status of the Mongolian population.

The fifth national nutrition survey was successfully completed by the Nutrition Department of National Center for Public Health in 2016-2017, with the technical and financial support of the United Nations Children's Fund and presenting the key results of the nutrition status of school children, pregnant women and household's residents selected from 8 districts of the capital city and 95 soums of the 21 provinces of Mongolia.

By conducting the comprehensive survey to assess the nutrition status of children under 5 years of age, school children aged 6-11 years, pregnant women, women and men aged 15-49 years, the current condition of the household food security, the condition of water and sanitation compared across the household wealth index of each city and provinces in 4 major regions including Ulaanbaatar, the survey result will serve as a vital information database to help develop and implement a scientifically-proven public health policy, based on the firm statistics and research analysis dedicated for specific circumstances and needs of the people living in target area and regions.

The prevalence of micronutrient deficiency is alarming high in children and women of Mongolia. For instance, 61% of children under 5-year-old and 75% of pregnant women were deficient in vitamin D, which indicates the essential need to include vitamin D screening and treatment in the antennal care package and implement the fortification of staple food products.
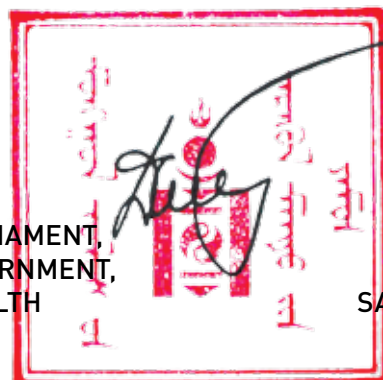
The prevalence of obesity is alarmingly high in all age groups of the Mongolian population, which is the main risk factor for the leading causes of morbidity and mortality. The situation urges us to intensify our actions in their health education and communication activities.

You have a great opportunity to use the survey report in your professional and work activities.

Therefore, I am confident that the survey report will contribute a lot in the improvement of the nutrition and food security status, which is essential for health and survival of the Mongolian population.

MEMBER OF PARLIAMENT,
MEMBER OF GOVERNMENT,
MINISTER OF HEALTH   **SARANGEREL.D**

ACKNOWLEDGEMENTS

GENERAL DIRECTOR,

NATIONAL CENTER FOR PUBLIC HEALTH   **TSOGTBAATAR BYAMBAA, PhD., MD**

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ABBREVIATIONS AND ACRONYMS

AGP	Alpha-1-acid glycoprotein
ANC	Antenatal care
BID	Biotechnology Innovation Department
BMI	Body mass index
CI	Confidence interval
CRP	C-reactive protein
DHPDP	Department of Health Promotion and Diseases Prevention
FAO	Food and Agricultural Organization
GAMD	Government Administration and Management Department
HFIAS	Household Food Insecurity Access Scale
HH	Household
ICC	Intra cluster correlation
IDA	Iron deficiency anaemia
IDD	Iodine deficiency disorders
IFA	Iron and folic acid supplement
IYCF	Infant and young child feeding
MCH	Maternal and child health
MD	Medical Doctor
MDD	Minimum dietary diversity
MFSc	Master of Food Science
MICS	Multiple Indicator Cluster Survey
MM	Master of Microbiology
MMN	Multiple micronutrients
MMP	Multiple micronutrient powder
MMSc	Master of Medical Science
MOH	Ministry of Health
MPH	Master of Public Health
MSc	Master of Science
MU	Medical University

MUAC	Mid-upper arm circumference
MUIC	Median urinary iodine concentration
NCPH	National Center for Public Health
ND	Nutrition Department
NFS	Nutrition and Food Safety
NNS	National Nutrition Survey
PE	Physical education
PHD	Public Health Division
PHRL	Public Health Reference Laboratory
PSU	Primary sampling units
PW	Pregnant women
RAW	Reproductive age women
RBP	Retinol binding protein
RME	Relative margin of error
SC	School children
SD	Standard deviation
SISS	Social Indicator Sample Survey
sTfR	Soluble transferrin receptor
UF	Under five
UNICEF	United Nations Children's Fund
USAID	United States Agency For International Development
VAS	Vitamin A supplementation
WHO	World Health Organization
YSC	Yes Service Center

SYMBOLS

>	greater than
<	less than
≥	equal to and greater than
≤	equal to and less than

SURVEY TEAM

PRINCIPAL INVESTIGATOR

Batjargal Jamiyan, PhD, Head of Nutrition department of NCPH

SURVEY COORDINATORS

Bolormaa Norov, MSc, PhD Candidate, Researcher of Nutrition department of NCPH
Enkhtungalag Batsaikhan, MSc, PhD Candidate, Researcher of Nutrition department of NCPH

SURVEY ADVISOR

Tsogtbaatar Byambaa, PhD, General Director of NCPH

INTERNATIONAL CONSULTANT

Jessica Blankenship, PhD, UNICEF EAPRO Consultant

REPORT WRITING TEAM

Jessica Blankenship, PhD, UNICEF EAPRO Consultant
Amynah Janmohamed, PhD, UNICEF EAPRO Consultant
Bolormaa Norov, MSc, PhD Candidate, Researcher of Nutrition department of NCPH
Enkhtungalag Batsaikhan, MSc, PhD Candidate, Researcher of Nutrition department of NCPH
Enkhmyagmar Dashzeveg, MPH, Researcher of Nutrition department of NCPH

REPORT TRANSLATION TEAM

Khongorbaatar Turmandakh, Translator
Bolormaa Norov, MSc, PhD Candidate, Researcher of Nutrition department of NCPH
Nyamragchaa Chimedragchaa, MPH, PhD Candidate, Researcher of Nutrition department of NCPH

EDITORIAL TEAM

Jamiyan Batjargal, PhD Head of Nutrition department of NCPH
Jessica Blankenship, PhD UNICEF EAPRO Consultant
Tsogtbaatar Byambaa, PhD, MD Director of NCPH
Ouyunchimeg Dalkhjav, PhD, Head of GAMD of MOH
Byambatogtokh Baasaikhuu, PhD, Officer in Charge for NFS, PHD of MOH
Gereljargal Bat, PhD, Associate Professor, Pediatrician, Head of Postgraduate Unit, Ach MU
Enkhtuya Palam, PhD, Hygienist Researcher of DHPDP of NCPH
Munkhjargal Luvsanjamba, MSc, Nutrition Officer, UNICEF Mongolia

DATA ANALYSIS TEAM

Jessica Blankenship, PhD, UNICEF EAPRO Consultant
Enkhtungalag Batsaikhan, MSc, Researcher of Nutrition department of NCPH
Bolormaa Norov, MSc, Researcher of Nutrition department of NCPH
Enkhmyagmar Dashzeveg, MPH, Researcher of Nutrition department of NCPH

LABORATORY ANALYSIS TEAM

Juergen Erhardt, PhD, Head of VitMin laboratory
Gantuya P., MSc, Chemist, PHRL of NCPH
Khishigbuyan S., MSc, Biochemist of PHRL of NCPH
Sodnomtseren B., Biochemist of PHRL of NCPH
Otgonjargal S., PhD, Chemist of PHRL of NCPH
Naranbat N., PhD, Associate Professor, Executive Director of Gyals LLC
Naranbold N., Quality Manager of Gyals LLC, Virus Researcher
Badamsed T., Head of Clinical Pathology Laboratory, Gyals LLC

DATA COLLECTION TEAM

Tserendolgor U	Team leader
Erdenetsogt E	Team leader
Enkhtuya P	Team leader
Bayasgalan J	Team leader
Oyundelger D	Team leader
Tuvshinbayar B	Team leader
Tserenlkham B	Team leader
Munkhtsetseg P	Team leader
Sarnai E	Team leader
Mandakhtsetsen Kh	Team leader
Tsolmonbayar G	Team leader
Ankhtuya B	Team leader
Otgonbayar R	Pediatrician
Ariunbileg Z	Pediatrician
Odonchimeg D	Pediatrician
Altantuya A	Pediatrician
Tungalag D	Pediatrician
Enkhzaya B	Pediatrician
Oyunbileg S	Pediatrician
Narangerel L	Pediatrician
Munkhzaya B	Pediatrician
Namuuntsetseg Ch	Pediatrician
Enkhchimeg T	Pediatrician
Enebish Sh	Endocrinologist
Narmisheekh Kh	Endocrinologist
Amgalan R	Epidemiologist
Nyamsuren D	Endocrinologist
Dashkhand TS	Endocrinologist
Enkh-Amgalan T	Endocrinologist
Bolormaa Ya	Endocrinologist
Diimaa B	Endocrinologist
Enerel E	Endocrinologist
Khishigjargal Ts	Endocrinologist
Narantsetseg D	Endocrinologist
Altantuya L	Interviewer
Enkhsaikhan B	Interviewer
Ganbolor D	Interviewer
Uyanga L	Interviewer
Odshuren N	Interviewer
Bayarchimeg B	Interviewer
Otgonjargal S	Interviewer
Bayambasuren Kh	Interviewer

Erkhembayar U	Interviewer
Erdenetuul S	Interviewer
Byambasuren D	Interviewer
Darkhansuld D	Interviewer
Erdenebayar Ts	Laboratory Assistant
Myadagmaa M	Laboratory Assistant
Mijid N	Laboratory Assistant
Gerel B	Laboratory Assistant
Saranchimeg D	Laboratory Assistant
Tsetsegsuren D	Laboratory Assistant
Ariunchimeg Ts	Laboratory Assistant
Sumya M	Laboratory Assistant
Yanjindulam D	Laboratory Assistant
Amarsanaa G	Laboratory Assistant
Byambatseren J	Laboratory Assistant
Otgonbileg S	Laboratory Assistant

DATA ENTRY TEAM

Tserendolgor U, Senior Researcher of ND of NCPH, ScD

Bayasgalan J, Researcher of ND of NCPH, PhD

Enkhtuya P, Researcher of ND of NCPH, PhD

Oyundelger D, Researcher of ND of NCPH, MSc

Tuvshinbayar B, Researcher of ND of NCPH, MFSc

Tserenlkham B, Researcher of ND of NCPH

Tuul B, Researcher of ND of NCPH, MFSc

Munkhtsetseg P, Researcher of ND of NCPH

Enkhsaikhan B, Researcher of YSC

Erkhembayar U, Researcher of DHPDP of NCPH

Ganbolor D, Researcher of ND of NCPH, MM

Mandakhtsetsen Kh, Researcher of BID of NCPH

Tsolmon Z, Researcher of ND of NCPH

GLOSSARY OF TERMS

Age-appropriate breastfeeding: Infants 0-5 months of age receive only breast milk and children 6-23 months of age receive breast milk as well as solid, semi-solid, or soft foods.

Anaemia: The condition of having less than the normal concentration of haemoglobin (Hb) in the blood. For children < 5 years of age and pregnant women, anaemia is diagnosed based on Hb < 110 g/l. For adult women and men, anaemia is diagnosed based on Hb < 120 g/l and 130 g/l, respectively.

Body mass index: An individual's weight in kilograms divided by the square of height in metres (kg/m²).

Complementary feeding: The use of age-appropriate, adequate, and safe solid or semi-solid foods in addition to breast milk. The target age for complementary feeding is 6-23 months as it is not recommended to provide any solid, semi-solid, or soft foods to infants < 6 months of age.

Continued breastfeeding at one year: A child 12-15 months of age receives breast milk in addition to age-appropriate complementary feeding.

Continued breastfeeding at two years: A child 20-23 months of age receives breast milk in addition to age-appropriate complementary feeding.

Early initiation of breastfeeding: Breastfeeding that starts within one hour of birth.

Exclusive breastfeeding: An infant 0-5 months of age receives only breast milk and no other liquids or solids, with the exception of oral rehydration salts and vitamin or medicine drops or syrups.

Food fortification: The addition of micronutrients to a food during or after processing.

Food security: The condition in which people at all times have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Goitre: Enlargement of the thyroid gland in the neck caused by iodine deficiency.

Haemoglobin: The protein in red blood cells responsible for transporting oxygen from the lungs to body cells for energy production.

Household Food Insecurity Access Scale: A survey instrument used to measure the level of household food insecurity during the past 30 days. The survey assesses quantity and quality of food available and changes households make in their food consumption patterns due to limited resources to acquire food.

Inflammation: The body's immune system response to pathogens (bacteria, viruses) or injury. Inflammation is commonly measured by C-reactive protein or α1-acid-glycoprotein biomarkers.

Iodine deficiency disorders: A range of abnormalities resulting from iodine deficiency, including reduction of IQ, goitre, and cretinism.

Iron deficiency: A condition resulting from a depletion of body iron stores due to increased iron needs, inadequate dietary iron intake, reduced iron absorption, or loss of iron from infections. Iron deficiency is most commonly measured through serum ferritin or soluble transferrin receptor.

Iron deficiency anaemia: A condition that develops when body iron stores drop too low to support normal red blood cell production resulting in low haemoglobin.

Low birthweight: Weight at birth less than 2,500 grams.

Malnutrition: A term referring to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients. It includes undernutrition (stunting, wasting, underweight, micronutrient deficiencies) and diet-related overweight and obesity.

Micronutrients: Essential vitamins and minerals required by the body in small amounts throughout the life cycle.

Micronutrient malnutrition: Suboptimal nutrition status caused by a lack of intake, absorption, or utilization of vitamins or minerals.

Minimum acceptable diet: A child 6-23 months of age receives breast milk or at least 2 milk feeds for non-breastfed children, the appropriate number of meals/snacks/milk feeds, and food items from at least 4 out of 7 food groups.

Minimum dietary diversity: For children 6-23 months of age, minimum dietary diversity requires consumption of food items from at least 4 out of 7 food groups. For adults, minimum dietary diversity requires consumption of food items from at least 5 out of 10 food groups.

Multiple Micronutrient Powder (MMP): A sachet containing essential vitamins and minerals to sprinkle on a child's food to improve the quality of complementary foods.

Obesity: In children 5-19 years, obesity is defined as BMI-for-age > +2 standard deviations above the WHO Growth Reference median. In adults, obesity is defined as BMI ⩾ 30 kg/m².

Overweight: In children < 5 years of age, overweight is defined as weight-for-length/height > +2 standard deviations above the WHO Child Growth Standards median. In children 5-19 years, overweight is defined as BMI-for-age > +1 standard deviation above the WHO Growth Reference Standards median. In adults, overweight is defined as BMI ⩾ 25 kg/m².

Predominant breastfeeding: An infant 0-5 months of age receives breast milk as the predominant source of nourishment, however the infant may also receive liquids (water and water-based drinks, fruit juice), oral rehydration salts, and vitamin or medicine drops or syrups.

Prevalence: The proportion of individuals in a population with a disease condition or characteristic at a given time, in contrast to incidence which refers to the number of new cases that develop in a given period of time.

Serum ferritin: An iron-containing protein mainly found in the intestinal mucosa, spleen, and liver that is the primary form of iron storage in the body.

Stunting: A form of growth failure that develops over a long period of time (chronic undernutrition). Stunting in children < 5 years of age and children 5-19 years of age is defined as length/height-for-age < -2 standard deviations below the WHO Child Growth Standards median and WHO Growth Reference Standards median, respectively. Severe stunting is length/height-for-age < -3 standard deviations below the WHO Child Growth Standards median.

Supplementation (micronutrient): Provision of micronutrients via a tablet, capsule, syrup, or powder.

Thinness: In children 5-19 years of age, thinness is defined as having a BMI-for-age < -2 standard deviations below the WHO Growth Reference Standards median. Severe thinness is BMI-for-age < -3 standard deviations below the WHO Growth Reference Standards median.

Undernutrition: An insufficient intake and/or inadequate absorption of energy, protein, or micronutrients that leads to nutrition deficiency.

Underweight: In children < 5 years of age, underweight is defined as weight-for-age < -2 standard deviations below the WHO Child Growth Standards median. Severe underweight is weight-for-age < -3 standard deviations below the WHO Child Growth Standards median. In adults, underweight is defined as BMI < 18.5 kg/m².

Wasting: A condition of acute undernutrition. In children < 5 years of age, wasting is defined as weight-for-length/height < -2 standard deviations below the WHO Child Growth Standards median. Severe wasting is weight-for-length/height < -3 standard deviations below the WHO Child Growth Standards median. Wasting in children can also be assessed using a mid-upper arm circumference measurement.

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KEY FINDINGS

HOUSEHOLDS

Indicator	Description	Value
Use of improved drinking water source	Percentage of households using an improved source of drinking water	92.8%
Improved drinking water source on property	Percentage of households with access to an improved source of drinking water on their property	32.6%
Use of improved sanitation facility	Percentage of households using an improved sanitation facility	67.6%
Open defecation	Percentage of households practicing open defecation	3.5%
Use of improved drinking water source and sanitation facility	Percentage of households using an improved source of drinking water and improved sanitation facility	64.9%
Household food insecurity	Percentage of households with food insecurity as measured by the Household Food Insecurity Access Scale	64.7%
Iodized salt consumption	Percentage of households consuming adequately iodized salt (≥ 15 ppm of iodine)	78.9%
Iodine content of iodized salt	Median iodine concentration of iodized salt (ppm)	26.5

CHILDREN UNDER 5 YEARS OF AGE

Indicator	Description	Value
Low birth weight prevalence	Percentage of most recent live births in the last 2 years weighing < 2,500 grams at birth	5.0%
High birth weight prevalence	Percentage of most recent live births in the last 2 years weighing ≥ 4,000 grams at birth	12.6%
Underweight prevalence	Percentage of children 0-59 months < -2 SD of the median weight-for-age of the WHO standard	0.7%
Stunting prevalence	Percentage of children 0-59 months < -2 SD of the median height-for-age of the WHO standard	6.1%
Wasting prevalence	Percentage of children 0-59 months < -2 SD of the median weight-for-height of the WHO standard	1.3%
Overweight prevalence	Percentage of children 0-59 months > +2 SD of the median weight-for-height of the WHO standard	11.7%
Anaemia prevalence	Percentage of children 0-59 months with haemoglobin < 110 g/l	26.6%
Iron deficiency (serum ferritin) prevalence	Percentage of children 6-59 months with serum ferritin < 12 µg/l	20.7%
Iron deficiency (soluble transferrin receptor) prevalence	Percentage of children 6-59 months with sTfR > 8.3 mg/l	27.7%
Iron deficiency anaemia prevalence	Percentage of children 6-59 months with haemoglobin < 110 g/l and ferritin < 12 µg/l	10.9%
Vitamin A deficiency prevalence	Percentage of children 6-59 months with serum retinol < 0.70 µmol/l	9.5%
Vitamin A insufficiency prevalence	Percentage of children 6-59 months with serum retinol ≥ 0.70-1.05 µmol/l	60.1%
Vitamin D deficiency prevalence	Percentage of children 6-59 months with 25-hydroxyvitamin D < 20 ng/ml	61.0%
Vitamin D insufficiency prevalence	Percentage of children 6-59 months with 25-hydroxyvitamin D 20-29 ng/ml	28.9%
Inflammation prevalence	Percentage of children 6-59 months with C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l	28.4%

Multiple Micronutrient Powder consumption	Percentage of children 6-59 months who consumed Multiple Micronutrient Powders during the past year	15.4%
Iron supplementation	Percentage of children 0-59 months who received iron supplementation during the past year	4.0%
Vitamin A supplementation	Percentage of children 6-59 months who received vitamin A supplementation during the past year	58.1%
Vitamin D supplementation	Percentage of children 0-59 months who received vitamin D supplementation during the past year	58.0%
Child ever breastfed	Percentage of women with a live birth in the last 2 years who breastfed their last live-born child at any time	97.9%
Early initiation of breastfeeding	Percentage of women with a live birth in the last 2 years who breastfed their last live-born child within 1 hour of birth	83.7%
Exclusive breastfeeding	Percentage of infants < 6 months who were exclusively breastfed	58.3%
Predominant breastfeeding	Percentage of infants < 6 months who received breast milk as the predominant source of nourishment during the previous day	65.3%
Continued breastfeeding at 1 year	Percentage of children 12-15 months who received breast milk during the previous day	81.1%
Continued breastfeeding at 2 years	Percentage of children 20-23 months who received breast milk during the previous day	47.3%
Age-appropriate breastfeeding	Percentage of children 0-23 months who were appropriately fed during the previous day	69.2%
Introduction of solid, semi-solid, or soft foods	Percentage of infants 6-8 months who received solid, semi-solid, or soft foods during the previous day	96.5%
Milk feeding frequency for non-breastfed children	Percentage of non-breastfed children 6-23 months who received at least 2 milk feedings during the previous day	58.2%
Minimum dietary diversity	Percentage of children 6-23 months who received foods from at least 4 food groups during the previous day	49.6%
Minimum meal frequency	Percentage of children 6-23 months who received solid, semi-solid, or soft foods the minimum number of times during the previous day	92.1%
Minimum acceptable diet	Percentage of children 6-23 months who had minimum dietary diversity and minimum meal frequency during the previous day	43.8%

SCHOOL CHILDREN 6-11 YEARS OF AGE

Indicator	Description	Value
Stunting prevalence	Percentage of children 6-11 years < -2 SD of the median height-for-age of the WHO standard	7.3%
Wasting prevalence	Percentage of children 6-11 years < -2 SD of the median weight-for-height of the WHO standard	2.8%
Overweight prevalence	Percentage of children 6-11 years > +2 SD of the median weight-for-height of the WHO standard	22.2%
Obesity prevalence	Percentage of children 6-11 years > +3 SD of the median weight-for-height of the WHO standard	6.4%
Goitre prevalence	Percentage of children 6-11 years with goitre (palpable or visible)	7.8%
Urinary iodine concentration	Median urinary iodine concentration in children 6-11 years (µg/l)	144.6
Awareness of iodine deficiency	Percentage of children 6-11 years who were aware about iodine deficiency	6.7%
Awareness of iodized salt	Percentage of children 6-11 years who were aware about iodized salt	36.1%
Consumption of sugar-sweetened beverages	Percentage of children 6-11 years who consumed sugar-sweetened beverages > 1 times per week	80.9%
Consumption of fried foods	Percentage of children 6-11 years who consumed fried foods > 1 times per week	77.3%

| Consumption of sweet foods | Percentage of children 6-11 years who consumed sweet foods > 1 times per week | 97.8% |
| Consumption of any junk foods | Percentage of children 6-11 years who consumed any junk foods > 1 times per week | 99.0% |

PREGNANT WOMEN 15-49 YEARS OF AGE

Indicator	Description	Value
Low mid-upper arm circumference (MUAC) prevalence	Percentage of pregnant women with mid-upper arm circumference (MUAC) < 22.5 cm	2.6%
Short stature prevalence	Percentage of pregnant women with height < 145 cm	0.6%
Anaemia prevalence	Percentage of pregnant women with haemoglobin < 110 g/l	21.4%
Iron deficiency (serum ferritin) prevalence	Percentage of pregnant women with serum ferritin < 15 µg/l	29.6%
Iron deficiency (soluble transferrin receptor) prevalence	Percentage of pregnant women with sTfR > 8.3 mg/l	8.7%
Iron deficiency anaemia prevalence	Percentage of pregnant women with haemoglobin < 110 g/l and ferritin < 15 µg/l	10.5%
Vitamin A deficiency prevalence	Percentage of pregnant women with serum retinol < 0.70 µmol/l	0.5%
Vitamin A insufficiency prevalence	Percentage of pregnant women with serum retinol ⩾ 0.70-1.05 µmol/l	11.3%
Vitamin D deficiency prevalence	Percentage of pregnant women with 25-hydroxyvitamin D < 20 ng/ml	75.4%
Vitamin D insufficiency prevalence	Percentage of pregnant women with 25-hydroxyvitamin D 20-29 ng/ml	20.2%
Urinary iodine concentration	Median urinary iodine concentration in pregnant women (µg/l)	120.5
Inflammation prevalence	Percentage of pregnant women with C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l	27.1%
Minimum dietary diversity	Percentage of pregnant women who consumed foods from at least 5 food groups during the previous day	76.6%
Antenatal care (ANC) attendance	Percentage of pregnant women who attended ANC during their current pregnancy	97.3%
Iron supplementation	Percentage of pregnant women who consumed iron supplements during their current pregnancy	74.6%
Multiple micronutrient supplementation	Percentage of pregnant women who consumed multiple micronutrient supplements during their current pregnancy	57.9%
Multiple micronutrient supplementation at ANC	Percentage of pregnant women who consumed multiple micronutrient supplements received at ANC visits during their current pregnancy	11.3%
Awareness of iodine deficiency	Percentage of pregnant women who were aware about iodine deficiency	47.5%
Awareness of iodized salt	Percentage of pregnant women who were aware about iodized salt	85.4%

MOTHERS 15-49 YEARS OF AGE

Indicator	Description	Value
Underweight prevalence	Percentage of mothers with BMI < 18.5 kg/m^2	4.1%
Overweight prevalence	Percentage of mothers with BMI ⩾ 25.0 kg/m^2	46.2%
Obesity prevalence	Percentage of mothers with BMI ⩾ 30.0 kg/m^2	16.5%
Short stature prevalence	Percentage of mothers with height < 145 cm	1.3%
Anaemia prevalence	Percentage of mothers with haemoglobin < 120 g/l	16.2%

Minimum dietary diversity	Percentage of mothers who consumed foods from at least 5 food groups during the previous day	70.2%
Vitamin and mineral supplementation	Percentage of mothers who consumed vitamin and mineral supplements during the past year	39.7%
Vitamin and mineral supplementation during last pregnancy	Percentage of mothers with a live birth in the last 2 years who consumed vitamin and mineral supplements during their last pregnancy	82.3%
Awareness of anaemia	Percentage of mothers who were aware about anaemia	59.8%
Antenatal care (ANC) attendance with skilled provided	Percentage of mothers with a live birth in the last 2 years who attended ANC with a skilled provider during their last pregnancy	99.0%
Antenatal care (ANC) attendance 4 or more visits	Percentage of mothers with a live birth in the last 2 years who attended ANC 4 times or more during their last pregnancy	94.3%
Antenatal care (ANC) attendance in first trimester	Percentage of mothers with a live birth in the last 2 years who first attended ANC in the first trimester during their last pregnancy	46.4%
Delivery of child in a public or private facility	Percentage of mothers with a live birth in the last 2 years who delivered their last child in a public or private facility	99.8%

MEN 15-49 YEARS OF AGE

Indicator	Description	Value
Underweight prevalence	Percentage of men with BMI < 18.5 kg/m^2	1.9%
Overweight prevalence	Percentage of men with BMI ⩾ 25.0 kg/m^2	48.8%
Obesity prevalence	Percentage of men with BMI ⩾ 30.0 kg/m^2	14.6%
Anaemia prevalence	Percentage of men with haemoglobin < 130 g/l	3.0%
Iron deficiency (serum ferritin) prevalence	Percentage of men with serum ferritin < 15 µg/l	1.1%
Iron deficiency (soluble transferrin receptor) prevalence	Percentage of men with sTfR > 8.3 mg/l	3.9%
Iron deficiency anaemia prevalence	Percentage of men with haemoglobin < 130 g/l and ferritin < 15 µg/l	0.1%
Vitamin A deficiency prevalence	Percentage of men with serum retinol < 0.70 µmol/l	0.6%
Vitamin A insufficiency prevalence	Percentage of men with serum retinol ⩾ 0.7-1.05 µmol/l	2.6%
Vitamin D deficiency prevalence	Percentage of men with 25-hydroxyvitamin D < 20 ng/ml	40.4%
Vitamin D insufficiency prevalence	Percentage of men with 25-hydroxyvitamin D 20-29 ng/ml	41.9%
Inflammation prevalence	Percentage of men with C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l	11.2%
Minimum dietary diversity	Percentage of men who consumed foods from at least 5 food groups during the previous day	58.9%

BACKGROUND AND PURPOSE

INTRODUCTION

Mongolia is a large, landlocked country in Central Asia bordered by China and Russia. Administratively, Mongolia is divided into 21 *aimags* (provinces), which are subdivided into *soums* (rural districts) and *baghs* (villages or communities). Ulaanbaatar, the capital city, is divided into 9 districts, which are further subdivided into *khoroos* (sub-districts). While the estimated population of Mongolia is 3,164,529[1], it is the least densely populated country in the world, with an average population density of 2 persons per square kilometer.[2] Average life expectancy at birth is 73 years for females and 65 years for males.[3]

Approximately 70% of the population live in urban areas with the majority residing in the capital Ulaanbaatar.[4] Increased socio-economic development in recent years has led to extensive migration from rural to urban areas. This has created widespread urban poverty with the expansion of slum communities, or Ger districts, which have limited access to employment opportunities and basic services such as safe water and sanitation; it is estimated that 43% of the urban population live in Ger districts.[5] Poverty in rural areas is largely due to a lack of livelihood diversification as the majority of the rural population are nomadic livestock herders. Mongolia's long and cold winters, dry and hot summers, and low precipitation encumber the agriculture sector and create a heavy reliance on imported fruits and vegetables. Further, the pastoral system in Mongolia fosters a diet that is to a large extent protein-based, consisting of meat and dairy products, and offers little dietary diversity making much of the population susceptible to micronutrient deficiencies.

Despite the country's unique geographic and ecological challenges, the government of Mongolia has achieved remarkable improvements in population health through substantial reductions in maternal and child mortality, child stunting and underweight, increased antenatal care attendance, and micronutrient supplementation for pregnant women and children. Resource limitations, however, have hindered the realization of optimal benefit from many initiatives. The National Nutrition Programme leads initiatives in four key areas to improve the nutrition status of the Mongolian population: (i) establishing a healthy and safe food system; (ii) strengthening the health sector's capacity for nutrition and food safety; (iii) disseminating nutrition information, education, and communication to the general public; and (iv) strengthening national nutrition surveillance, monitoring, and evaluation systems. Despite these advancements and the positive trends in economic growth in recent years, the burden of malnutrition is high in Mongolia with immeasurable consequences for individuals, families, communities, and society at large.

This report presents the results of the 5th National Nutrition Survey (NNS V) which was conducted in Mongolia in 2017. It reports on the current nutrition status of the Mongolian population, highlights progress made since the 2010 NNS IV and identifies nutrition status shortfalls with the goal of informing policy and programmatic action within the context of significant changes in socio-economic conditions and dietary practices that have occurred in Mongolia over the past few years. Key features of the NNS V survey include the availability of regional data on relevant nutrition indicators and the inclusion of data on men's micronutrient status and household food security which previously were not included. The NNS V survey quantifies the prevalences of the nutrition conditions that are of greatest concern to the population, particularly young children and pregnant women. As Mongolia is experiencing a double burden of malnutrition with both under- and over-nutrition, the survey examined national and regional indicators relevant to the country's current nutrition transition. The regional level data are useful for identifying target areas requiring additional programming, training, and resources.

The NNS V report focuses on the prevalences of nutrition conditions during the life course and is divided into five sections for specific target populations: children under 5 years, school-aged children 6-11 years, pregnant women 15-49 years, mothers 15-49 years, and men 15-49 years. Also included are household

1   National Statistics Office of Mongolia webpage. http://www.en.nso.mn/index.php. Accessed September 19, 2017.
2   Food and Agriculture Organization and World Bank population estimates. https://data.worldbank.org/indicator/EN.POP.DNST. Accessed September 19, 2017.
3   World Health Organization. Mongolia Country Profile. http://www.who.int/countries/mng/en/. Accessed September 19, 2017.
4   United Nations World Urbanization Prospects. http://www.indexmundi.com/facts/mongolia/indicator/SP.URB.TOTL.IN.ZS. Accessed September 19, 2017.
5   United Nations Millennium Development Goals database. https://mdgs.un.org/unsd/mdg/Data.aspx. Accessed September 19, 2017.

socio-demographic characteristics, food security status, and iodized salt coverage. The survey report also includes six thematic chapters examining in greater depth the most pressing nutrition concerns facing Mongolia - iron, vitamin A, vitamin D, and iodine deficiency, household food insecurity, and overweight and obesity – along with recommendations for nutrition-specific policy and programmatic actions for each topic.

The results of the NNS V reveal that the burden of malnutrition is high in Mongolia; poor exclusive breastfeeding practices, lack of dietary diversity, and high prevalence of micronutrient deficiencies, food insecurity, overweight, and obesity pose serious public health consequences for the population. Of particular concern is the very high prevalence of overweight and obesity in adults, and increasingly in children, which has reached epidemic proportions and affects all population groups without regard to region or wealth. The increasing number of people adopting unhealthy energy-dense diets and engaging in less physical activity will further increase the prevalence of non-communicable diseases which are already the leading cause of mortality in Mongolia.[6]

The 5th National Nutrition Survey Report provides analysis of the latest available data on the nutrition status of the Mongolian population and aims to guide efforts to reduce malnutrition. A well-nourished population is vital to a country's social and economic progress; however, Mongolia faces serious public health challenges from malnutrition. This NNS V Report aims to stimulate a political commitment to investment in nutrition programmes, to deliver effective and affordable interventions to women and children and to advance Mongolia's sustainable development agenda.

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6   Institute for Health Metrics and Evaluation. Mongolia Country Profile. http://www.healthdata.org/mongolia. Accessed September 19, 2017.

JUSTIFICATION FOR CONDUCTING THE NNS V

In light of the fast-changing political, economic, and environmental landscape of Mongolia in recent years, a timely update of the nutrition situation in the country is needed in order to adjust policy and programme strategies to address the unmet nutrition needs of the population. The importance of conducting periodic national nutrition surveys in Mongolia is widely recognized. Prior assessments of population nutrition status were conducted in 1992 (NNS I), 1999 (NNS II), 2001 (Dzud survey), 2004 (NNS III), 2005 (MICS), and 2010 (NNS IV) with financial and technical support from UNICEF, WHO, and World Vision Mongolia. On the basis of these findings, the government of Mongolia implemented various initiatives to reduce the burden of malnutrition including: breastfeeding promotion and prohibiting the marketing of breast milk substitutes; child growth promotion and monitoring through infant and young child feeding counselling; food security initiatives; programmes to reduce iodine deficiency; and vitamin A, vitamin D, and multi-micronutrient supplementation programmes. Though these and other efforts resulted in institutional strengthening and greater intersectoral collaboration to address the multiple determinants of malnutrition in the country, complex challenges remain including the need to address the dual burdens of under- and over-nutrition in Mongolia.

The National Nutrition Programme has four key focus areas to improve the nutrition status of the Mongolian population: (i) ensuring a healthy and safe food system; (ii) strengthening the health sector's capacity in nutrition and food safety; (iii) scaling-up nutrition information, education, and communication programs for the general public; and (iv) strengthening national nutrition surveillance, monitoring, and evaluation systems. Through obtaining representative data on the current nutrition status of the Mongolian population, the 2017 National Nutrition Survey V focused on assessing progress made as a result of the government's nutrition interventions and identifying remaining nutrition gaps to inform future nutrition-related programming and to enable the government to respond to the changes in socio-economic conditions and dietary practices in the country.

The NNS V is the most comprehensive nutrition assessment conducted in the country to date. The NNS V is the first national nutrition survey to assess both wealth and household food security status of households with under 5-year-old children. The NNS V is also the first survey to assess the dietary diversity of the Mongolian adult population through the FAO and USAID Household Food Insecurity Access Scale measurement guide. Dietary diversity assessment of men, mothers and pregnant women provides information on dietary quality and potential rationale for common types of micronutrient deficiencies in Mongolian women and men.

A key strength of the survey is the measurement of biochemical indicators to obtain prevalence estimates of anaemia, iron deficiency, vitamin A and vitamin D deficiency among children and pregnant women at the regional level and in men at the national level. The survey contributes important data on the micronutrient status of men in Mongolia which was unavailable prior to the NNS V. The regional level data collected for all nutrition indicators is useful for identifying under-performing regions and areas where additional planning, training, and resources may be required for targeted support.

SURVEY PURPOSE AND OBJECTIVES

PURPOSE OF THE SURVEY

The aims of the 2017 NNS V were to assess the current nutrition status of the Mongolian population, estimate the prevalence of diet- and nutrition-related conditions among specific groups at risk for malnutrition, and identify next steps for improving the overall nutrition situation in the country.

OBJECTIVES OF THE SURVEY

The specific objectives of the 2017 NNS V were the following:

1. Estimate the prevalence of under- and over-nutrition, anaemia, micronutrient deficiencies (iron, vitamin A, vitamin D), use of micronutrient supplementation, and IYCF practices among children 0-59 months of age.

2. Estimate the prevalence of under- and over-nutrition, iodine deficiency, unhealthy food consumption, and participation in school-based physical education among school children 6-11 years of age.

3. Estimate the prevalence of under-nutrition, anaemia, micronutrient deficiencies (iron, iodine, vitamin A, vitamin D), use of micronutrient supplementation, dietary diversity, antenatal care (ANC) practices, and knowledge of infant and young child feeding (IYCF) practices among pregnant women 15-49 years of age.

4. Estimate the prevalence of under- and over-nutrition, anaemia, use of micronutrient supplementation, dietary diversity, and IYCF practices among mothers (15-49) of children 0-59 months of age.

5. Estimate the prevalence of under- and over-nutrition, anaemia, micronutrient deficiencies (iron, vitamin A, vitamin D), and dietary diversity among men 15-49 years of age.

6. Assess household food security status and estimate coverage of adequately iodized salt in households with a child 0-59 months of age.

ETHICAL CONSIDERATIONS

The survey methodology was discussed at the Scientific Committee of the Public Health Institute (recently named by National Center for Public Health) and granted the PHI Directors Order on 28th June, 2016 (Annex I). Ethics approval for conducting the NNS V, including obtaining biological (blood and urine) samples, was obtained from the Medical Ethics Committee under the Mongolian Ministry of Health on 7th July, 2016 with granted approval to conduct the survey and send blood serum samples to the VitMin laboratory in Germany (Annex II). Participation in the survey was voluntary and oral and written informed consent was obtained from all individuals selected for the survey. Participant confidentiality was maintained during data collection, data entry, data analysis, and in the dissemination of survey findings.

SURVEY METHODOLOGY

SURVEY METHODOLOGY

SAMPLING PROCEDURE

The NNS V was implemented in 21 provinces (*aimags*) in 4 economic regions (Central, Eastern, Khangai, Western) and the capital city of Ulaanbaatar. Given the regional differences in lifestyle and nutrition status, target populations were stratified into 5 strata based on economic region and Ulaanbaatar with equal samples drawn from each stratum using a cluster-randomized sampling design. National estimates for all indicators were based on weighted regional estimates. A representative sample of 30 clusters (villages) was randomly selected using Probability Proportional to Size (PPS) methodology in each of the 4 regions and Ulaanbaatar for a total of 150 cluster units (Figures 1-2). The PPS method was used to ensure all households had the same probability of selection, irrespective of cluster size. Thirty clusters per region was considered the optimal number to maximize the precision of point estimates[7]. A list of the selected clusters is included in Annex III.
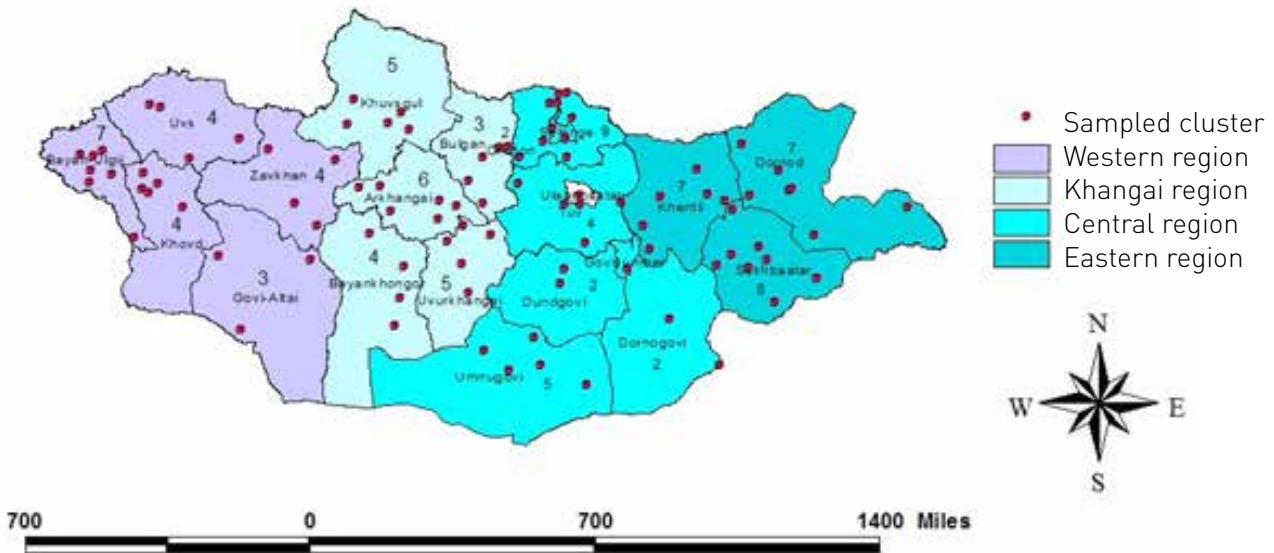
Figure 1. Sampled clusters in Central, Eastern, Khangai, and Western regions
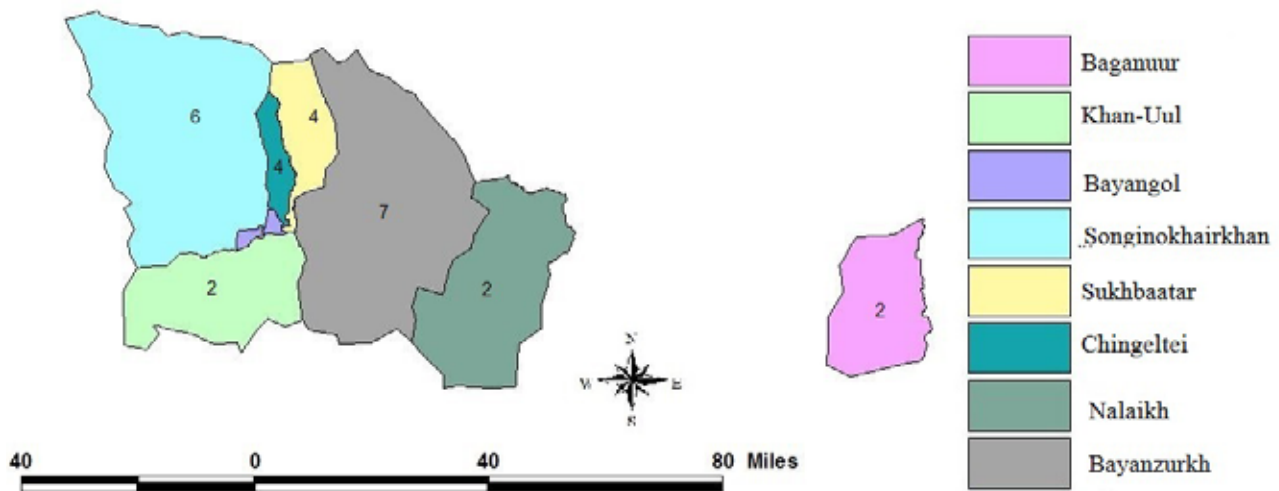
Figure 2. Selected primary sampling units in Ulaanbaatar

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7   Henderson RH and Sundaresan T. Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. Bull World Health Organ 1982;60(2):253-60.

The sample frame was designed to enable statistically representative estimates of key nutrition indicators at the national and provincial level. Three sampling universes were utilized to select households, school-aged children 6-11 years from primary schools, and pregnant women. For the selection of households in urban areas, the process involved first selecting 30 *khoroos* (clusters), then *khesegs*, and then households with a child 0-59 months of age. Due to difficulties in transportation logistics in the provinces, cluster sampling at the *soum* and *bagh* level was implemented to minimize travel between selected households. In rural areas, 94 *soums* (clusters) were selected first, followed by *baghs*, and households with a child 0-59 months. The selection of clusters (*khoroos* and *soums*) was performed in Ulaanbaatar and was based on current household and population data from the National Statistics Office. For each sampling unit (*khesegs* and *baghs*), the survey team prepared a list of households with children 0-59 months based on information provided by local government authorities and primary health centres.

In the clusters (*soums* and *khoroos*) selected for the household component of the NNS V survey, pregnant women were selected randomly from *soum* and *khoroo* family health centre antenatal care registries. Thus, the sample of pregnant women was independent of the household sample described above. However, because this sample was drawn from the same selected primary sampling units (PSUs) as the household sample, it was also regionally stratified. The primary schools from which children 6-11 years were selected were located in the same selected sampling units (*soums* and *khoroos*). Survey teams obtained official permission from school authorities to collect data from the school children.

SAMPLE SIZE CALCULATION

The required minimum sample size was calculated separately for each primary outcome measured in each of the target population groups.

All sample size calculations were based on the following assumptions:

1. Limit of statistical significance (alpha) = 0.05

2. Statistical power (beta) = 0.80

3. As the population size from which the samples were selected was > 10,000, the finite population correction factor was not used.

Similarities between individuals within cluster units reduce the variability of responses as compared to a simple random sample. This homogeneity results in a loss of power to make statistical inferences from the data collected. Therefore, the degree of similarity of clustered data, known as the intra-cluster correlation coefficient (ICC) or rho (ρ), was identified from earlier studies and incorporated into the sample size calculation. The equation below was used to calculate the design effect from the ICC of 0.077 calculated in the Mongolia Dzud Survey conducted in 2001. Using this equation, the design effect was 2.12 with an average cluster size of 15 households. The design effect of 2.12 was used to calculate minimum sample size requirements for each outcome in the NNS V.

$$\frac{\text{Design effect} - 1}{\text{Average cluster size} - 1} = \text{ICC}$$

Sample sizes assumed a household response rate of 98%; that is, 98% of the households selected for the survey sample were expected to be available and willing to consent to participation. This household response rate was based on the results of the NNS IV survey. Individual response rates of 90% and 85% were estimated for anthropometric and biochemical indicators, respectively. The relative margin of error (RME) was used to determine the level of precision for each indicator point estimate. The RME was determined based on the MICS recommendation that 0.12 be utilized as the RME for all indicators, such that the true value of the estimate falls within ± 12% of the survey estimate.[8] As the RME is a percentage of the predicted value of the indicator, the lower the prevalence of the indicator, the larger the required sample size. For example, an RME of 0.12 corresponds to a precision of ± 3.4% for the prevalence of anaemia in children under 5. However, the same RME of 0.12 corresponds to a precision of ± 1.7% for the prevalence of anaemia in women of reproductive age due to the lower prevalence of anaemia in women.

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8   http://mics.unicef.org/tools.

An RME of 0.12 to 0.20 is considered to yield a high level of precision to provide robust point estimates for measured indicators at the regional level, with an RME of 0.25 incorporated when the current prevalence is less than 15%. A higher level of desired precision, with a low RME, increases the sample size required, but reduces the confidence interval (variability) around the estimate.

The sample size required for each target population was calculated using the following formula:

$$\frac{\{4*r*(1-r)*deff\}}{(RME*r)^2*pb*AveSize*RR}$$

r = predicted value of the indicator
deff= design effect of 2.12
RME = 0.05, 0.12, 0.15, 0.20, or 0.25
pb= proportion of target population in total population
AveSize= average household size of 3.5
RR= response rate of 98%

Table 1 presents the calculated minimum number of households and individuals required to achieve the desired sample size for each outcome indicator.

Table 1. Minimum sample size requirements for key outcomes in target populations, Mongolia National Nutrition Survey, 2017

Target population and indicator	Current prevalence assumed	Relative Margin of Error (RME)	Corresponding level of precision	Design effect assumed	Individual response rate assumed	Number of individuals to select in EACH region
Households						
Adequately iodized salt	75%	0.05	± 3.8%	2.12	98%	330
Children 0-59 months						
Anaemia	28%	0.15	± 4.2%	2.12	85%	326
Iron deficiency	21%	0.15	± 3.2%	2.12	85%	477
Vitamin A deficiency	32%	0.15	± 4.8%	2.12	85%	269
Vitamin D deficiency	22%	0.15	± 3.3%	2.12	85%	449
Stunting	11%	0.25	± 2.8%	2.12	90%	348
Overweight	11%	0.25	± 2.8%	2.12	90%	348
Mothers 15-49 years						
Anaemia	14%	0.25	± 3.5%	2.12	85%	239
Overweight	30%	0.12	± 3.6%	2.12	90%	436
Men 15-49 years						
Overweight	40%	0.12	± 4.8%	2.12	85%	242
Vitamin D deficiency	35%	0.12	± 4.2%	2.12	70%	446
Pregnant women 15-49 years						
Anaemia	27%	0.20	± 5.4%	2.12	85%	193
Iron deficiency	30%	0.20	± 6.0%	2.12	85%	166
Vitamin A deficiency	25%	0.20	± 5.0%	2.12	85%	214
Vitamin D deficiency	30%	0.20	± 6.0%	2.12	85%	166
School children 6-11 years						
Overweight	15%	0.20	± 3.0%	2.12	90%	381

The minimum required sample sizes were used to calculate the planned sample sizes at the stratum (regional) level for each of the target populations (Table 2). The level of precision for the measured indicators ranged from ± 2.8% to ± 6.0% at the regional level with the final sample sizes selected to provide a minimum of ± 5.0% precision for each indicator at the regional level for children 0-59 months of age, school children 6-11 years of age, mothers 15-49 years of age, and pregnant women 15-49 years of age and at the national level for men 15-49 years of age.

Table 2. Planned sample size for each target population, Mongolia National Nutrition Survey, 2017

Target population	Sample size per region	Number of regions	Total sample size for national estimate
Children 0-59 months	450	5	2250
Mothers 15-49 years	450	5	2250
Mothers 15-49 years (for blood analysis)	200	5	1000
Men 15-49 years	250	5	1250
Men 15-49 years (for blood analysis)	450	1*	450
Pregnant women 15-49 years	450	5	2250
Pregnant women 15-49 years (for blood analysis)	200	5	1000
School children 6-11 years	350	5	1750

* Biological samples for blood analysis were collected in a sub-sample of men aged 15-49 years for national level representation.

SELECTION OF PARTICIPANTS

The selection of survey participants differed for the three sampling universes. Household eligibility was based on a child 0-59 months of age living in the household with 15 households with a child 0-59 months of age randomly selected from each cluster for a total of 450 households selected in each region. Households with a child 0-59 months of age were selected from household lists available at the *kheseg* or *bagh* level. If more than one age-eligible child lived in the household, one child was randomly selected for the survey sample. Heads of households provided information on household socio-demographic characteristics. All mothers (15-49 years) of selected children were eligible to participate in the survey. The child's caretaker was interviewed if the mother was not available. All men 15-49 years of age who resided in the selected households were also eligible to participate in the survey.

In each region, 350 school children 6-11 years of age were randomly selected from school attendance lists at selected *soum* or *khoroo* primary schools in each cluster. Survey teams randomly selected 12 children from school attendance lists for all grades (1-6) at the selected schools and ensured an equal representation of boys (n=6) and girls (n=6). Pregnant women were identified based on *soum* or family doctor antenatal care registries at the *kheseg* and *soum* level and 15 women were randomly selected from lists prepared by survey teams in each cluster.

Due to resource limitations, all biological indicators were not measured in all target populations. Selected indicators were specific to target groups at highest risk for malnutrition or with no prior data available, as with data on the micronutrient status of men in the country. Table 3 presents an overview of the indicators measured for each target population at the regional and national level.

Table 3. Survey indicators measured for each target population, Mongolia National Nutrition Survey, 2017

Indicator	Household Level	Children 0-59 m	Mothers 15-49 y	Men 15-49 y	Children 6-11 y	Pregnant women 15-49 y
Biochemical indicators						
Anaemia		Regional/National [a]	Regional/National	National		Regional/National
Iron status		Regional/National [b]		National		Regional/National
Vitamin A status		Regional/National [b]		National		Regional/National
Vitamin D status		Regional/National [b]		National		Regional/National
Iodine status					Regional/National	Regional/National
Anthropometric indicators						
Underweight		Regional/National	Regional/National	Regional/National	Regional/National	

Overweight		Regional/National	Regional/National	Regional/National	Regional/National	
Stunted/short stature		Regional/National	Regional/National		Regional/National	Regional/National
Wasted		Regional/National			Regional/National	
Low MUAC						Regional/National
Household and individual characteristics						
Demographic indicators	Regional/National	Regional/National	Regional/National	Regional/National	Regional/National	Regional/National
Wealth index	Regional/National					
Food security	Regional/National					
24-hour dietary recall		Regional/National				
Food frequency and diversity		Regional/National	Regional/National	Regional/National		Regional/National
Consumption of unhealthy foods					Regional/National	
Health status		Regional/National				
Iodine concentration of salt	Regional/National					
Micronutrient supplement use		Regional/National	Regional/National			Regional/National
IYCF knowledge/practice			Regional/National			Regional/National
Receipt of ANC services			Regional/National			Regional/National

[a] Anaemia measured in children 0-59 months.
[b] Iron, vitamin A, and vitamin D status measured in children 6-59 months.

FIELDWORK PROCEDURES

Each of the 4 regions had 3 data collection teams, comprising 5 members each, for a total of 12 field teams and 60 enumerators. All data collection teams conducted fieldwork in Ulaanbaatar together before the provincial level fieldwork. The fieldwork was coordinated by NCPH in collaboration with the Department of Health in the 21 provinces (*aimags*) and 8 districts in Ulaanbaatar. Data collection occurred during September to November 2016, in contrast to the 2010 NNS IV which was implemented during the warm season (July to August 2010). The survey teams participated in a comprehensive one-week training which included practice exercises.

Survey procedures consisted of interviews, anthropometric measurements, clinical examinations, and the collection of biological (blood and urine) samples for respective target groups. Nutrition status was assessed based on anthropometric measurements of weight and length/height in children 0-59 months, children 6-11 years, mothers, and men, and height and mid-upper arm circumference (MUAC) in pregnant women. Child and adult body weight was measured using UNICEF electronic scales with a precision of 100 g. Body length/height was measured in a horizontal (lying down) position for children 0-23 months and in a vertical (standing) position for children 24 months and older using a wooden stadiometer with a precision of 1 mm. Adult height was also measured using a stadiometer with a precision of 1 mm. MUAC measurements of pregnant women were taken using standard adult MUAC tapes.

Micronutrient deficiencies were assessed by tests for haemoglobin, serum ferritin, soluble transferrin receptor (sTfR), retinol-binding protein (RBP), 25-hydroxyvitamin D [25(OH)D], C-reactive protein (CRP), alpha-1-acid glycoprotein (AGP), and spot urine samples for determination of urinary iodine concentration. These tests are discussed in detail in the section "Laboratory testing methods" below.

Children 0-59 months of age were examined for the following 18 specific clinical signs and symptoms of rickets by paediatricians or family medicine doctors: occipital alopecia, soft fontanel, craniatabes, olympic forehead, cranial deformation, unclogged fontanel, rosary of rickets, harrison groove, pigeon chest, symptom bracelet, muscular hypotonia, spinal deformation, bowed leg, X leg, hard swollen joints, hard swollen joints of anklebone, sweating on forehead during sleeping and breastfeeding, and urine smell. A child was determined to have rickets based on the presence of one or more of 16 symptoms, excluding sweating on forehead during sleeping and breastfeeding and urine smell. School children 6-11 years of age were examined for goitre by palpation of the thyroid gland performed by paediatricians or family medicine doctors. Assessment methods for key indicators measured in each target population are presented in Table 4.

Table 4. Nutrition indicators and methods of assessment, Mongolia National Nutrition Survey, 2017

Target population	Nutrition indicator	Assessment method
Household	Food security	Interview
	Socio-economic status	Interview
	Water and sanitation	Interview
	Iodized salt consumption	Measurement of iodine content in salt
Children 0-59 m	IYCF practices • Breastfeeding • Complementary feeding	Interview/24-hour recall
	Nutrition Status • Wasting • Underweight • Stunting • Overweight	Measurement of weight, length/height, age
	Rickets prevalence	Clinical examination
	Use of vitamin and mineral supplements • Vitamin A • Vitamin D • Iron • Multiple Micronutrient Powder • Other micronutrients	Interview
	Anaemia	Haemoglobin measurement using HemoCue
Children 6-59 m	Micronutrient status • Iron • Vitamin A • Vitamin D	Measurement of ferritin, sTfR, RBP, 25(OH)D, CRP, and AGP from venipuncture
Children 6-11 years	Nutrition Status • Wasting • Stunting • Overweight • Obesity	Measurement of weight, height, age
	Goitre prevalence	Palpation of thyroid gland
	Iodine nutrition	Measurement of urinary iodine concentration
	Awareness of prevention of iodine deficiency and iodized salt	Interview
	Consumption of unhealthy foods	Interview
	Physical education enrolment	Interview
Pregnant women 15-49 years	Nutrition Status • Wasting	Measurement of MUAC
	• Short stature	Measurement of height
	Anaemia	Haemoglobin measurement using HemoCue

	Micronutrient status • Iron • Vitamin A • Vitamin D • Iodine	Measurement of ferritin, sTfR, RBP, 25(OH)D, CRP, AGP, and urinary iodine concentration
	Use of vitamin and mineral supplements • Vitamin D • Iron and folic acid • Multi-micronutrients • Other micronutrients	Interview
	Awareness of prevention of iodine deficiency and iodized salt	Interview
	Dietary diversity	Interview/24-hour recall
	IYCF knowledge	Interview
	ANC attendance	Interview
Mothers 15-49 years	Nutrition Status • Underweight • Overweight • Obesity • Short stature	Measurement of weight and height
	Anaemia	Haemoglobin measurement using HemoCue
	Use of vitamin and mineral supplements	Interview
	Dietary diversity	Interview/24-hour recall
	Awareness of anaemia	Interview
	IYCF knowledge and practice	Interview
	ANC attendance	Interview
Men 15-49 years	Nutrition Status • Underweight • Overweight • Obesity	Measurement of weight and height
	Anaemia	Haemoglobin measurement using HemoCue
	Micronutrient status • Iron • Vitamin A • Vitamin D	Measurement of ferritin, sTfR, RBP, 25(OH)D, CRP, and AGP
	Dietary diversity	Interview/24-hour recall

COLLECTION OF BIOLOGICAL SPECIMENS AND HOUSEHOLD SALT SAMPLES

Blood samples were collected from children 6-59 months of age (from children 0-59 months for HemoCue test for anaemia), pregnant women, and men by laboratory staff or licensed nurses trained in standard venipuncture methods. Approximately 6-8 ml of blood was collected in a vacutainer with no additives, kept in a cold box away from direct sunlight, and transported to the local *soum* or family health centre where samples were centrifuged. Isolated serum was aliquoted into 3 microtubes using a disposable single use pipette and transported at -20˚C to the NCPH laboratory for sending to VitMin in Germany for testing and the Gyals laboratory in Ulaanbaatar for storage under appropriate conditions. Spot urine specimens were collected by laboratory staff, transferred into 3 microtubes using a disposable pipette, and transported at -20˚C to the NCPH laboratory in Ulaanbaatar for testing. Household salt samples (30 g) were collected in small plastic *bags* by survey teams and transported to the NCPH laboratory in Ulaanbaatar for testing. Table 5 presents the procedures used for handling biological specimens and household salt samples collected.

Table 5. Procedures for handling biological specimens and household salt samples, Mongolia National Nutrition Survey, 2017

Nutrition indicator	Specimen	Biomarker	Handling procedure
Anaemia	Peripheral blood	Haemoglobin	Tested on-site
Iron status	Venous blood / serum	Ferritin	Serum isolated, frozen and transported without thawing
	Venous blood / serum	Soluble transferrin receptor	Serum isolated, frozen and transported without thawing
Vitamin A status	Venous blood / serum	Retinol-binding protein	Serum isolated, frozen and transported without thawing
Vitamin D status	Venous blood / serum	25-hydroxyvitamin D [25[OH]D]	Serum isolated, frozen and transported without thawing
Inflammation markers	Venous blood / serum	C-reactive protein	Serum isolated, frozen and transported without thawing
	Venous blood / serum	Alpha-1-acid glycoprotein	Serum isolated, frozen and transported without thawing
Iodine status	Urine	Iodine	Kept in microtube with no special requirements
Salt iodization	Salt	Iodine	Kept in plastic bagh with no special requirements

LABORATORY TESTING METHODS

Testing of serum ferritin, soluble transferrin receptor (sTfR), C-reactive protein (CRP), alpha-1-acid glycoprotein (AGP), and retinol-binding protein (RBP) measured in children 6-59 months, pregnant women, and men was conducted at VitMin laboratory in Germany under the supervision of Juergen Erhardt, a globally recognized leader in micronutrient analysis who developed the 5-column ELISA technique.[9] CRP and AGP inflammation biomarkers were used to adjust serum ferritin and RBP by using ratios of the geometric means of the reference to the incubation, early, and late convalescent group, concentrations to calculate adjustment factors for children 6-59 months, pregnant women, and men.[10,11] While the WHO has adopted a 1:1 ratio between RBP and serum retinol, to comply with the National Institute of Standards and Technology (NIST), RBP values were multiplied by 1.15 in the NNS V to be comparable with serum retinol.[12]

Testing for anaemia in children 0-59 months, mothers, men, and pregnant women occurred at the field site using the HemoCue® Hb 201 photometer (HemoCue AB, Sweden). To accurately characterize anaemia status, haemoglobin concentrations were adjusted for altitude of the location of residence and smoking status of mothers and pregnant women. Due to the absence of smoking data for men, men's haemoglobin concentrations were only adjusted for altitude.[13]

Testing of vitamin D for children 6-59 months, pregnant women, and men was conducted at the Gyals Health Centre Laboratory in Ulaanbaatar under the supervision of quality control manager Nyamdavaa Naranbold. An enzyme-linked fluorescence assay was used to measure serum 25(OH) vitamin D. The analysis was performed using the VIDAS® 25 OH Vitamin D Total assay and the MINI VIDAS® immunoanalyzer (BioMerieux, France).

Urinary iodine concentration in school children 6-11 years of age and pregnant women 15-49 years of age

9   Erhardt J, Estes J, Pfeiffer C, et al. Combined measurement of ferritin, soluble transferrin receptor, retinol binding protein, and C- reactive protein by an inexpensive, sensitive, and simple sandwich enzyme-linked immunosorbent assay technique. J Nutr 2004; 134(11):3127–32.

10 Thurnham DI, McCabe LD, Haldar S, et al. Adjusting plasma ferritin concentrations to remove the effects of subclinical inflammation in the assessment of iron deficiency: a meta-analysis. Am J Clin Nutr. 2010 92(3):546-55.

11 Thurnham, DI, Northrop-Clewes CA, Knowles J. The use of adjustment factors to address the impact of inflammation on Vitamin A and iron status in humans. J Nutr 2015;145(5):1137S–1143S.

12 WHO. Serum retinol concentrations for determining the prevalence of vitamin A deficiency in populations. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011 (http://www.who.int/vmnis/indicators/retinol.pdf).

13 WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011 (http://www.who.int/vmnis/indicators/haemoglobin.pdf).

was measured at the NCPH laboratory using the Sandell-Kolthoff method.[14] Testing was conducted using an ELISA plate reader (Immuno Mini NJ2300; Nalge Nunc International, Tokyo, Japan) at 405 nm with a test detection limit of 10 µg/l. Samples with a negative urinary iodine concentration were not included in the analysis.

The iodine content of salt samples collected from households was measured at the NCPH laboratory using a quantitative titration method with test detection limit of 1.1 mg/kg.[15] Iodine was added to the salt in the form of potassium iodate (KIO3) based on the process of redox titration. The amount of iodate (IO3-) in the iodized salt was determined by first reacting the iodate added under acidic conditions (sulfuric acid) to produce free iodine that was titrated with thiosulphate. The amount of sodium thiosulphate used for titration was equal to the amount of iodine released from the salt.

DATA PROCESSING AND DATA QUALITY ASSURANCE PROCEDURES

Data processing

Data from the six target population questionnaires (households, children 0-59 months, mothers 15-49, men 15-49, pregnant women 15-49, and school children 6-11 years) were entered into EpiData 3.1 using double data entry and a prior established coding scheme. Two methods of data quality assurance were employed using the EpiData data entry forms to allow for immediate detection and correction of errors. First, interactive checking was incorporated into the data entry files prior to data entry. This included setting required variables for entry to prevent missing data, setting specific data values or numerical ranges (e.g., children's age in months could only be entered as a value from 0-59), and setting conditional skip patterns to route the data entry process. In addition, where possible, restricted data entry was set up to only allow entered responses that corresponded to those included in the questionnaire.

Second, as all data were entered twice into different EpiData files by different data operators, validation checking was conducted using the dual EpiData forms for each survey question. The two data files were compared to determine discrepancies which were resolved based on reverting to the original paper questionnaires for correction. Once final EpiData forms for each survey questionnaire were prepared, data were exported to SPSS version 23 and additional data cleaning and quality assurance were performed. The data cleaning process involved producing a set of (unweighted) frequency distributions for every variable in each data file which were checked for unusual values, those outside the range of most responses (outliers), and implausible answers to respective questions. Seemingly incorrect values were checked against original paper questionnaires. To generate national prevalence estimates for all indicators, weights were generated for household, children 0-59 months, mothers 15-49 years of age, school-age children 6-11 years of age, pregnant women 15-49 years of age and men 15-49 years of age. Weighting estimates were applied for the development of all national estimates in the NNS V and are presented by cluster in Annex IV.

DATA ANALYSIS

Survey data were analysed using SPSS version 23 with the complex survey module and the analysis was conducted in three stages. The first stage involved calculation of composite variables, using the standardized MICS 5 protocol[16] and the calculation and integration of sample weights. During this stage, coefficient of variation was calculated for all variables and confirmatory checks of recodes, transformations, and calculations were conducted. The second stage of analysis involved conducting descriptive analyses for all key survey indicators, including calculating proportions to derive prevalence estimates and calculating means and medians for continuous measurements. National prevalence estimates were calculated using a weighted analysis to account for the unequal probability of cluster selection in the five strata. Weighted percentages as well as unweighted counts are presented in the results tables.

14   Shelor CP, Dasgupta PK. Review of analytical methods for the quantification of iodine in complex matrices. Analytica Chimica Acta 2011;702(1):16-36.

15   WHO. Assessment of iodine deficiency disorders and monitoring their elimination. Geneva, World Health Organization, 2007 (http://apps.who.int/iris/bitstream/10665/43781/1/9789241595827_eng.pdf).

16   http://mics.unicef.org/tools?round=mics5#data-processing.

In the third stage, bivariate analyses (chi-square, t-test) were performed to determine relationships between key dependent variables and influencing independent variables. The statistical precision of all estimates was assessed using 95% confidence limits that accounted for the complex stratified cluster sampling design. Tables 6 and 7 present the methodology used for the determination and/or classification of key socio-demographic, anthropometric, and biomarker indicators measured in the target populations.

Table 6. Methods for classification of key household, dietary quality, and anthropometric indicators, Mongolia National Nutrition Survey, 2017

Indicator	Classification method
Household wealth quintile index[17]	Mongolia Household Social Indicator Sample Survey- 2013 syntax used to calculate wealth index quintiles
Household Food Insecurity Access Scale[18]	USAID FANTA HFIAS methodology used to calculate and categorize household food security status
Mothers' and men's minimum dietary diversity score[19]	USAID FANTA and FAO Minimum Dietary Diversity (MDD) methodology used to calculate mothers' and men's dietary diversity score and percentage with minimum dietary diversity. MDD also used to assess consumption of specific food groups including consumption of iron-rich foods, vitamin A-rich foods, sugar-sweetened drinks, sugary foods and fried foods.
Consumption of unhealthy foods and physical education participation[20]	The 2010 WHO global school-based student health survey in Mongolia provided sample questions and indicators.
IYCF Indicators[21]	IYCF Indicators calculated using WHO Indicators for assessing infant and young child feeding practices.
Child 0-59 months anthropometry[22]	Calculated using WHO Child Growth Standards and ANTHRO calculator with following cut-offs: • Wasting: < -2 SD WHZ • Stunting: < -2 SD HAZ • Underweight: < -2 SD WAZ • Overweight: > +2 SD WHZ
Children 6-11 years anthropometry[23]	Thinness < -2 SD BMI-for-age Stunting < -2 SD HAZ Overweight > +1 SD BMI-for-age Obese > +2 SD BMI-for-age
Mothers' and men's anthropometry[24]	BMI calculated [weight (kg) / height (m)^2] with following cut-offs: • Underweight: < 18.5 kg/m^2 • Normal weight: 18.5-24.9 kg/m^2 • Overweight: 25.0-29.9 kg/m^2 • Obese: ⩾ 30.0 kg/m^2 Women's short stature: height < 145 cm Women's borderline short stature: height < 150 cm

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17   Mongolia Social Indicator Sample Survey (MICS). National Statistics Office, 2013.

18   Coates J, Swindale A, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). Washington, DC: FANTA/AED, 2007.

19   FAO and FHI 360. Minimum Dietary Diversity for Women: A Guide for Measurement. Rome: FAO, 2016.

20   WHO. Global school-based student health survey – Mongolia, 2010.

21   Infant and young child feeding: Model chapter for textbooks for medical students and allied health professionals: Indicators for assessing infant and young child feeding practices. Geneva: World Health Organization, 2009.

22   WHO Multicentre Growth Reference Study Group. WHO Child Growth Standards: Length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: Methods and development. Geneva: World Health Organization, 2006.

23   WHO Multicentre Growth Reference Study Group. WHO Growth Reference for 5-19 years. Geneva: World Health Organization, 2007.

24   WHO. Global database on body mass index. Geneva: World Health Organization, 2000

Table 7. Clinical classification of biomarker indicators, Mongolia National Nutrition Survey, 2017

Indicator	Reference range			
Haemoglobin [a]	Mild anaemia		Moderate anaemia	Severe anaemia
Children < 5 [b]	100-109 g/l		70-99 g/l	< 70 g/l
Mothers 15-49 [b,c,d]	110-119 g/l		80-109 g/l	< 80 g/l
Pregnant women [b,c]	100-109 g/l		70-99 g/l	< 70 g/l
Men 15-49 [b]	110-129 g/l		80-109 g/l	< 80 g/l
Plasma ferritin [e]	Iron deficiency		Iron sufficiency	Iron overload
Children < 5 [f]	< 12 µg/l			
Pregnant women [f]	< 15 µg/l		15-200 µg/l	> 200 µg/l
Men 15-49 [f]	< 15 µg/l		1-300 µg/l	> 300 µg/l
Soluble transferrin receptor [g]	Iron deficiency			
Children < 5	> 8.3 mg/l			
Pregnant women	> 8.3 mg/l			
Men 15-49	> 8.3 mg/l			
Body iron stores [h]	Calculation: –[[sTFR*1000/adjusted ferritin)-2.8229]/0.1207			
Retinol-binding protein [e]	Vitamin A deficiency		Moderate Vitamin A deficiency	
Children < 5 [i]	< 0.7 µmol/l		⩾ 0.7 and ⩽ 1.05 µmol/l	
Pregnant women [i]	< 0.7 µmol/l		⩾ 0.7 and ⩽ 1.05 µmol/l	
Men 15-49 [i]	< 0.7 µmol/l		⩾ 0.7 and ⩽ 1.05 µmol/l	
25(OH)D [j]	Vitamin D deficiency	Vitamin D insufficiency	Vitamin D sufficiency	Vitamin D toxicity
Children < 5	< 20 ng/ml	20-29 ng/ml	30-100 ng/ml	> 100 ng/ml
Pregnant women	< 20 ng/ml	20-29 ng/ml	30-100 ng/ml	> 100 ng/ml
Men 15-49	< 20 ng/ml	20-29 ng/ml	30-100 ng/ml	> 100 ng/ml
Median urinary iodine concentration [k]	Insufficient Iodine status	Adequate level	Excessive level	
Children 6-11 years	< 100 µg/l	100-299 µg/l	⩾ 300 µg/l	
Pregnant women	< 150 µg/l	150-499 µg/l	⩾ 500 µg/l	
α1-acid-glycoprotein [l]				
Children < 5	> 1 g/l			
Pregnant women	> 1 g/l			
Men 15-49	> 1 g/l			
C-reactive protein [l]				
Children < 5	> 5 mg/l			
Pregnant women	> 5 mg/l			
Men 15-49	> 5 mg/l			

a   WHO. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Geneva, World Health Organization, 2011.

b   Altitude (metres above sea level) haemoglobin adjustment (g/l): < 1000 m: 0; 1000 m: -2; 1500 m: -5; 2000 m: -8; 2500 m: -13; 3000 m: -19; 3500 m: -27; 4000 m: -35; 4500 m: -45.

c   Smoking haemoglobin adjustment (g/l): non-smoker: 0; smoker (all): -0.3; ½ to 1 packet/day: -0.3; 1-2 packets/day: -0.5.

d   Only mothers 15-49 who were not pregnant were included in the analysis.

e   Thurnham DI, Northrop-Clewes CA, Knowles J. The use of adjustment factors to address the impact of inflammation on vitamin A and iron status in humans. J Nutr 2015;145(5):1137S–1143S.f Serum ferritin values were adjusted for inflammation in pregnant women and men (0.77, 0.53, 0.75) and for children 6-59 months of age (0.798, 0.62, 0.98) for the incubation, early, and late convalescent groups, respectively.

g   There is no generally agreed upon threshold for soluble transferrin receptor, but the most commonly used commercial assay (Ramco) suggests the cut-offs indicated.

h   Cook JD, Skikne BS, Baynes RD. Serum transferrin receptor. Annu Rev Med 1993;44:63–74.

i   RBP values were adjusted for inflammation in pregnant women and men (1.13, 1.24, 1.11) and for children 6-59 months of age (1.15, 1.45, 1.11) for the incubation, early, and late convalescent groups, respectively,No established thresholds have been developed for RBP; however, RBP was corrected by a multiplication of 1.15 for good correlation between RBP and serum retinol.

j   No common definition exists for adequate vitamin D status measured as 25(OH)D serum concentration. Cut-offs provided are based on Holick et al, Evaluation, treatment, and prevention of vitamin D deficiency: An Endocrine Society clinical practice guideline, J Clin Endocrinol Metab 2011;96(7):1911–30.

k   WHO/UNICEF/ICCIDD. Assessment of iodine deficiency disorders and monitoring their elimination: a guide for programme managers, 3rd ed. Geneva: World Health Organization, 2007.

l   Thomas C, Thomas L. Biochemical markers and hematologic indices in the diagnosis of functional iron deficiency. Clin Chem 2002;48(7):1066-76.

METHODOLOGICAL LIMITATIONS

Limitations of the NNS V are common to other large cross-sectional surveys. A key limitation is not being able to infer causality from observed associations between dependent and influencing variables. Survey data were only collected during the end of autumn and beginning of winter (September to November, 2016) so no seasonal variations could be identified. In addition, survey sampling was based on local population registries and, therefore, limited the opportunity for unregistered households with children 0-59 months to be included in the survey. Due to the cold weather conditions at the time of the survey, field teams faced challenges with keeping blood samples at appropriate temperatures, especially when traveling long distances to remote herder households. In late autumn, many herders move to isolated areas far from the *soum* centre to spend the winter months. The climate conditions in Khangai region were especially challenging and resulted in the inadvertent freezing of 50 blood samples. However, this did not compromise specimen quality or reliability of the test results.

SURVEY RESULTS

HOUSEHOLDS

SAMPLE COVERAGE AND CHARACTERISTICS OF HOUSEHOLDS AND RESPONDENTS

There was high sample coverage for all demographic groups in all regions included in the NNS V. Of the 2250 households randomly selected for the sample (on the basis of a child 0-59 months present in the household), 2249 were successfully interviewed, for a response rate of 99.9% (Table HH.1a). In the

interviewed households, 2092 mothers 15-49 years of age were identified as eligible with 1944 mothers successfully interviewed, yielding a response rate of 92.9%. The household survey overenrolled a subsample of 1384 men aged 15-49 years in sampled households for a response rate of 79.1% and 2251 children 0-59 months of age were successfully included in the survey with one household refusing participation of their child and three sets of twins enrolled for a response rate of 100.1% in 2248 households. Through separate sampling schemes, 1750 school children 6-11 years of age and 2250 pregnant women were selected for survey participation with 1755 (100.3%) and 2220 (98.7%) interviewed, respectively.

Table HH.1a: Results of household, children under 5 years, mothers, men, school-aged children, and pregnant women interviews						
Number of households, children 0-59 months, mothers 15-49 years, men 15-49 years, school children 6-11 years, and pregnant women 15-49 years by interview results and percent response rates for each region, Mongolia National Nutrition Survey, 2017.						
	National	Regional				
		Western	Khangai	Central	Eastern	Ulaanbaatar
Households						
Sampled	2250	450	450	450	450	450
Interviewed	2249	448	450	452	450	449
Household response rate (%)	99.9	99.6	100.0	100.4	100.0	99.8
Children under 5						
Eligible	2252	449	450	454	450	449
Child questionnaires completed	2251	449	450	453	450	449
Under-5's response rate (%)	99.9	100.0	100.0	99.8	100.0	100.0
Mothers 15-49 years						
Eligible	2092	433	408	420	426	405
Interviewed	1944	408	378	389	390	379
Mothers' response rate (%)	92.9	94.2	92.6	92.6	91.5	93.6
Men 15-49 years						
Planned	1750	350	350	350	350	350
Interviewed	1384	350	258	243	266	267
Men's response rate (%)	79.1	100.0	73.7	69.4	76.0	76.3
School children 6-11 years						
Sampled	1750	350	350	350	350	350
Interviewed	1755	352	355	344	351	353
Children's response rate (%)	100.3	100.6	101.4	98.3	100.3	100.9
Pregnant women 15-49 years						
Sampled	2250	450	450	450	450	450
Interviewed	2220	458	430	448	434	450
Pregnant women's response rate (%)	98.7	101.8	95.6	99.6	96.4	100.0

There was acceptable to high coverage for the subsample analysis of anaemia, venipuncture and urinary iodine samples for all demographic groups in all regions of the NNS V. The response rate for anaemia was over 90% for children under 5 years, mothers 15-49 years of age, pregnant women 15-49 years of age and men 15-49 years of age (Table HH.1b). The response rate was lower but sufficient for venipuncture samples with 84.5% of eligible children under 5 years, 91.8% of pregnant women, and 84.4% of men providing venipuncture blood samples. The response rate for collection of urine for measurement of urinary iodine concentration was high with 98.7% of school-aged children and 92.2% of pregnant women providing samples.

Table HH.1b: Results for anaemia, venipuncture and urinary iodine concentration in children under 5 years, school-aged children, pregnant women, mothers, and men

Number of participants eligible, interviewed and response rate for children under 5 years, school-aged children 6-11 years, pregnant women 15-49 years of age, mothers 15-49 years of age, and men 15-49 years of age for anaemia, venipuncture and urinary iodine concentration, Mongolia National Nutrition Survey, 2017

	National	Regional				
		Western	Khangai	Central	Eastern	Ulaanbaatar
Children under 5y Anaemia						
Eligible	2251	449	450	453	450	449
Interviewed	2198	444	447	447	442	418
Under-5's response rate	97.6%	98.9%	99.3%	98.7%	98.2%	93.1%
Children under 5y Venipuncture						
Eligible	2050	415	404	405	426	400
Interviewed	1732	372	339	328	369	324
Under-5's response rate	84.5%	89.6%	83.9%	81.0%	86.6%	81.0%
Children under 5y Vitamin D						
Eligible	2050	415	404	405	426	400
Interviewed	1826	386	368	348	388	336
Under-5's response rate	89.1%	93.0%	91.1%	85.9%	91.1%	84.0%
School children 6-11y Urinary Iodine						
Eligible	1755	352	355	344	351	353
Interviewed	1733	351	350	341	349	342
School-aged children's response rate	98.7%	99.7%	98.6%	99.1%	99.4%	96.9%
Pregnant women 15-49y Anaemia						
Eligible	2220	458	430	448	434	450
Interviewed	2211	457	429	447	431	447
Pregnant women's response rate	99.6%	99.8%	99.8%	99.8%	99.3%	99.3%
Pregnant women 15-49y Urinary Iodine						
Planned	1000	200	200	200	200	200
Interviewed	922	187	179	195	185	174
Pregnant women's response rate	92.2%	93.5%	89.5%	97.5%	92.5%	87.0%
Pregnant women 15-49y Venipuncture						
Planned	1000	200	200	200	200	200
Interviewed	918	188	177	192	186	175
Pregnant women's response rate	91.8%	94.0%	88.5%	96.0%	93.0%	87.5%
Mothers/caretakers 15-49y Anaemia						
Planned	1000	200	200	200	200	200
Interviewed	902	180	178	172	178	194
Mothers' response rate	90.2%	90.0%	89.0%	86.0%	89.0%	97.0%
Men 15-49y Anaemia						
Planned	450	-	-	-	-	-
Interviewed	482	-	-	-	-	-
Men's response rate	107.1%	-	-	-	-	-
Men 15-49y Venipuncture						
Planned	450	-	-	-	-	-
Interviewed	380	-	-	-	-	-
Men's response rate	84.4%	-	-	-	-	-

HOUSING CHARACTERISTICS, ASSET OWNERSHIP, AND WEALTH QUINTILES

Household characteristics are presented nationally in Table HH.2a and by area and regionally in Table HH.2b. At the national level, 6.5% of households were female-headed with a mean household size of 4.6 household members (Table HH.2a). In Central, Eastern, Khangai, and Western regions, more than 50% of households were in rural areas with the highest prevalence of households from *Bagh* areas in Khangai (34.5%) and Eastern (21.8%) regions (Table HH.2b). The majority of households lived in Ger dwellings in Eastern, Khangai, and Western regions. There was a high percentage of ethnic minorities (Kazak and "Other") in Western (57.6%) and Eastern (28.2%) regions.

Table HH.2a: Household characteristics (National level)						
Percent and frequency distribution of households by selected characteristics at the national level, Mongolia National Nutrition Survey, 2017						
Characteristics	Percent and number of households					
	%	Standard Error	95% CI		Weighted Number	Unweighted Number
			Lower	Upper		
Total	100.0	0.0	100.0	100.0	2248	2249
Sex of household head						
Male	93.5	0.7	92.0	94.7	2102	2125
Female	6.5	0.7	5.3	8.0	146	124
Economic region						
Western	12.5	0.6	11.4	13.8	281	448
Khangai	18.0	0.8	16.4	19.7	404	450
Central	15.1	0.7	13.8	16.6	340	452
Eastern	6.6	0.3	6.0	7.3	149	450
Ulaanbaatar	47.7	1.3	45.1	50.4	1073	449
Area						
Urban	66.6	1.1	64.5	68.6	1497	1079
Rural	33.4	1.1	31.4	35.5	751	1170
Location						
Capital City	47.7	1.3	45.1	50.4	1073	449
Aimag Center	18.8	0.8	17.3	20.4	423	630
Soum Center	24.4	0.9	22.7	26.2	549	872
Bagh/Rural	9.0	0.6	8.0	10.2	203	298
Number of household members						
2	0.9	0.3	0.5	1.6	21	18
3	17.7	1.0	15.1	22.8	398	407
4	34.3	1.2	31.9	36.8	771	747
5	28.2	1.2	26.0	30.5	634	650
6	13.4	0.9	11.8	15.2	301	305
7	3.4	0.5	2.5	4.4	76	75
8	1.5	0.3	1.0	2.3	34	36
9	0.4	0.2	0.2	1.0	9	7
10+	0.2	0.1	0.0	0.7	4	4
Mean household size	4.6	0.3	4.5	4.6	2248	2249
Religion of household head						
No religion	52.3	1.3	49.8	54.8	1175	1172
Buddhism	38.4	1.3	36.0	40.9	863	870
Christianity	1.8	0.4	1.2	2.7	40	27
Islam	3.3	4.0	2.7	4.2	75	102
Shamanism	3.8	6.0	2.9	5.0	86	66

Table HH.2a: Household characteristics (National level)

Percent and frequency distribution of households by selected characteristics at the national level, Mongolia National Nutrition Survey, 2017

Characteristics	Percent and number of households					
	%	Standard Error	95% CI		Weighted Number	Unweighted Number
			Lower	Upper		
Age of household head						
< 20 years	0.3	0.2	0.1	0.9	8	6
20-29 years	30.8	1.2	28.5	33.2	693	699
30-39 years	46.9	1.3	44.3	49.4	1054	1058
40-49 years	15.3	0.9	13.5	17.2	343	350
> 49 years	6.7	0.7	5.5	8.2	151	136
Type of dwelling						
Ger	37.4	1.2	35.1	39.9	842	917
Apartment, condominium	26.2	1.2	23.9	28.7	590	467
Convenient single-family house	9.9	0.7	8.5	11.5	223	237
Single family house	25.6	1.1	23.5	27.9	576	595
Public accommodation, dormitory	0.8	0.2	0.5	1.3	18	33
Ethnicity of household head						
Khalkh	83.0	0.9	81.2	84.7	1866	1738
Kazak	3.7	0.4	3.0	4.5	83	114
Other	13.3	0.8	11.8	14.9	299	397

Table HH.2b: Household characteristics (Regional level)

Percent of households at regional level by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Total	**100.0**	**66.6**	**33.4**	**12.5**	**16.0**	**15.1**	**6.6**	**47.7**	**2248**	**2249**
Sex of household head										
Male	93.5	92.1	96.4	96.9	94.9	96.2	93.1	91.3	2102	2125
Female	6.5	7.9	3.6	3.1	5.1	3.8	6.9	8.7	146	124
Area										
Urban	48.0	100.0	0.0	43.0	36.7	33.6	26.7	100.0	1497	1079
Rural	52.0	0.0	100.0	57.0	63.3	66.4	73.3	0.0	751	1170
Location										
Capital city	20.0	71.7	0.0	0.0	0.0	0.0	0.0	100.0	1073	449
Aimag center	28.0	28.3	0.0	43.0	36.7	33.6	26.7	0.0	423	630
Soum center	38.8	0.0	73.0	50.8	28.8	62.4	51.6	0.0	549	872
Bagh/rural	13.3	0.0	27.0	6.1	34.5	4.0	21.8	0.0	203	298
Number of household members										
2	0.9	1.0	0.7	0.4	0.4	1.3	0.7	1.1	21	18
3	17.7	17.6	18.0	20.5	15.1	22.8	15.3	16.7	398	407
4	34.3	34.5	33.8	29.3	34.9	35.6	30.9	35.4	771	747
5	28.2	28.3	28.1	29.0	28.5	26.3	32.9	27.8	634	650
6	13.4	12.8	14.5	14.9	15.6	11.3	13.1	12.9	301	305
7	3.4	3.6	2.9	3.3	3.8	2.0	4.0	3.6	76	75
8	1.5	1.4	1.7	2.0	1.6	0.4	2.4	1.6	34	36
9	0.4	0.5	0.2	0.2	0.2	0.0	0.4	0.7	9	7

Table HH.2b: Household characteristics (Regional level)										
Percent of households at regional level by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
10+	0.2	0.3	0.0	0.2	0.0	0.2	0.2	0.2	4	4
Mean HH size	4.6	4.6	4.5	4.6	4.6	4.3	4.7	4.6	2248	2249
Religion of household head										
No religion	52.3	54.1	48.7	36.3	39.4	66.2	63.1	55.5	1175	1172
Buddhism	38.4	36.5	42.2	40.9	56.0	28.3	33.3	35.0	863	870
Christianity	1.8	2.4	0.5	0.9	1.1	1.1	0.2	2.7	40	27
Islam	3.3	2.2	5.5	20.7	0.4	0.2	0.0	1.3	75	102
Shamanism	3.8	4.7	2.0	0.9	1.3	4.0	2.9	5.6	86	66
Age of household head										
< 20 years	0.3	0.4	0.2	0.0	0.2	0.4	0.2	0.4	8	6
20-29 years	30.8	30.4	31.7	31.9	30.5	37.4	26.4	29.2	693	699
30-39 years	46.9	46.2	48.2	51.8	46.4	43.8	46.4	46.8	1054	1058
40-49 years	15.3	15.1	15.6	14.0	17.1	14.3	17.3	14.9	343	350
> 49 years	6.7	7.9	4.3	2.2	5.8	4.0	9.6	8.7	151	136
Type of dwelling										
Ger	37.4	31.9	48.4	45.1	51.8	31.2	44.9	31.0	842	917
Apartment, condominium	26.2	34.7	9.4	13.4	5.1	33.8	14.7	36.7	590	467
Convenient single-family house	9.9	8.5	12.7	32.6	1.0	8.4	1.8	8.9	223	237
Single family house	25.6	24.0	28.8	8.9	41.1	26.3	32.9	22.9	576	595
Public accommodation, dormitory	0.8	0.9	0.7	0.0	0.9	0.2	5.8	0.4	18	33
Ethnicity of household head										
Khalkh	83.0	85.7	77.7	42.5	90.9	91.6	71.8	89.5	1866	1738
Kazak	3.7	2.2	6.6	23.0	0.6	0.4	0.0	1.3	83	114
Other	13.3	12.1	15.7	34.6	8.5	8.0	28.2	9.1	299	397

Data on household and personal assets are presented in Table HH.3. More than 90% of households in all regions owned a television and almost all households owned a mobile telephone (99.4%). Agricultural land ownership was low across all regions and ranged from 3.6% in Khangai to 14.2% in Central region. Farm animal and or livestock ownership was approximately 60% in Eastern, Khangai, and Western regions and 33.9% in Central region with Ulaanbaatar the lowest at 14.3%. Ownership of a home/dwelling was high in all regions (Western: 97.3%; Khangai: 94.2%; Eastern: 91.6%; Ulaanbaatar: 82.0%; Central: 81.2%). More than 90% of respondents in all regions reported having a bank account.

Table HH.3: Ownership of household and personal assets																
Percent ownership of selected household and personal assets, Mongolia National Nutrition Survey, 2017																
	Total		Area				Region									
	Weighted Percent	Unweighted Number	Urban		Rural		Western		Khangai		Central		Eastern		Ulaanbaatar	
			%	n	%	n	%	n	%	n	%	n	%	n	%	n
Total	100.0	2249	50.7	538	49.3	1711	12.7	450	18.0	450	15.1	452	6.6	450	47.5	447
Household owns																
Radio	10.1	245	8.0	89	14.2	156	15.4	69	15.6	70	8.2	37	7.8	35	7.6	34
Television	97.3	2166	98.7	1061	94.7	1105	96.4	433	94.9	427	97.8	441	93.6	421	98.9	444
Non-mobile telephone	8.2	157	8.2	72	8.1	85	5.4	24	9.6	43	6.2	28	4.2	19	9.6	43
Internet connection	30.0	497	38.7	344	12.6	153	18.3	82	10.7	48	22.8	103	14.0	63	44.8	201
Refrigerator	86.9	1877	92.4	993	75.9	884	86.6	389	74.2	334	90.5	408	73.6	331	92.4	415
Household owns																
Agricultural land	7.3	185	5.8	61	10.2	124	6.9	31	3.6	16	14.2	64	10.2	46	6.2	28
Farm animals/Livestock	33.7	1000	18.3	242	64.4	758	57.9	260	60.0	270	33.9	153	56.2	253	14.3	64
At least one member of household has																
Computer	43.8	903	48.7	498	34.0	405	47.7	214	27.3	123	43.7	197	31.3	141	50.8	228
Mobile telephone	99.4	2238	99.4	1074	99.5	1164	99.8	448	99.1	446	99.8	451	99.6	448	99.3	446
Motorcycle or scooter	20.2	665	4.8	79	50.9	586	40.8	183	46.0	207	21.7	98	37.1	167	2.2	10
Car or truck	55.5	1246	53.4	567	59.5	679	59.2	266	59.8	269	57.0	257	47.6	214	53.5	240
Bank account	95.3	2127	96.4	1038	92.9	1089	97.8	439	93.8	422	92.5	417	92.4	416	96.4	433
Ownership of dwelling																
Owned by household	86.6	2007	84.2	937	91.5	1070	97.3	437	94.2	424	81.2	366	91.6	412	82.0	368
Not owned by HH	3.5	65	11.7	102	6.4	75	1.6	7	4.9	22	12.6	57	6.7	30	13.6	61
Rented	9.9	177	4.1	40	2.2	25	1.1	5	0.9	4	6.2	28	1.8	8	4.5	20

n = Unweighted number.

Household characteristics are presented by wealth index quintile in Table HH.4. The wealth index is a composite indicator of wealth with households given a score based on the number and type of assets owned. In Khangai region (44.5%) and Eastern region (38.9%), a much larger percentage of households were in the poorest wealth quintile, while most households in the wealthiest quintile resided in Ulaanbaatar (31.8%). Ethnic minorities had a higher percentage of households in the poorest wealth quintile with 19.9% of Khalkhs, 42.9% of Dariganga, and 36.1% of Durvud households classified as poorest. Approximately half (49.7%) of the households in the poorest wealth quintile resided in Ger dwellings while 76.5% of the wealthiest households resided in apartments or condominiums.

Table HH.4: Household wealth quintiles											
Percent of households in wealth index quintiles by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Unweighted Number	Wealth index quintile[a]									
		Poorest		Second		Third		Fourth		Wealthiest	
		%	n	%	n	%	n	%	n	%	n
Total	2249	20.0	596	19.9	428	19.9	472	19.9	443	20.3	310
Area											
Urban	1079	8.4	95	22.2	246	18.7	213	22.0	257	28.6	268
Rural	1170	43.2	501	15.3	182	22.1	259	15.9	186	3.6	42
Location											
Capital city	449	8.2	37	21.4	96	17.6	79	20.9	94	31.8	143
Aimag center	630	8.8	58	24.4	150	21.6	134	24.6	163	20.5	125
Soum center	872	28.4	254	17.9	157	28.2	242	20.8	178	4.8	41
Bagh/rural	298	83.3	247	8.2	25	5.6	17	2.6	8	0.4	1
Economic region											
Western	448	26.2	117	25.6	115	22.3	100	15.8	71	10.0	45
Khangai	450	44.5	200	17.5	79	22.2	100	11.8	53	4.0	18

Table HH.4: Household wealth quintiles											
Percent of households in wealth index quintiles by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Unweighted Number	Wealth index quintile[a]									
		Poorest		Second		Third		Fourth		Wealthiest	
		%	n	%	n	%	n	%	n	%	n
Central	452	14.8	67	15.5	70	21.5	97	29.8	135	18.4	83
Eastern	450	38.9	175	15.1	68	21.3	96	20.0	90	4.7	21
Ulaanbaatar	449	8.2	37	21.4	96	17.6	79	20.9	94	31.8	143
Ethnicity of household head											
Khalkh	1738	19.9	466	18.9	305	18.6	336	20.8	358	21.8	273
Kazak	114	7.4	7	19.5	23	42.2	50	26.1	31	4.7	3
Durvud	67	36.1	28	25.9	19	11.1	7	11.5	6	15.4	7
Buriad	34	2.2	2	21.8	6	35.3	12	11.8	9	28.9	5
Bayad	40	5.7	3	38.9	18	22.4	8	10.5	6	22.4	5
Dariganga	65	42.9	29	16.3	11	22.2	15	10.8	6	7.8	4
Other	180	26.5	57	26.3	44	19.2	39	15.8	27	12.2	13
Religion of household head											
No religion	1172	20.1	310	21.0	224	19.2	245	20.5	242	19.2	151
Buddhism	870	21.3	251	18.0	162	18.7	162	19.5	156	22.6	139
Christianity	27	13.5	6	16.5	4	10.2	3	16.2	6	43.6	8
Islam	102	7.4	6	21.8	23	41.5	44	24.1	26	5.2	3
Shamanism	66	15.8	16	26.0	15	24.6	14	17.6	13	16.0	8
Age of household head											
< 20 years	6	4.4	1	12.0	1	10.0	1	63.6	2	10.0	1
20-29 years	699	21.5	180	21.6	139	21.2	160	18.7	134	17.1	86
30-39 years	1058	20.4	304	18.5	190	17.6	193	19.6	203	23.9	168
40-49 years	350	18.9	82	18.1	67	22.0	81	24.0	82	17.0	38
> 49 years	136	13.9	29	26.6	31	25.1	37	16.7	22	17.7	17
Sex of household head											
Male	2125	19.8	561	19.5	397	20.1	447	20.2	422	20.5	298
Female	124	23.8	35	26.6	31	16.9	25	16.6	21	16.2	12
Type of dwelling											
Ger	917	49.7	553	39.3	284	11.0	80	0.0	0	0.0	0
Apartment, condominium	467	0.0	0	0.1	1	0.1	1	23.4	160	76.5	305
Convenient single-family house	237	1.6	6	13.9	43	43.0	100	39.6	84	1.9	4
Single family house	595	5.0	37	14.7	97	43.7	282	36.6	178	0.1	1
Public accommodation, dormitory	33	0.0	0	5.6	3	31.6	9	62.8	21	0.0	0

a Wealth index quintiles are based on methodology used in the 2011 Mongolia Household Socio-Economic Survey.
n = Unweighted number.

WATER AND SANITATION

A lack of safe drinking water and sanitation has negative impacts on human health through frequent exposure to harmful pathogens causing repeated infection and illness. Table HH.5 presents the distribution of the population using an improved source of drinking water, defined as any of the following types of supply: piped water (into dwelling, compound, yard or plot, to neighbor, public tap/standpipe); tube well/borehole; protected well. Overall, 92.8% of households used an improved source of drinking water, though differences existed by area and region. While almost all urban households utilized an improved source, usage was 80.5% in rural areas and lowest in Khangai (79.1%) and Western (82.8%) regions. In the poorest wealth quintile, three-quarters of households (74.7%) used improved drinking water compared to greater than 95% in each of the other wealth categories. Additionally, households living in Gers (87.1%) had lower utilization of improved drinking water as compared to those in other types of accommodations.

Table HH.5: Use of improved drinking water				
Percent of households using an improved drinking water source by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved source of drinking water [a]			
	Percent	95%CI		Unweighted Number
		Lower	Upper	
Total	**92.8**	**91.8**	**93.8**	**2249**
Area				
Urban	99.1	98.3	99.5	1079
Rural	80.5	77.9	82.8	1170
Location				
Capital city	99.6	98.2	99.9	449
Aimag center	97.8	96.2	98.7	630
Soum center	87.3	84.7	89.4	872
Bagh/rural	62.0	56.0	67.7	298
Economic region				
Western	82.8	79.0	86.0	448
Khangai	79.1	75.1	82.6	450
Central	98.0	96.2	99.0	452
Eastern	88.9	85.6	91.5	450
Ulaanbaatar	99.6	98.2	99.9	449
Religion of household head				
No religion	94.2	92.9	95.3	1172
Buddhism	90.4	88.4	92.2	870
Christianity	100.0	100.0	100.0	27
Islam	94.1	88.1	97.2	102
Shamanism	98.2	93.6	99.5	66
Type of dwelling				
Ger	87.1	84.8	89.0	917
Apartment, condominium	97.7	95.9	98.8	467
Convenient single-family house	94.4	91.3	96.4	237
Single family house	95.5	93.6	96.8	595
Public accommodation, dormitory	100.0	100.0	100.0	33
Ethnicity of household head				
Khalkh	93.9	92.8	94.9	1738
Kazak	94.7	89.2	97.5	114
Other	85.5	81.5	88.7	397
Sex of household head				
Male	92.7	91.6	93.7	2125
Female	95.0	90.5	97.4	124
Age of household head				
< 20 years	-	-	-	6
20-29 years	93.1	91.1	94.6	699
30-39 years	92.1	90.5	93.5	1058
40-49 years	93.0	89.8	95.2	350
> 49 years	96.4	92.4	98.3	136

Table HH.5: Use of improved drinking water				
Percent of households using an improved drinking water source by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved source of drinking water [a]			
	Percent	95%CI		Unweighted Number
		Lower	Upper	
Wealth index quintile				
Poorest	74.7	70.8	78.3	596
Second	96.3	94.4	97.5	428
Third	97.4	95.7	98.5	472
Fourth	97.8	96.2	98.7	443
Wealthiest	98.1	95.6	99.2	310

a   Improved drinking water source defined as: piped water (into dwelling, compound, yard or plot, to neighbor, public tap/standpipe); tube well/borehole; protected well.

(-)   Based on fewer than 25 unweighted cases.

While 92.8% of households used improved drinking water, only 32.6% of households had access to improved drinking water on their property (Table HH.6). Access to improved drinking water on the household property was higher in urban areas (39.3%) compared to rural areas (19.1%) with highest access in Central region (42.5%) and lowest access in Khangai region (9.3%).

Table HH.6: Households with access to improved drinking water on property				
Percent of households with improved drinking water on property by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved drinking water			
	Percent	95%CI		Unweighted Number
		Lower	Upper	
Total	**32.6**	**30.2**	**35.1**	**2249**
Area				
Urban	39.3	36.0	42.8	1079
Rural	19.1	16.9	21.6	1170
Location				
Capital city	39.6	35.2	44.2	449
Aimag center	38.5	34.7	42.5	630
Soum center	24.0	21.1	27.0	872
Bagh/rural	5.9	3.6	9.6	298
Economic region				
Western	33.0	28.8	37.5	448
Khangai	9.3	7.0	12.4	450
Central	42.5	38.0	47.1	452
Eastern	21.3	17.8	25.4	450
Ulaanbaatar	39.6	35.2	44.2	449
Religion of household head				
No religion	32.2	28.9	35.6	1172
Buddhism	31.3	27.5	35.4	870
Christianity	51.6	31.0	71.6	27
Islam	52.1	40.9	63.1	102
Shamanism	28.3	16.9	43.3	66
Type of dwelling				
Ger	2.9	1.9	4.3	917
Apartment, condominium	98.8	97.9	99.4	467
Convenient single-family house	30.2	24.2	36.9	237
Single family house	9.0	6.7	12.0	595
Public accommodation, dormitory	35.5	19.0	56.3	33

Table HH.6: Households with access to improved drinking water on property				
Percent of households with improved drinking water on property by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved drinking water			Unweighted Number
	Percent	95%CI		
		Lower	Upper	
Ethnicity of household head				
Khalkh	32.5	29.8	35.4	1738
Kazak	54.1	43.4	64.4	114
Other	26.9	21.3	33.2	397
Sex of household head				
Female	28.7	19.8	39.8	124
Male	32.8	30.4	35.4	2125
Age of household head				
< 20 years	-	-	-	6
20-29 years	28.6	24.6	32.9	699
30-39 years	35.9	32.3	39.6	1058
40-49 years	33.4	27.5	39.9	350
> 49 years	27.1	18.6	37.6	136
Wealth index quintile				
Poorest	2.2	1.3	3.9	596
Second	3.2	1.9	5.3	428
Third	10.0	7.6	13.1	472
Fourth	46.3	40.7	52.0	443
Wealthiest	100.0	100.0	100.0	310

An improved sanitation facility hygienically separates human excreta from human contact and includes: flush or pour flush to a piped sewer system, septic tank, or pit latrine; a ventilated improved pit latrine; a pit latrine with slab; or a composting toilet. As shown in Table HH.7, 67.6% of households were using an improved sanitation facility, with higher use in urban (71.4%) compared to rural (60.1%) areas. Only about half (53.7%) of households in Khangai region used an improved facility, the lowest among regions. Improved sanitation was strongly associated with household wealth with 97.1% of the wealthiest households using improved sanitation compared to 27.7% of the poorest households. Access to improved sanitation was also very low in Ger households (43.3%). Only 3.5% of households practiced open defecation, though open defecation was more common in rural areas (10.5%) and in Khangai (11.3%) and Eastern (13.1%) regions (Table HH.7).

Table HH.7: Use of improved sanitation and open defecation								
Percent of households using an improved sanitation facility and using open defecation by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Improved sanitation				Open defecation			
	%	95%CI		Unweighted Number	%	95%CI		Unweighted Number
		Lower	Upper			Lower	Upper	
Total	67.6	65.2	69.9	2249	3.5	2.9	4.3	2249
Area								
Urban	71.4	68.1	74.5	1079	0.1	0.0	0.4	1079
Rural	60.1	57.1	63.0	1170	10.5	8.8	12.5	1170
Location								
Capital city	70.2	65.8	74.2	449	0.0	0.0	0.0	449
Aimag center	74.5	70.8	77.9	630	0.2	0.0	1.3	630
Soum center	73.2	70.0	76.1	872	2.6	1.8	4.0	872
Bagh/rural	24.6	19.8	30.1	298	31.8	26.5	37.6	298

Table HH.7: Use of improved sanitation and open defecation							
Percent of households using an improved sanitation facility and using open defecation by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Improved sanitation				Open defecation			
	%	95%CI		Unweighted Number	%	95%CI		Unweighted Number
		Lower	Upper			Lower	Upper	
Economic region								
Western	64.9	60.3	69.2	448	4.0	2.5	6.3	448
Khangai	53.7	49.1	58.3	450	11.3	8.7	14.6	450
Central	81.0	77.1	84.3	452	0.9	0.3	2.3	452
Eastern	61.6	57.0	65.9	450	13.1	10.3	16.6	450
Ulaanbaatar	70.2	65.8	74.2	449	0.0	0.0	0.0	449
Religion of household head								
No religion	68.7	65.3	71.9	1172	2.9	2.2	3.8	1172
Buddhism	65.1	61.2	68.8	870	5.2	4.0	6.7	870
Christianity	65.9	43.8	82.8	27	0.0	0.0	0.0	27
Islam	88.4	78.5	94.1	102	0.0	0.0	0.0	102
Shamanism	62.1	47.3	75.0	66	0.0	0.0	0.0	66
Type of dwelling								
Ger	43.3	39.4	47.3	917	9.4	7.8	11.3	917
Apartment, condominium	95.9	93.0	97.6	467	0.0	0.0	0.0	467
Convenient single-family house	74.3	66.2	81.0	237	0.0	0.0	0.0	237
Single family house	73.0	68.3	77.2	595	0.2	0.0	1.1	595
Public accommodation, dormitory	24.3	12.5	41.8	33	0.0	0.0	0.0	33
Ethnicity of household head								
Khalkh	67.8	65.1	70.4	1738	3.1	2.5	3.9	1738
Kazak	87.3	78.2	92.9	114	0.0	0.0	0.0	114
Other	60.8	54.7	66.6	397	7.0	5.1	9.7	397
Sex of household head								
Male	67.8	65.4	70.2	2125	3.6	3.0	4.4	2125
Female	64.2	53.4	73.8	124	2.5	1.0	6.1	124
Age of household head								
< 20 years	-	-	-	6	-	-	-	6
20-29 years	59.7	55.2	64.0	699	2.7	1.8	3.9	699
30-39 years	69.9	66.4	73.2	1058	4.3	3.4	5.5	1058
40-49 years	72.8	66.8	78.0	350	3.2	1.9	5.3	350
> 49 years	76.9	67.1	84.4	136	3.3	1.5	6.9	136
Wealth index quintile								
Poorest	27.7	24.0	31.8	596	17.5	14.6	20.8	596
Second	55.1	49.2	60.9	428	0.1	0.0	0.5	428
Third	69.8	64.3	74.9	472	0.2	0.0	1.2	472
Fourth	88.0	83.7	91.2	443	0.0	0.0	0.0	443
Wealthiest	97.1	93.7	98.7	310	0.0	0.0	0.0	310

a   Improved sanitation defined as: flush or pour flush to a piped sewer system, septic tank, or pit latrine, ventilated improved pit latrine, pit latrine with slab, or composting toilet.

(-)   Based on fewer than 25 unweighted cases.

As shown in Table HH.8, about two-thirds (64.9%) of households had access to both an improved source of drinking water and an improved sanitation facility. Compared to rural households, poorer households, and families living in a Ger, a larger percentage of urban households, wealthier households, and those living in non-Ger dwellings had access to both improved water and sanitation.

Table HH.8: Use of improved drinking water and sanitation				
Percent of households using an improved drinking water source and improved sanitation facility by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved water and sanitation			
	Percent	95%CI		Unweighted Number
		Lower	Upper	
Total	**64.9**	**62.4**	**67.2**	**2249**
Area				
Urban	70.5	67.2	73.7	1079
Rural	53.6	50.5	56.6	1170
Location				
Capital city	69.7	65.3	73.8	449
Aimag center	72.7	68.9	76.1	630
Soum center	65.0	61.6	68.2	872
Bagh/rural	22.6	18.0	28.0	298
Economic region				
Western	55.1	50.4	59.6	448
Khangai	48.9	44.3	53.5	450
Central	79.0	75.0	82.5	452
Eastern	59.8	55.2	64.2	450
Ulaanbaatar	69.7	65.3	73.8	449
Religion of household head				
No religion	66.5	63.1	69.7	1172
Buddhism	61.7	57.8	65.5	870
Christianity	65.9	43.8	82.8	27
Islam	83.4	73.4	90.2	102
Shamanism	60.7	46.0	73.7	66
Type of dwelling				
Ger	41.1	37.3	45.1	917
Apartment, condominium	93.6	90.5	95.7	467
Convenient single family house	70.1	62.1	77.0	237
Single family house	69.4	64.6	73.8	595
Public accommodation, dormitory	24.3	12.5	41.8	33
Ethnicity of household head				
Khalkh	65.7	63.0	68.3	1738
Kazak	82.7	73.5	89.2	114
Other	54.7	48.6	60.8	397
Sex of household head				
Male	65.0	62.5	67.4	2125
Female	62.6	51.8	72.3	124
Age of household head				
< 20 years	-	-	-	6
20-29 years	57.5	53.0	61.9	699
30-39 years	66.7	63.1	70.0	1058
40-49 years	69.6	63.6	75.1	350
> 49 years	75.7	65.9	83.4	136

Table HH.8: Use of improved drinking water and sanitation				
Percent of households using an improved drinking water source and improved sanitation facility by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Improved water and sanitation			
	Percent	95%CI		Unweighted Number
		Lower	Upper	
Wealth index quintile				
Poorest	23.4	19.9	27.3	596
Second	51.5	45.7	57.3	428
Third	68.0	62.4	73.1	472
Fourth	86.0	81.7	89.4	443
Wealthiest	95.1	91.5	97.3	310

(-)   Based on fewer than 25 unweighted cases.

HOUSEHOLD FOOD SECURITY

Table HH.9 presents the distribution of sampled households according to their level of food security as measured by the Household Food Insecurity Access Scale.[25] Overall, only 35.3% of households were food secure, with 50.2% experiencing moderate or severe food insecurity. A larger percentage of households were food secure in rural (40.7%) than in urban (32.7%) areas and households living in a Ger had the highest prevalence of moderate and severe food insecurity. Household food security was lowest in the poorest wealth quintile, with 75.3% of these households having mild, moderate, or severe food insecurity. Food security was highest in Central, Eastern, and Western regions where about half of households were food secure, though 25% of households in Eastern region had severe food insecurity. Household food security was lowest in Khangai region (19.6%) and Ulaanbaatar (31.6%), with 1 in 4 households in these two regions (24.8% and 27.4% respectively) having severe food insecurity. Female headed households had high food insecurity with 39.1% of these households severely food insecure.

Table HH.9: Household Food Insecurity Access Scale [a]								
Percent of households according to food insecurity category by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Unweighted Number	Food secure		Mild food insecurity		Moderate food insecurity		Severe food insecurity	
		%	n	%	n	%	n	%	n
Total	2249	35.3	893	14.4	294	27.5	597	22.7	465
Area									
Urban	1079	32.7	382	15.1	149	26.5	293	25.7	255
Rural	1170	40.7	511	12.9	145	29.6	304	16.9	210
Location									
Capital city	449	31.6	142	16.3	73	24.7	111	27.4	123
Aimag center	630	35.4	240	12.3	76	31.1	182	21.2	132
Soum center	872	44.1	398	13.9	116	26.7	212	15.3	146
Bagh/rural	298	31.2	113	10.3	29	37.2	92	21.3	64
Economic region									
Western	448	46.2	207	7.1	32	29.9	134	16.8	75
Khangai	450	19.6	88	12.0	54	43.6	196	24.8	112
Central	452	50.0	226	18.8	85	21.9	99	9.3	42
Eastern	450	51.1	230	11.1	50	12.7	57	25.1	113
Ulaanbaatar	449	31.6	142	16.3	73	24.7	111	27.4	123

25   Coates J, Swindale A, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, August 2007.

Table HH.9: Household Food Insecurity Access Scale [a]

Percent of households according to food insecurity category by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Food secure		Mild food insecurity		Moderate food insecurity		Severe food insecurity	
		%	n	%	n	%	n	%	n
Religion of household head									
No religion	1172	35.9	467	14.3	159	26.0	289	23.8	257
Buddhism	870	35.1	341	15.4	114	30.8	259	18.7	156
Christianity	27	-	6	-	2	-	9	-	10
Islam	102	51.1	55	-	8	-	24	-	15
Shamanism	66	-	21	-	10	-	13	-	22
Type of dwelling									
Ger	917	26.4	282	11.3	98	31.5	285	30.8	252
Apartment, condo-minium	467	43.3	233	15.6	67	27.0	112	14.1	55
Convenient sin-gle-family house	237	48.9	123	16.9	35	20.8	50	13.3	29
Single family house	595	35.3	246	16.9	90	24.8	139	23.1	120
Public accommoda-tion, dormitory	33	-	9	-	4	-	11	-	9
Ethnicity of household head									
Khalkh	1738	34.6	673	15.3	243	27.0	456	23.2	366
Kazak	114	52.4	63	-	9	-	24	-	18
Other	397	35.3	157	10.9	42	33.7	117	20.1	81
Sex of household head									
Female	124	21.4	30	-	13	27.9	35	39.1	46
Male	2125	36.3	863	14.6	281	27.5	562	21.6	419
Age of household head									
< 20 years	6	-	1	-	2	-	1	-	2
20-29 years	699	39.0	229	13.7	94	26.3	180	21.1	126
30-39 years	1058	33.3	410	14.8	137	29.0	287	23.0	224
40-49 years	350	35.1	133	14.4	40	28.7	100	21.8	77
> 49 years	136	33.8	50	-	21	21.6	29	30.8	36
Wealth index quintile									
Poorest	596	24.7	184	10.3	58	34.6	192	30.4	162
Second	428	27.3	137	13.1	52	26.6	115	33.0	124
Third	472	36.0	195	15.9	74	27.0	118	21.1	85
Fourth	443	44.1	221	17.2	66	22.0	92	16.6	64
Wealthiest	310	44.5	156	15.5	44	27.4	80	12.7	30

a   Categories of household food insecurity are based on methodology used in the Household Food Insecurity Access Scale (FANTA, 2007). n = Unweighted number.

(-)   Based on fewer than 25 unweighted cases.

IODIZED SALT CONSUMPTION

The prevention of iodine deficiency disorders through salt iodization has been a longstanding strategy in Mongolia and the proportion of households consuming iodized salt has increased in recent years. To meet government regulations, household salt must be fortified with iodine to at least 30 parts per million (ppm) and to at least 15 ppm to meet international monitoring standards. Household salt used for cooking was collected and tested for the presence of iodine in 95.1% of all households (Table HH.10). In the majority of households (78.9%), salt was adequately iodized with 15 ppm or more of iodine, while 17.3% of salt samples were not iodized and 2.6% were insufficiently iodized (> 0 and < 15 ppm). Use of adequately iodized salt was higher in urban areas (81.6%) compared to rural areas (73.7%). Regional differences were apparent with the utilization of adequately iodized salt lowest in Western (60.4%) and Khangai (70.6%) regions and highest in Eastern (92.4%), Ulaanbaatar (85%), and Central (80.4%) regions. Use of adequately iodized salt did not significantly differ by household wealth status.

Table HH.10: Iodized salt utilization						
Percent of households using iodized salt by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Households with salt tested (%)	Unweighted Number	Percent of households with:			
			No salt (%)	Salt test result		
				Not iodized (0 ppm) (%)	> 0 and < 15 ppm (%)	15+ ppm (%)
Total	95.1	2249	1.1	17.3	2.6	78.9
Area						
Urban	93.9	1079	1.2	14.5	2.6	81.6
Rural	97.5	1170	0.9	22.7	2.7	73.7
Location						
Capital city	92.0	449	1.7	10.5	2.9	85.0
Aimag center	98.9	630	0.1	24.3	2.1	73.6
Soum center	98.0	872	0.8	20.3	3.1	75.8
Bagh/rural	96.4	298	1.2	29.5	1.5	67.8
Economic region						
Western	99.6	448	0.2	31.1	8.3	60.4
Khangai	99.6	450	0.2	28.3	0.9	70.6
Central	96.7	452	0.5	18.9	0.2	80.4
Eastern	94.0	450	2.8	4.1	0.7	92.4
Ulaanbaatar	92.0	449	1.7	10.5	2.9	85.0
Ethnicity of household head						
Khalkh	95.5	1738	1.0	16.2	2.9	80.0
Kazak	94.2	114	3.0	9.5	5.5	82.1
Other	93.1	397	1.3	27.0	0.3	71.3
Religion of household head						
No religion	95.9	1172	0.7	15.7	2.4	81.2
Buddhism	94.4	870	1.6	20.1	2.5	75.7
Christianity	88.0	27	0.0	35.2	8.6	56.1
Islam	93.6	102	3.3	8.6	5.2	82.9
Shamanism	95.5	66	0.4	10.3	2.9	86.4
Type of dwelling						
Ger	95.5	917	1.1	19.2	2.2	77.5
Apartment, condominium	92.9	467	2.2	17.3	2.7	77.8
Convenient single-family house	97.9	237	0.0	12.4	2.7	84.9
Single family house	95.7	595	0.4	17.1	3.3	79.2
Public accommodation, dormitory	100.0	33	0.0	3.7	0.0	96.3

Table HH.10: Iodized salt utilization						
Percent of households using iodized salt by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Households with salt tested (%)	Unweighted Number	Percent of households with:			
			No salt (%)	Salt test result		
				Not iodized (0 ppm) (%)	> 0 and < 15 ppm (%)	15+ ppm (%)
Sex of household head						
Male	95.4	2125	1.0	17.6	2.7	78.8
Female	91.6	124	3.1	14.1	2.2	80.6
Age of household head						
< 20 years	-	6	-	-	-	-
20-29 years	95.0	699	0.5	13.8	2.8	83.0
30-39 years	95.6	1058	1.4	17.5	2.7	78.4
40-49 years	94.4	350	1.6	23.6	2.2	72.6
> 49 years	94.1	136	1.2	17.0	3.0	78.8
Wealth index quintile						
Poorest	97.9	596	1.0	23.7	2.1	73.3
Second	94.0	428	1.2	14.6	2.2	82.0
Third	97.0	472	0.5	15.2	3.0	81.4
Fourth	93.0	443	0.0	14.8	2.8	82.4
Wealthiest	93.9	310	2.8	18.1	3.2	75.9

(-) Based on fewer than 25 unweighted cases.

The median iodine content of iodized salt was 26.5 ppm with no variation by urban and rural area and little variation by region (Table HH.11). The median iodine content of iodized salt was lowest in Western region (24.3 ppm) with the highest median iodine content of salt in Khangai region (27.5 ppm).

Table HH.11: Iodine content in iodized salt			
Median iodine concentration of iodized salt by area of residence, Mongolia National Nutrition Survey, 2017			
Characteristics	Median (ppm)	SD	Unweighted Number
Total	26.5	19.0	1753
Area			
Urban	26.5	22.8	1199
Rural	26.5	5.5	564
Economic region			
Western	24.3	7.2	307
Khangai	27.5	45.4	321
Central	25.4	3.9	354
Eastern	25.4	4.5	402
Ulaanbaatar	26.5	5.4	369

DISCUSSION

Household living standards

By building on the methodology used in Social indicators survey-2013 by NSC[26], an estimation of wealth index of households was carried out for the first time in this survey. Wealth index is a composite indicator of households' living standards or wealth, measured by giving a score based on selected number and types of physical assets owned by households, such as personal assets, livestock, agricultural land, dwelling (types of dwelling and roof, floor and walls), water and sanitation facilities, etc. The present survey revealed 20% of sampled households were in poorest wealth quintile, with equal percentages of households in second, middle and fourth (19.9%) wealth quintiles and the wealthiest (20.3% or 1 of every 5 HHs) quintile, which is similar to results of Social indicators survey-2013 (households were equally distributed across all quintiles). Higher percentage of rural households and households in bag were in lowest wealth quintile (43.2% and 83.3%, respectively). The percentage of poorest households was highest in Khangai (44.5%) and Eastern (38.9%) regions. The percent of sampled households in wealth quintiles is shown in Figure 1 and 2.
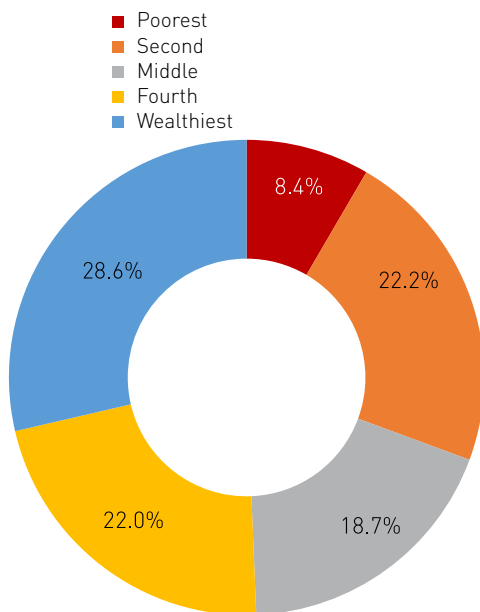
Figure HH.1: Percent distribution of urban households by wealth quintiles
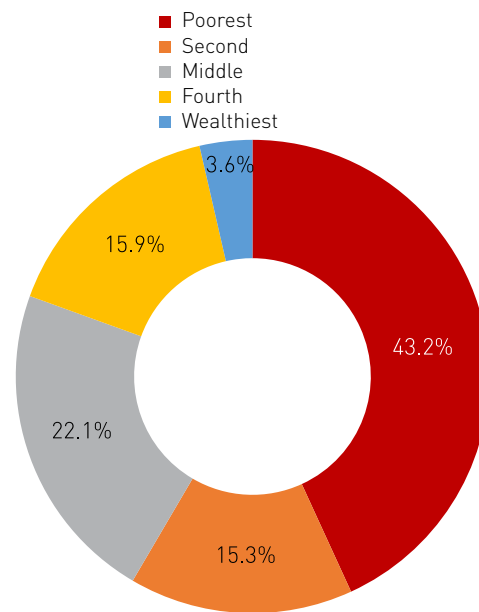
Figure HH.2: Percent distribution of rural households by wealth quintiles

Drinking water and sanitation

Improved sources of drinking water refer to piped water from public or individual water supply system into dwelling, public taps, tube well, protected well and springs, snow and rain water collection, and purified bottled water. The comparison of 5th NNS data on households' access to improved sources of water with results from 4th NNS was not available, as these were never studied during 4th NNS. The present survey revealed 92.8% of sampled households had access to improved water sources which is 6 percentage points higher than result of Social indicator survey-2013 (68.1%). However, the comparison of these two data may not be meaningful to our analysis, as some contrasts were seen in the characteristics of samples for two surveys: samples for Social indicators survey 2013 were taken from general population, while those for 5th NNS were taken from much narrower group of households with children under 5 years of age.

According to revised definition by UNICEF and WHO, an improved sanitation facility means flush or pour flush toilet that send sewages into a piped sewer system, septic tank, pit latrine, or elsewhere, a ventilated improved or traditional pit latrine. According to results of Social indicators survey-2013, 84.3% of population lived in households with improved sanitation facility, 58.3% (by definition for global use) had access to improved sanitation facility, and 9.4% practiced open defecation. In our survey, 67.6% of sampled households were found using improved sanitation facility, while 3.5% defecated in open spaces. Open defecation was more common in rural areas (10.5%), Eastern (13.1%) and Khangai (11.3) regions, and highest among households living in bags (31.8%). It suggests local authorities in said areas/regions

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26   Mongolia. Social indicators survey-2013. National statistical committee of Mongolia. Bit press LLC;UB:2014.

to concentrate on encouraging these households to use improved sanitation facilities to prevent soil contamination.

Household food security

Household food security exists when all members in the household, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Determining if the Goal 2: End hunger is met, the prevalence of and addressing moderate and severe food insecurity or hunger among population are at the heart of every nations.

We used Household food insecurity access scale (HFIAS)[27] questionnaire-based approach for the first time in present survey to measure household food access, thanks to which, we could identify that households in Mongolia, regardless of their socio-economic statuses, cannot purchase the foods they prefer, though they have potential economic access to foods.

During 5th National nutrition survey, we observed higher prevalence of food insecurity among sampled households. 1 out of every 3 households in Mongolia (35.3%) was food secure, with 41.9% experiencing mild to moderate food insecurity, while 22.7% was severely food insecure. Food security is lowest among women headed families (39.1%). 1 out of 3 households in poorest and second wealth quintiles (30.4-33.0%), and 1 out of 5 households in Ulaanbaatar, Eastern and Khangai regions (24.8-27.4%) had severe food insecurity.

65% of all households experienced food insecurity, of which 14% was mildly food insecure or concerned about food inadequacy, 28% was moderately food insecure or couldn't take foods they prefer, and 23% was severely food insecure or had serious reductions in food intake. Household food insecurity access scale (HFIAS) has never been measured in Mongolia, so there are no national level surveys, the results of which can be compared to scales measured under present survey. Even though, an attempt was made to compare some of the 5th NNS results to the results from regional surveys, particularly those conducted in Asia during 2014-2015. The prevalence of moderate (27.3%) to severe (22.7%) food insecurity among Mongolian households have been found to be 5 to 2 times greater than the proportion of moderate (6%) to severely (10%) food insecure households in entire Asia (Regional Overview of Food Insecurity in Asia and the Pacific[28]).

Consumption of iodized salt

Iodized salt consumption and iodine content in iodized salts are the main determinants of effectiveness of interventions aimed at addressing iodine deficiency. The samples of salts were collected from 95.1% of surveyed households for determination of iodine content at designated labs, under present survey. The sample collection rate (95.%) was 4 percentage points greater than that of previous survey (91.1%).

The prevalence of iodized salt consumption among households, as measured in previous 4 national nutrition surveys, was zero before the start (1995) of National iodine deficiency disorder control program (NIDDCP), 46.0%[29] in 1999, 74.7%[30] in 2005 and 89.1%[31] in 2010. However, during present survey, the prevalence dropped by 7.4 percentage points from level in 2010 (Figure HH.3).

27   Coates, Jennifer, Anne Swindale and Paula Bilinsky. 2007. Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3). Washington, D.C.: FHI 360/FANTA.

28   FAO. Regional Overview of Food Insecurity:Asia and Pacific/FAO,Bangkok (Thailand).Regional Office for Asia and Pacific. Bangkok:FAO, 2016.-50p.

29   MoHSP UNICEF, PHI-NRC. 2nd National nutrition survey report, UB;2000:51-52

30   MoH, UNICEF, PHI. ̈Maternal and child nutrition status of Mongolia ̈ 3rd national survey report, UB;2006:51

31   MoH, MoFAL, PHI, UNICEF, World vision Mongolia, WHO. ̈Nutrition status of Mongolian population ̈ 3rd national survey report, UB;2010:162-168
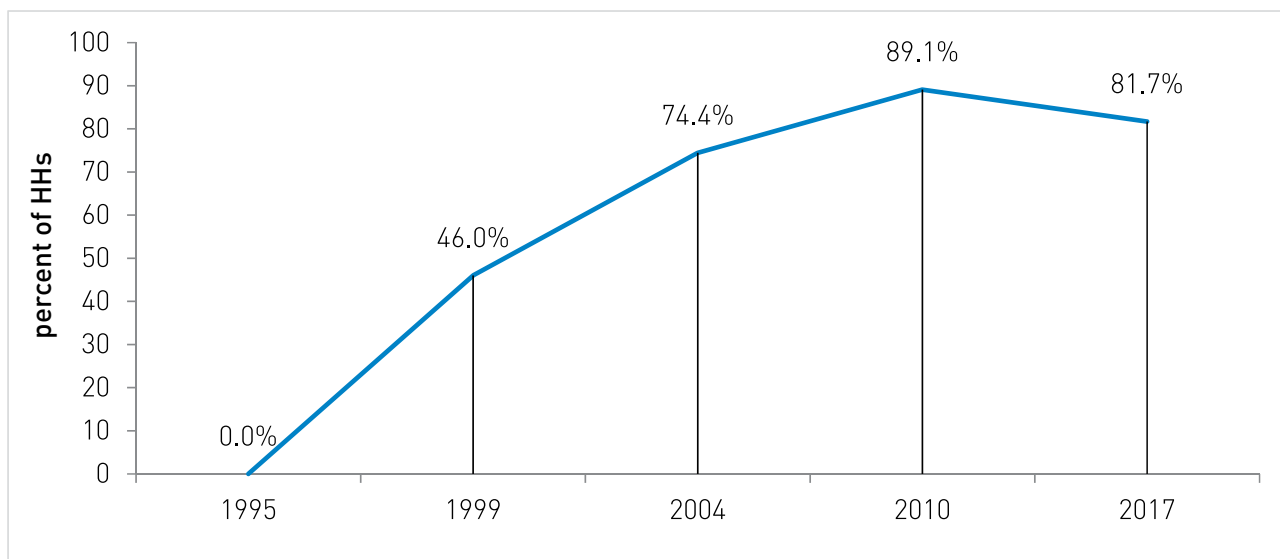
Figure HH.3: Comparison of household iodized salt consumption, by survey years

The recommended iodine content in the iodized salt is 15-30mg/kg . Salts can be non-iodized (00mg/kg), insufficiently iodized (<15 mg/kg), or adequately iodized (15-30 mg/kg) depending on iodine concentration. The median iodine concentration (26.5mg/kg) in table salts for households consumption was within WHO recommended value and met national standards. Median iodine content in the table salt was found to be 1.7mg/kg higher compared to previous survey (24.8mg/kg) at national level. On regional level, it was 2.9mg/kg, 2.4mg/kg and 3.1mg/kg higher in Western, Khangai and Central regions, respectively, compared to results of previous survey, but in Eastern region and Ulaanbaatar, the median content was 1.7mg/kg and 1.9mg/kg lower (Figure HH.4).
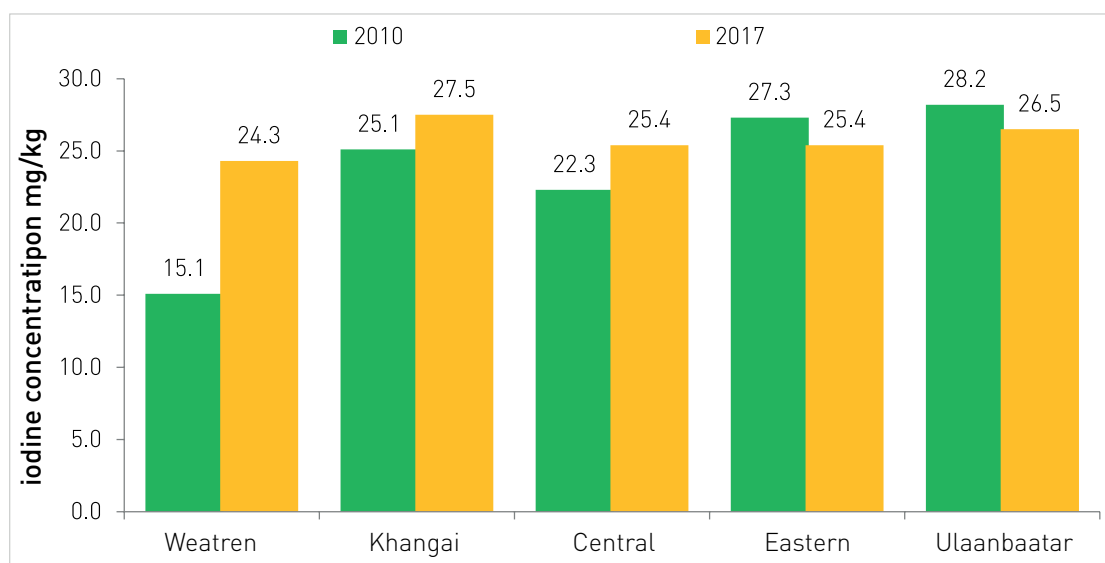
Figure HH.4: Comparison of median iodine concentration in salt for household consumption, by regions

As results of intensive government policy to promote and develop domestic production of iodine fortified salt, and with the financial and technical assistance from UNICEF, an iodization of salt began in Mongolia and was sustainably maintained until 2010. Due to weakening of policy and interventions, and lack of state support in recent years, salt iodization process ground to halt. MoFALI, who is responsible for food production, has no clear information about the place and number of factories still engaged in salt iodization.

The present survey revealed 3.2 percentage points increase in the prevalence of adequately iodized salt consumption among households compared to results of previous survey, while percentage of households that use non-iodized salts increased by 6.3 percentage points (Figure HH.5), which requires particular attention.
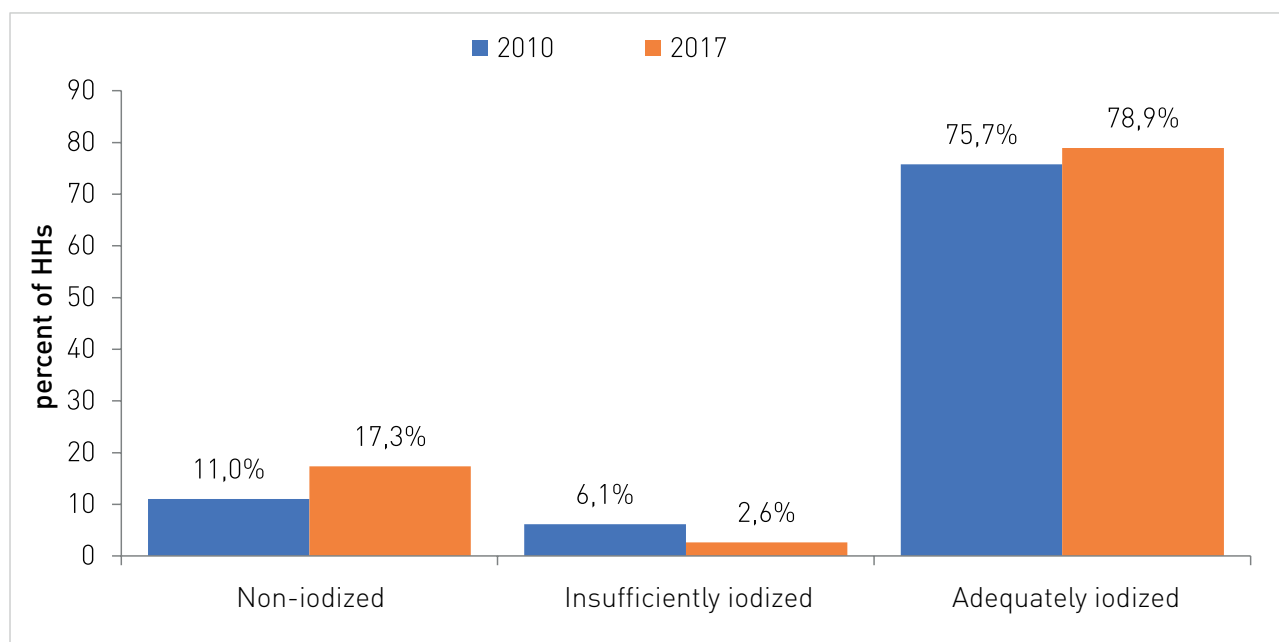
Figure HH.5: Comparison of household salt consumption, by iodine contents

Like in previous survey, there was regional variation in the consumption of non-iodized and insufficiently iodized salts. An evident increase in the prevalence of non-iodized salt consumption in regions and areas was observed, for example: 6.7 percentage points increase was detected in the prevalence of non-iodized salt consumption in urban area. Such increases can also be seen in rural area (6.8), Khangai (18.0%), Central (12.7%), Ulaanbaatar (4.6%) and Eastern (1.2%) regions, when compared to results of previous survey. Despite significant increase (19.4 percentage points) in the consumption of adequately iodized salt among Western households, the prevalence of adequately iodized salt consumption is still the lowest in Western region, with visible decrease in Khangai region, on the other hand (Table HH.12). This calls for urgency to redirecting attentions of public organizations at all levels, NGOs, and private sector to production and consumption of iodine fortified salts, which need to be increased.

Table HH.12: Percent distribution of non-iodized and poorly iodized salt consumption among households, by area, regions, and survey years

Selected characteristics	Percent of households					
	Non-iodized (0 mg/kg)		Insufficiently iodized (0.1-14.9 mg/kg)		Adequately iodized (≥ 15 mg/kg)	
	2010	2017	2010	2017	2010	2017
Area						
Urban	8.1	14.5	5.6	2.6	78.4	81.6
Rural	15.9	22.7	6.9	2.7	71.0	73.7
Regions						
Western	41.0	31.1	9.8	8.3	41.0	60.4
Khangai	10.3	28.3	5.7	0.9	75.9	70.6
Central	6.2	18.9	9.3	0.2	80.9	80.4
Eastern	2.9	4.1	8.1	0.7	73.6	92.4
Ulaanbaatar	5.9	10.5	3.2	2.9	83.4	85.0

CONCLUSION

1. All households in Mongolia are equally distributed across 5 wealth quintiles: poorest, second, middle, fourth and wealthiest. Poorest households are prevalent in rural area (43.2%), particularly at bag level (83.3%), Khangai (44.5%) and Eastern (38.9%) regions.

2. 92.8% of all households in Mongolia (99.1% and 80.5% in urban and rural area, respectively, and 74.7% of poorest households) have access to improved drinking water sources.

3. 67.6% of all households in Mongolia (71.4% in urban and 60.1% in rural area) use improved sanitation facility, with 28.9% using unimproved sanitation facility, while 3.5% practices open defecation (0.1% in urban, 10.5% in rural area). Percentage of households that practice open defecation is higher at bag level (31.8%), Eastern (13.1%) and Khangai (11.3%) regions.

4. 1 of every 3 households in Mongolia is food secure (35.3%), 41.9% of all households experience mild and moderate food insecurity, and 22.7% is severely food insecure. Prevalence of severe food insecurity is higher among women headed households (39.1%), and among households in poorest and second wealth quintiles (30.4% and 33.0%). Moreover, 1 of every 5 households in Ulaanbaatar, Eastern and Khangai regions (24.8-27.4%) are severely food insecure, which needs attention.

5. Though 78.9% of all households in Mongolia consume adequately iodized salts, it is 7.4 percentage points lower than level in 2010; no progress was made in consumption of adequately iodized salts at national level (75.7% in 2010, 78.9% in 2016); prevalence of adequately iodized salt consumption in Khangai and Central regions decreased with 5.3 and 0.5 percentage points from level in 2010, while consumption of non-iodized salts increased with 6.3 percentage points. This may be associated with weakening of state policy, interventions and control regarding salt fortification with iodine, followed by collapse of salt iodization process. Therefore, we should emphasize on rejuvenating domestic production of iodine fortified salt, and ensuring effective control and monitoring mechanisms for sale and consumption of iodized salt, in place.

6. Though, the prevalence of adequately iodized salt consumption in Western region increased by around 20 percentage points compared to level in 2010, the prevalence is still the lowest among other regions, being almost 18 percentage points lower than the national average. Moreover, 1 of every 3 households in this region consumes non-iodized salts, which is indeed an issue of concern.

CHILDREN UNDER 5 YEARS OF AGE

SAMPLE CHARACTERISTICS

Tables UF.1 and UF.2 provide background characteristics for sampled children 0-59 months of age at the national and regional level. In the sample, 51.6% of children were under 2 years of age (Table UF.1). Approximately equal percentages of male children (1141) and female children (1110) were sampled and the percentage of children in each wealth quintile was approximately 20%. A high concentration of Kazak and other ethnic minority children were located in Western (57.4%) and Eastern (28.2%) regions (Table UF.2). Khangai (18.3%) and Eastern (31.8%) regions had the largest proportion of children from the poorest households.

Table UF.1: Children 0-59 months of age characteristics (National level)			
Percent of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Total	100.0	2251	2251
Economic region			
Western	13.2	298	449
Khangai	17.5	393	450
Central	14.6	329	453
Eastern	6.6	149	450
Ulaanbaatar	48.1	1083	449
Area			
Urban	66.9	1505	1080
Rural	33.1	746	1171
Location			
Capital city	48.1	1083	449
Aimag center	18.8	423	631
Soum center	24.2	546	872
Bagh/rural	8.9	200	299
Maternal age			
< 20 years	1.0	20	16
20-29 years	44.1	849	858
30-39 years	46.4	892	900
40-49 years	8.5	163	170
Maternal marital status			
Not married	77.6	1494	1594
Married	14.5	280	216
Cohabitating	7.8	151	134
Ethnicity of household head			
Khalkh	82.7	1862	1740
Kazak	3.8	87	114
Other	13.5	303	397

Table UF.1: Children 0-59 months of age characteristics (National level)

Percent of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Maternal education			
No education	0.8	15	22
Primary	2.5	47	64
Secondary	42.5	819	850
Higher	54.2	1043	1008
Child age			
0-5 months	9.9	224	201
6-11 months	15.0	337	305
12-23 months	26.7	601	598
24-35 months	19.6	442	457
36-59 months	28.7	647	690
Child gender			
Male	49.0	1148	1141
Female	51.0	1103	1110
Wealth index quintile			
Poorest	20.0	449	597
Second	20.0	450	428
Third	19.8	446	471
Fourth	19.9	448	444
Wealthiest	20.3	458	311

Table UF.2: Children 0-59 months of age characteristics (Regional level)

Percent of children 0-59 months by selected characteristics in each region, Mongolia National Nutrition Survey, 2017

Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Total	100.0	67.0	33.0	13.0	18.0	15.0	7.0	48.0	2251	2251
Area										
Urban	66.9	100.0	0.0	43.2	36.7	33.5	26.6	100.0	1505	1080
Rural	33.1	0.0	100.0	56.8	63.3	66.5	73.4	0.0	746	1171
Location										
Capital city	48.1	71.9	0.0	0.0	0.0	0.0	0.0	100.0	1083	449
Aimag center	18.8	28.1	0.0	43.2	36.7	33.5	26.6	0.0	423	631
Soum center	24.2	0.0	73.2	50.7	28.8	62.3	51.6	0.0	546	872
Bagh/rural	8.9	0.0	26.8	6.1	34.5	4.2	21.8	0.0	200	299
Maternal age										
< 20 years	1.0	1.3	0.6	0.0	0.5	0.8	1.3	1.6	20	16
20-29 years	44.1	44.3	43.8	41.1	43.1	47.7	44.6	44.2	849	858
30-39 years	46.4	46.3	46.5	49.5	47.9	43.6	44.3	46.0	892	900
40-49 years	8.5	8.1	9.2	9.3	8.5	8.0	9.7	8.2	163	170

Table UF.2: Children 0-59 months of age characteristics (Regional level)										
Percent of children 0-59 months by selected characteristics in each region, Mongolia National Nutrition Survey, 2017										
Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Maternal marital status										
Married	77.6	73.2	86.3	94.4	80.7	79.0	84.9	70.1	280	216
Not married	14.5	17.6	8.5	2.2	10.8	14.9	7.9	20.4	1494	1594
Cohabitating	7.8	9.2	5.1	3.4	8.5	6.2	7.2	9.5	151	134
Ethnicity of household head										
Khalkh	82.7	85.5	77.0	42.6	90.9	91.6	71.8	89.5	1862	1740
Kazak	3.8	2.3	7.0	22.9	0.6	0.4	0.0	1.3	87	114
Other	13.5	12.2	16.0	34.5	8.4	7.9	28.2	9.1	303	397
Maternal education										
No education	0.8	0.5	1.4	2.2	1.3	0.3	1.5	0.3	15	22
Primary	2.5	1.5	4.3	4.9	5.8	0.8	4.1	0.8	47	64
Secondary	42.5	40.5	46.5	33.3	47.9	42.3	53.8	41.8	819	850
Higher	54.2	57.5	47.7	59.6	45.0	56.7	40.5	57.1	1043	1008
Child age										
0-5 months	9.9	10.6	8.5	7.6	10.2	10.6	5.3	10.9	224	201
6-11 months	15.0	16.3	12.2	12.5	11.6	16.1	10.4	17.2	337	305
12-23 months	26.7	26.3	27.6	23.4	30.0	27.8	25.3	26.3	601	598
24-35 months	19.6	19.0	20.9	22.0	22.0	19.0	20.2	18.3	442	457
36-59 months	28.7	27.7	30.8	34.5	26.2	26.5	38.7	27.4	647	690
Child gender										
Male	49.0	47.6	51.8	50.7	51.1	48.3	56.2	47.0	1148	1141
Female	51.0	52.4	48.2	49.3	48.9	51.7	43.8	53.0	1103	1110
Wealth index quintile										
Poorest	20.0	8.4	43.3	26.1	44.5	15.0	38.9	8.2	449	597
Second	20.0	22.3	15.4	25.6	17.5	15.5	15.1	21.4	450	428
Third	19.8	18.6	22.2	22.3	22.2	21.2	21.3	17.6	446	471
Fourth	19.9	22.0	15.7	15.8	11.8	30.0	20.0	20.9	448	444
Wealthiest	20.3	28.7	3.5	10.2	4.0	18.3	4.7	31.8	458	311

NUTRITION

LOW BIRTH WEIGHT

Weight at birth is a good indicator of the mother's health and nutrition status during gestation and a child's chances for survival, growth, long-term health, and psychosocial development. Low birth weight (defined as less than 2500 grams) poses a range of serious health risks for children. Babies who were undernourished in the womb face a greatly increased risk of dying during their early days, months, and years. Those who survive may have impaired immune function and are likely to remain undernourished, with reduced muscle strength throughout their lives, and suffer a higher incidence of diabetes and heart disease in later life. Children born with low birth weight are also at risk for a lower IQ and cognitive disabilities, affecting their performance in school and productivity as adults.

Low birth weight stems primarily from the mother's poor health and nutrition. Three factors have the most impact: the mother's poor nutrition status before conception, short stature (due mostly to undernutrition and infections during her childhood), and poor nutrition during pregnancy. Inadequate weight gain during pregnancy is particularly important since it accounts for a large proportion of foetal growth retardation. Additional causes of low birth weight are cigarette smoking during pregnancy and becoming pregnant at an early age as young mothers who give birth when their own bodies have not finished growing have a higher risk of bearing low birth weight babies.

Babies born with high birth weight (≥ 4000g) are at increased risk for complications during delivery and negative health outcomes in childhood and later life. High birth weight is primarily due to excess maternal weight gain and or pre-existing or gestational diabetes in the mother. Genetics also plays a role as babies born to overweight or obese mothers are more likely to be large. Babies born over 4000g at birth are at higher risk for hypoglycaemia during the neonatal period and are more likely to be overweight or obese in childhood and adolescence.

Almost all (99.5%) children in the sample were weighed at birth with 5.0% weighing less than 2500 grams at birth and 12.6% weighing over 4000 grams at birth (Table UF.3). The prevalence of low birth weight was slightly higher among girls than boys, however high birth weight was much more common in boys (15.9%) compared to girls (9.5%). Prevalence of low birth weight was highest in Western region (9.6%) and the poorest households (7.8%) while the prevalence of high birth weight was highest in Ulaanbaatar (13.8%) and wealthiest households (16.4%). High birth weight was more than double among children of overweight (17.5%) and obese (17.3%) mothers compared to children of normal weight (8.4%) or underweight (7.0%) mothers.

Table UF.3: Birth weight								
Percent distribution of low birth weight and high birth weight of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Low birth weight (< 2500 g)	95% CI		High birth weight (≥ 4000 g)	95% CI		Weighed at birth (%)	Unweighted Number
	%	Lower	Upper	%	Lower	Upper		
Total	5.0	4.0	6.1	12.6	11.0	14.5	99.5	2241
Child gender								
Female	5.7	4.3	7.6	9.5	7.6	11.9	99.5	1104
Male	4.2	3.1	5.7	15.9	13.3	18.8	99.6	1137
Child age								
0-5 months	3.1	1.3	7.1	9.6	5.6	15.8	99.4	199
6-11 months	5.2	3.0	8.9	12.8	8.8	18.3	99.8	304
12-23 months	4.8	3.2	7.2	13.3	10.1	17.2	99.5	596
24-35 months	5.0	3.1	8.1	14.2	10.6	18.7	99.5	454
36-59 months	5.7	3.9	8.1	11.9	9.2	15.3	99.5	688

Table UF.3: Birth weight

Percent distribution of low birth weight and high birth weight of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Low birth weight (< 2500 g)	95% CI		High birth weight (≥ 4000 g)	95% CI		Weighed at birth (%)	Unweighted Number
	%	Lower	Upper	%	Lower	Upper		
Economic region								
Western	9.6	7.2	12.8	8.9	6.6	11.9	98.4	442
Khangai	6.4	4.5	9.1	12.9	10.1	16.3	99.8	449
Central	4.2	2.7	6.5	12.1	9.4	15.5	100.0	453
Eastern	2.2	1.2	4.1	11.8	9.1	15.1	100.0	450
Ulaanbaatar	3.8	2.4	6.0	13.8	10.9	17.3	99.6	447
Area								
Urban	4.4	3.2	6.0	13.3	11.1	15.9	99.5	1074
Rural	6.2	4.8	7.8	11.3	9.5	13.3	99.6	1167
Location								
Capital city	3.8	2.4	6.0	13.8	10.9	17.3	99.6	447
Aimag center	5.9	4.3	8.2	11.9	9.5	14.9	99.3	627
Soum center	5.6	4.2	7.5	11.6	9.6	14.0	99.6	869
Bagh/Rural	7.6	4.9	11.6	10.4	7.3	14.6	99.7	298
Wealth index quintile								
Poorest	7.8	5.4	11.0	9.9	7.4	13.2	100.0	597
Second	4.5	2.7	7.6	12.1	8.7	16.6	99.9	427
Third	5.7	3.8	8.6	13.3	9.9	17.7	98.7	465
Fourth	4.4	2.5	7.4	11.4	8.3	15.3	99.2	441
Wealthiest	2.6	1.3	5.0	16.4	12.0	21.9	100.0	311
Ethnicity of household head								
Khalkh	4.4	3.4	5.7	13.5	11.6	15.6	100.0	1739
Kazak	13.8	8.7	21.1	6.2	3.1	12.0	94.6	107
Other	6.0	3.5	9.9	9.2	6.0	13.8	98.4	395
Maternal age								
< 20 years	-	-	-	-	-	-	-	18
20-29 years	4.4	3.0	6.4	10.8	8.4	13.8	99.8	856
30-39 years	3.8	2.7	5.4	14.1	11.5	17.2	99.7	894
40-49 years	2.9	1.3	6.2	13.1	8.3	20.3	100.0	170
Maternal nutrition status								
Underweight	6.5	1.8	21.1	7.0	2.1	21.3	100.0	59
Normal weight	5.0	3.6	7.1	8.4	6.4	11.0	99.8	935
Overweight	3.9	2.7	5.6	17.5	13.9	21.7	99.8	623
Obese	2.0	1.0	4.0	17.3	12.8	23.1	99.8	320
Maternal employment								
Not employed	4.1	2.7	6.1	11.7	9.1	14.9	99.8	767
Employed	4.3	3.2	5.9	13.2	11.0	15.7	99.7	1165
Maternal marital status								
Married	4.1	3.1	5.3	13.7	11.7	16.0	99.7	1586
Not married	3.7	1.7	7.9	9.8	5.9	15.7	100.0	219
Cohabitating	6.9	3.0	15.2	5.5	2.0	14.4	100.0	133

Table UF.3: Birth weight								
Percent distribution of low birth weight and high birth weight of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Low birth weight (< 2500 g)	95% CI		High birth weight (≥ 4000 g)	95% CI		Weighed at birth (%)	Unweighted Number
	%	Lower	Upper	%	Lower	Upper		
Maternal education								
No education	-	-	-	-	-	-	-	22
Primary	9.3	4.1	19.9	13.2	5.5	28.5	100.0	64
Secondary	5.3	3.6	7.6	12.3	9.7	15.5	99.8	845
Higher	3.2	2.2	4.5	12.7	10.4	15.4	99.7	1001

(-)   Based on fewer than 25 unweighted cases.

NUTRITION STATUS

Children's nutrition status is a reflection of their overall health. Good nutrition in early life is crucial for ensuring proper physical and mental development and long-term health. When children have access to an adequate food supply, are not exposed to repeated illness, and are well cared for, they reach their growth potential and are considered well-nourished. An estimated 35% of all deaths among children under 5 years of age are linked to childhood malnutrition.[32] Undernourished children are more likely to die from common childhood ailments and those who survive have recurring sickness and faltering growth. Often children who are mildly or moderately malnourished show no outward signs of their vulnerability.

In a well-nourished population, there is a reference distribution of height and weight for children under 5 years of age. Undernourishment in a population can be gauged by comparing children to such a reference population. The reference population used in this survey is based on the WHO Child Growth Standards.[33] Each of the three nutrition status indicators - weight-for-age, height-for-age, and weight-for-height - can be expressed in standard deviation units (z-scores) from the median of the reference population.

Weight-for-age is a measure of both acute and chronic malnutrition. Children whose weight-for-age is more than 2 standard deviations below the median of the reference population are considered moderately or severely underweight, while those whose weight-for-age is more than 3 standard deviations below the median are classified as severely underweight.

Height-for-age is a measure of linear growth. Children whose height-for-age is more than 2 standard deviations below the median of the reference population are considered short for their age and are classified as moderately or severely stunted. Those whose height-for-age is more than 3 standard deviations below the median are classified as severely stunted. Stunting is a reflection of chronic malnutrition as a result of failure to receive adequate nutrition over a long period and recurrent or chronic illness.

Weight-for-height can be used to assess wasting and overweight status. Children whose weight-for-height is more than 2 standard deviations below the median of the reference population are classified as moderately or severely wasted, while those who fall more than 3 standard deviations below the median are classified as severely wasted. Wasting is usually the result of a recent nutrition deficiency and may reflect seasonal shifts associated with changes in food availability and or disease prevalence. Children whose weight-for-height is more than 2 standard deviations above the median reference population are classified as overweight.

Tables UF.4, UF.5, and UF.6 present weight-for-age, height-for-age, and weight-for-height status of children based on anthropometric measurements collected during the NNS V fieldwork. Additionally, the tables include mean z-scores for all three anthropometric indicators.

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32   WHO. Comprehensive implementation plan on maternal, infant and young child nutrition. WHO Geneva, 2014.
33   WHO child growth standards and the identification of severe acute malnutrition in infants and children. WHO and UNICEF, 2009.

Prevalence of underweight was very low with 0.7% of children underweight (Table UF.4). Low birth weight children had a higher prevalence of underweight (10.9%) compared to normal weight children (0.3% underweight) and high birth weight children (0.0% underweight).

Table UF.4: Weight-for-age status								
Percent distribution of weight-for-age of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Weight-for-age						Mean Z- score (SD) [c]	Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]				
	%	95% CI		%	95% CI			
		Lower	Upper		Lower	Upper		
Total	0.7	0.4	1.3	0.2	0.1	0.7	0.48	2242
Child gender								
Female	0.6	0.2	1.7	0.3	0.1	1.3	0.48	1105
Male	0.9	0.4	1.7	0.2	0.1	0.6	0.49	1137
Child age								
0-5 months	2.4	0.9	6.6	0.3	0.0	2.1	1.31	199
6-11 months	1.0	0.2	4.4	1.0	0.2	4.4	0.86	304
12-23 months	0.1	0.0	1.0	0.0	0.0	0.0	0.62	593
24-35 months	0.5	0.2	1.6	0.2	0.0	1.1	0.25	456
36-59 months	0.6	0.2	2.3	0.1	0.0	0.8	0.03	690
Child birth weight								
Low birth weight	10.9	5.2	21.5	5.0	1.6	14.6	-0.52	97
Normal birth weight	0.3	0.1	0.8	0.0	0.0	0.3	0.46	1856
High birth weight	0.0	0.0	0.0	0.0	0.0	0.0	1.03	268
Economic region								
Western	0.7	0.2	2.1	0.2	0.0	1.6	0.32	447
Khangai	1.3	0.6	2.8	0.4	0.1	1.6	0.32	449
Central	0.4	0.1	1.8	0.2	0.0	1.6	0.66	450
Eastern	0.0	0.0	0.0	0.0	0.0	0.0	0.41	450
Ulaanbaatar	0.7	0.2	2.1	0.2	0.0	1.6	0.54	446
Area								
Urban	0.8	0.3	1.7	0.2	0.0	1.0	0.51	1074
Rural	0.6	0.3	1.3	0.3	0.1	0.9	0.43	1168
Location								
Capital city	0.7	0.2	2.1	0.2	0.0	1.6	0.54	446
Aimag center	1.0	0.4	2.3	0.2	0.0	1.5	0.42	628
Soum center	0.4	0.1	1.3	0.2	0.1	1.0	0.48	870
Bagh/Rural	1.1	0.4	3.5	0.4	0.1	2.5	0.29	298
Wealth index quintile								
Poorest	1.6	0.6	4.3	0.3	0.1	1.4	0.28	597
Second	0.9	0.2	3.2	0.7	0.1	3.3	0.35	426
Third	0.5	0.2	1.5	0.0	0.0	0.0	0.39	469
Fourth	0.3	0.1	1.3	0.2	0.0	1.1	0.67	442
Wealthiest	0.2	0.0	1.4	0.0	0.0	0.0	0.73	308
Ethnicity of household head								
Khalkh	0.7	0.4	1.5	0.3	0.1	0.8	0.51	1733
Kazak	2.3	0.7	7.0	0.8	0.1	5.3	0.15	113
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.38	396

Table UF.4: Weight-for-age status							
Percent distribution of weight-for-age of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Weight-for-age						Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]			Mean Z- score (SD) [c]
	%	95% CI		%	95% CI		
		Lower	Upper		Lower	Upper		
Maternal age							
< 20 years	-	-	-	-	-	-	-	16
20-29 years	0.5	0.2	1.7	0.1	0.0	0.6	0.57	852
30-39 years	1.0	0.4	2.4	0.4	0.1	1.7	0.48	897
40-49 years	0.0	0.0	0.0	0.0	0.0	0.0	0.28	170
Maternal nutrition status							
Underweight	3.1	0.4	18.7	0.0	0.0	0.0	0.09	59
Normal weight	0.6	0.2	1.6	0.3	0.1	1.6	0.44	928
Overweight	0.4	0.1	1.3	0.0	0.0	0.0	0.61	623
Obese	0.3	0.0	2.0	0.3	0.0	2.0	0.60	318
Maternal employment							
Not employed	0.4	0.1	1.6	0.3	0.1	1.7	0.58	769
Employed	0.9	0.4	2.1	0.1	0.0	0.6	0.43	1166
Maternal marital status							
Married	0.7	0.4	1.5	0.3	0.1	1.0	0.52	1588
Not married	0.9	0.1	5.9	0.0	0.0	0.0	0.44	213
Cohabitating	0.0	0.0	0.0	0.0	0.0	0.0	0.37	134
Maternal education							
No education	-	-	-	-	-	-	-	22
Primary	1.9	0.3	12.1	1.9	0.3	12.1	0.15	64
Secondary	1.2	0.5	2.9	0.4	0.1	1.8	0.40	846
Higher	0.3	0.1	0.8	0.0	0.0	0.0	0.60	1003

a Children whose weight-for-age is more than 2 standard deviations below the median of the WHO Child Growth Standards reference population are classified as moderately or severely underweight.

b Children whose weight-for-age is more than 3 standard deviations below the median of the WHO Child Growth Standards reference population are classified as severely underweight.

c In standard deviation units (z-scores) from the median of the reference population.

(-) Based on fewer than 25 unweighted cases.

In the NNS V, 6.1% of children were stunted and 1.4% were severely stunted (Table UF.5). Boys, at 7.5%, had a higher prevalence of stunting compared to girls, at 4.7%. Low birth weight children had a higher prevalence of stunting (23.9%) compared to normal birth weight children (5.6%) and high birth weight children (3.0%). The prevalence of stunting was higher in rural areas compared to urban areas, in children living in the poorest households versus wealthier quintiles, and in Western region versus other regions. The prevalence of stunting in the Kazak ethnic minority population was more than double (13.1%) that of the Khalkh population (5.7%).

Table UF.5: Height-for-age status							
Percent distribution of height-for-age of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Height-for-age						Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]			Mean Z- score (SD) [c]
	%	95% CI		%	95% CI		
		Lower	Upper		Lower	Upper	
Total	6.1	5.1	7.2	1.4	1.0	2.1	-0.14	2244
Child gender							
Female	4.7	3.6	6.2	0.6	0.3	1.2	-0.06	1107
Male	7.5	5.9	9.4	2.3	1.5	3.6	-0.24	1137
Child age							
0-5 months	1.6	0.7	3.9	0.6	0.1	2.4	1.00	199
6-11 months	5.1	2.9	8.8	0.9	0.3	2.3	0.46	304
12-23 months	6.9	5.1	9.3	1.5	0.8	3.0	-0.21	595
24-35 months	7.0	5.0	9.8	2.3	1.2	4.3	-0.54	457
36-59 months	6.6	4.7	9.3	1.4	0.6	3.2	-0.52	689
Child birth weight							
Low birth weight	23.9	15.8	34.5	3.1	1.2	7.7	-1.09	97
Normal birth weight	5.6	4.5	6.8	1.5	0.9	2.3	-0.17	1858
High birth weight	3.0	1.3	6.9	0.3	0.0	2.2	0.34	268
Economic region							
Western	11.6	8.9	14.9	2.5	1.4	4.4	-0.6	448
Khangai	8.2	6.0	11.1	1.9	1.0	3.7	-0.37	450
Central	6.4	4.5	9.1	1.8	0.9	3.5	-0.04	452
Eastern	8.0	5.8	10.9	1.1	0.5	2.6	-0.47	450
Ulaanbaatar	3.4	2.0	5.5	0.9	0.3	2.4	0.08	444
Area							
Urban	4.8	3.6	6.4	1.3	0.7	2.2	-0.03	1075
Rural	8.6	7.0	10.4	1.7	1.1	2.7	-0.37	1169
Location							
Capital city	3.4	2.0	5.5	0.9	0.3	2.4	0.08	444
Aimag center	8.5	6.5	11.0	2.3	1.3	3.8	-0.31	631
Soum center	8.3	6.5	10.4	2.0	1.2	3.3	-0.32	871
Bagh/Rural	9.4	6.5	13.6	1.0	0.3	3.4	-0.52	298
Wealth index quintile							
Poorest	11.4	8.7	14.7	2.3	1.1	4.8	-0.56	597
Second	7.7	5.2	11.3	2.3	1.2	4.4	-0.35	428
Third	4.3	3.0	6.2	1.3	0.6	2.5	-0.3	469
Fourth	4.0	2.4	6.5	0.3	0.1	1.2	0.04	442
Wealthiest	2.9	1.4	5.7	0.9	0.3	3.2	0.44	308
Ethnicity of household head							
Khalkh	5.7	4.6	7.1	1.3	0.8	2.1	-0.1	1735
Kazak	13.1	8.2	20.4	5.4	2.6	11.0	-0.51	113
Other	6.2	4.4	8.9	1.1	0.5	2.6	-0.29	396

Table UF.5: Height-for-age status							
Percent distribution of height-for-age of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Height-for-age						Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]			Mean Z- score (SD) [c]
	%	95% CI		%	95% CI		
		Lower	Upper		Lower	Upper		
Maternal age							
< 20 years	-	-	-	-	-	-	-	16
20-29 years	5.2	3.8	7.1	1.0	0.5	2.1	-0.06	855
30-39 years	5.9	4.4	7.8	1.8	1.1	3.1	-0.14	897
40-49 years	11.0	6.7	17.6	3.2	1.1	8.8	-0.33	170
Maternal nutrition status							
Underweight	2.8	0.9	8.6	0.0	0.0	0.0	-0.09	59
Normal weight	6.4	4.9	8.4	1.5	0.8	2.9	-0.11	930
Overweight	5.2	3.8	7.0	1.7	1.0	2.8	-0.08	623
Obese	6.0	3.5	9.9	1.6	0.6	4.7	-0.15	319
Maternal employment							
Not employed	6.2	4.6	8.4	1.8	1.0	3.4	-0.01	770
Employed	5.7	4.5	7.3	1.3	0.9	2.1	-0.21	1168
Maternal marital status							
Married	6.3	5.1	7.7	1.7	1.1	2.6	-0.11	1589
Not married	4.5	2.2	9.0	0.3	0.0	1.8	-0.06	215
Cohabitating	5.3	2.5	11.1	3.0	0.9	9.4	-0.21	134
Maternal education							
No education	-	-	-	-	-	-	-	22
Primary	17.7	9.9	29.5	6.5	2.4	16.4	-0.78	64
Secondary	7.9	6.1	10.1	1.7	0.9	3.1	-0.27	848
Higher	3.8	2.7	5.4	1.3	0.7	2.3	0.05	1004

a Children whose height-for-age is more than 2 standard deviations below the median of the WHO Child Growth Standards reference population are classified as moderately or severely stunted.
b Children whose height-for-age is more than 3 standard deviations below the median of the WHO Child Growth Standards reference population are classified as severely stunted.
c In standard deviation units (z-scores) from the median of the reference population.
(-) Based on fewer than 25 unweighted cases.

Weight-for-height is used to assess both wasting and overweight status. The overall prevalence of both moderate wasting (< -2 SD, 1.3%) and severe wasting (< -3 SD, 0.4%) was low in Mongolian children (Table UF.6). As found with the underweight and stunting indicators, children with low weight at birth had higher prevalence of wasting (5.8%) compared to children who were normal birth weight (1.2%) or high birth weight (0.2%). 11.7% of children had high weight-for-height (> +2 SD) and were therefore classified as overweight with overweight prevalence ranging from 8.0% in Khangai region to 13.6% in Central region (Table UF.6). The prevalence of overweight was highest among children under 2 years of age and children with high birth weight with prevalence of overweight also higher in boys (13.0%) compared to girls (10.4%).

Table UF.6: Weight-for-height status										
Percent distribution of weight-for-height of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Weight-for-height								Mean Z- score (SD) [d]	Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]			Percentage > +2 SD [c]				
	%	95% CI		%	95% CI		%	95% CI			
		Lower	Upper		Lower	Upper		Lower	Upper		
Total	1.3	0.8	2.0	0.4	0.2	0.9	11.7	10.1	13.4	0.78	2229
Child gender											
Female	1.4	0.7	2.8	0.3	0.1	1.3	10.4	8.3	12.9	0.72	1099
Male	1.1	0.6	2.0	0.5	0.2	1.3	13.0	10.7	15.6	0.86	1130
Child age											
0-5 months	1.6	0.7	3.9	0.4	0.1	2.8	18.7	12.9	26.5	0.94	199
6-11 months	2.3	0.9	5.8	0.9	0.2	4.4	18.4	13.7	24.2	0.89	299
12-23 months	0.9	0.3	2.5	0.1	0.0	0.4	15.9	12.5	20.0	0.99	590
24-35 months	1.1	0.4	3.4	0.7	0.2	3.4	6.0	4.0	9.0	0.73	454
36-59 months	1.1	0.4	3.0	0.1	0.0	0.7	5.7	3.9	8.3	0.53	687
Child birth weight											
Low birth weight	5.8	2.1	15.0	2.6	0.4	16.0	2.7	1.0	7.4	0.13	97
Normal birth weight	1.2	0.7	2.0	0.3	0.1	0.8	11.0	9.3	12.9	0.76	1847
High birth weight	0.2	0.0	1.7	0.2	0.0	1.7	19.9	14.6	26.6	1.18	264
Economic region											
Western	1.3	0.6	3.0	0.4	0.1	1.8	13.0	10.2	16.4	0.9	447
Khangai	1.3	0.6	2.8	0.4	0.1	1.8	8.0	5.9	10.9	0.72	448
Central	1.4	0.6	3.0	0.0	0.0	0.0	13.6	10.7	17.2	0.94	440
Eastern	0.4	0.1	1.8	0.2	0.0	1.6	9.4	7.0	12.4	0.92	449
Ulaanbaatar	1.3	0.6	3.0	0.4	0.1	1.8	12.4	9.6	15.8	0.71	445
Area											
Urban	1.5	0.8	2.6	0.4	0.1	1.3	12.2	10.1	14.7	0.74	1065
Rural	0.9	0.4	1.7	0.2	0.1	0.9	10.6	8.8	12.6	0.89	1164
Location											
Capital city	1.3	0.6	3.0	0.4	0.1	1.8	12.4	9.6	15.8	0.71	445
Aimag center	1.8	1.0	3.3	0.4	0.1	1.3	11.8	9.5	14.7	0.81	620
Soum center	0.7	0.3	1.7	0.3	0.1	1.3	11.3	9.3	13.7	0.92	865
Bagh/Rural	1.3	0.5	3.6	0.0	0.0	0.0	8.5	5.7	12.6	0.77	299
Wealth index quintile											
Poorest	1.1	0.5	2.4	0.4	0.1	1.5	11.6	8.7	15.2	0.8	597
Second	2.5	1.1	5.4	0.9	0.3	3.2	11.0	7.8	15.3	0.72	422
Third	1.2	0.4	3.4	0.0	0.0	0.0	12.1	8.7	16.5	0.77	467
Fourth	0.2	0.0	1.2	0.0	0.0	0.0	11.1	8.1	15.2	0.92	437
Wealthiest	1.4	0.5	4.2	0.5	0.1	3.7	12.5	8.8	17.4	0.71	306
Ethnicity of household head											
Khalkh	1.1	0.7	2.0	0.4	0.1	1.0	12.2	10.4	14.3	0.79	1723
Kazak	2.3	0.7	6.9	0.0	0.0	0.0	6.1	3.1	11.9	0.62	114
Other	1.8	0.6	4.9	0.5	0.1	2.1	9.8	6.9	13.6	0.76	392

Table UF.6: Weight-for-height status										
Percent distribution of weight-for-height of children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Weight-for-height									Unweighted Number
	Percentage < -2 SD [a]			Percentage < -3 SD [b]			Percentage > +2 SD [c]			Mean Z- score (SD) [d]	
	%	95% CI		%	95% CI		%	95% CI			
		Lower	Upper		Lower	Upper		Lower	Upper		
Maternal age											
< 20 years	-	-	-	-	-	-	-	-	-	-	16
20-29 years	1.5	0.8	2.8	0.3	0.1	0.9	12.8	10.3	15.7	0.81	850
30-39 years	1.3	0.6	2.8	0.6	0.2	2.1	11.7	9.3	14.7	0.77	888
40-49 years	1.5	0.2	9.8	0.0	0.0	0.0	10.1	5.5	17.9	0.68	169
Maternal nutrition status											
Underweight	1.3	0.3	5.8	0.0	0.0	0.0	1.3	0.3	5.8	0.21	59
Normal weight	1.8	0.9	3.3	0.6	0.2	2.0	11.1	8.8	13.9	0.71	926
Overweight	0.7	0.2	2.6	0.0	0.0	0.0	13.0	10.1	16.6	0.88	615
Obese	1.8	0.7	4.9	0.8	0.2	2.4	14.8	10.5	20.5	0.93	316
Maternal employment											
Not employed	2.1	1.2	3.7	0.8	0.3	2.1	13.9	11.1	17.3	0.8	766
Employed	0.9	0.4	2.0	0.2	0.0	0.6	10.2	8.3	12.5	0.75	1157
Maternal marital status											
Married	1.4	0.8	2.3	0.5	0.2	1.3	12.7	10.7	14.9	0.81	1577
Not married	1.3	0.3	5.1	0.1	0.0	0.8	9.5	5.6	15.5	0.66	212
Cohabitating	2.4	0.6	9.2	0.6	0.1	4.0	9.3	4.9	17.1	0.67	134
Maternal education											
No education	-	-	-	-	-	-	-	-	-	-	22
Primary	3.7	0.9	13.7	0.0	0.0	0.0	7.7	3.4	16.6	0.83	64
Secondary	1.6	0.8	3.2	0.6	0.2	1.8	11.5	9.1	14.5	0.75	841
Higher	1.2	0.6	2.5	0.3	0.1	1.5	12.4	10.1	15.2	0.79	996

a Children whose weight-for-height is more than 2 standard deviations below the median of the WHO Child Growth Standards reference population are classified as moderately or severely wasted.

b Children whose weight-for-height is more than 3 standard deviations below the median of the WHO Child Growth Standards reference population are classified as severely wasted.

c Children whose weight-for-height is more than 2 standard deviations above the median of the WHO Child Growth Standards reference population are classified as moderately or severely overweight.

d In standard deviation units (z-scores) from the median of the reference population.

(-) Based on fewer than 25 unweighted cases.

MICRONUTRIENT STATUS

Undernutrition comprises underweight, stunting, wasting, and deficiencies of essential vitamins and minerals known as micronutrients. Iron, vitamin A, and vitamin D are particularly important for children's growth and cognitive development as well as for a healthy immune system. In the NNS V, sampled children 0-59 months were tested for anaemia and children 6-59 months were tested for iron, vitamin A, and vitamin D status and the presence of inflammation. Table UF.7 presents summary results for these indicators.

Table UF.7: Micronutrient status				
Percent distribution of anaemia in children 0-59 months and iron, vitamin A, vitamin D, and inflammation status in children 6-59 months, Mongolia National Nutrition Survey, 2017				
Type of micronutrient deficiency	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Anaemia				
Any anaemia [a]	26.6	24.4	28.9	2198
Iron status				
Iron deficiency [b]	20.7	20.7	18.5	374
Iron sufficiency	79.3	79.3	76.8	1358
Iron overload	-	-	-	0
Iron deficiency by soluble transferrin receptor [c]	27.7	27.7	25.3	1732
Low iron stores [d]	22.6	22.6	20.3	1732
Iron deficiency anaemia [e]	10.9	10.9	9.3	1732
Vitamin A status [f]				
Vitamin A deficiency	9.5	9.5	7.9	179
Moderate Vitamin A deficiency	60.1	60.1	57.2	1031
Vitamin A sufficiency	30.4	30.4	27.8	522
Vitamin D status [g]				
Vitamin D deficiency	61.0	61.0	58.1	1047
Vitamin D insufficiency	28.9	28.9	26.3	509
Vitamin D sufficiency	10.1	10.1	8.4	154
Inflammation				
Any inflammation [h]	28.4	28.4	25.8	1732

a Haemoglobin < 110 g/l.
b Serum ferritin < 12 µg/l.
c sTfR > 8.3 mg/l.
d Body iron stores < 0 mg/kg.
e Haemoglobin < 110 g/l and ferritin < 12 µg/l.
f Serum retinol < 0.70 µmol/l (deficiency); ⩾ 0.7–1.05 µmol/l (insufficiency); > 1.05 µmol/l (sufficiency).
g Serum 25(OH)D < 20 ng/ml (deficiency); 20 to < 30 ng/ml (insufficiency); 30 to ⩽100 ng/ml (sufficiency).
h C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l.
(-) Based on fewer than 25 unweighted cases.

The overall prevalence of anaemia was 26.6%, with 15% mild, 10.8% moderate, and 0.8% severe anaemia (Table UF.8). A lower percentage (10.9%) of children had iron deficiency anaemia (Table UF.8), meaning they had both a low haemoglobin and a low serum ferritin concentration. Anaemia and iron deficiency anaemia were more prevalent in boys compared to girls and anaemia prevalence was highest in children under 2 years of age. Anaemia and iron deficiency anaemia were more prevalent among children in rural areas, in the poorest households, in ethnic minority groups, among children of anaemic mothers, and among children of unemployed mothers. Khangai and Western regions had the highest prevalence of both anaemia and iron deficiency anaemia.

Table UF.8: Overall prevalence of anaemia and severity of anaemia

Percent distribution of mild, moderate, and severe anaemia in children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Anaemia [a]			Mild anaemia [b]			Moderate anaemia [c]			Severe anaemia [d]		
		%	95%CI		%	95%CI		%	95%CI		%	95%CI	
			Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Total	2198	26.6	24.4	28.9	15.0	13.3	16.9	10.8	9.3	12.5	0.8	0.5	1.5
Child gender													
Female	1078	24.2	21.2	27.4	13.7	11.4	16.3	10.0	8.0	12.5	0.5	0.2	1.4
Male	1120	29.1	26.0	32.5	16.4	13.9	19.2	11.6	9.5	14.1	1.2	0.6	2.4
Child age													
0-5 months	161	43.1	34.2	52.5	26.3	19.0	35.2	13.9	8.5	22.0	2.9	0.7	10.8
6-11 months	301	43.8	37.1	50.7	25.5	20.0	32.0	16.8	12.3	22.5	1.4	0.5	4.4
12-23 months	594	36.5	31.9	41.2	19.3	15.9	23.3	16.0	12.8	19.8	1.2	0.5	2.7
24-35 months	456	17.9	14.1	22.5	9.1	6.4	12.7	8.6	6.0	12.3	0.2	0.0	1.4
36-59 months	686	10.5	8.0	13.6	6.7	4.8	9.3	3.6	2.2	5.9	0.1	0.0	0.7
Economic region													
Western	444	30.9	26.8	35.4	18.5	15.2	22.4	11.0	8.4	14.3	1.4	0.6	3.0
Khangai	447	37.8	33.4	42.4	20.1	16.7	24.1	16.7	13.6	20.5	0.9	0.3	2.4
Central	447	23.3	19.6	27.4	13.6	10.8	17.2	9.4	7.0	12.5	0.2	0.0	1.6
Eastern	442	15.8	12.7	19.5	11.3	8.7	14.6	4.5	2.9	6.9	0.0	0.0	0.0
Ulaanbaatar	418	23.7	19.9	28.0	12.9	10.0	16.5	9.8	7.3	13.1	1.0	0.4	2.5
Area													
Urban	1043	24.6	21.6	27.8	13.8	11.5	16.4	9.9	8.0	12.3	0.9	0.4	1.9
Rural	1155	30.6	27.8	33.5	17.3	15.1	19.8	12.5	10.6	14.8	0.7	0.3	1.5
Location													
Capital city	418	23.7	19.9	28.0	12.9	10.0	16.5	9.8	7.3	13.1	1.0	0.4	2.5
Aimag center	625	26.7	23.3	30.5	15.8	13.1	19.0	10.2	7.9	13.0	0.7	0.3	1.9
Soum center	859	26.9	23.8	30.2	16.0	13.6	18.9	10.2	8.2	12.6	0.7	0.3	1.6
Bagh/rural	296	40.7	34.8	46.8	20.9	16.4	26.3	18.9	14.4	24.2	0.9	0.2	3.5
Wealth index quintile													
Poorest	588	32.2	27.9	36.8	16.5	13.3	20.4	14.6	11.6	18.1	1.1	0.4	3.3
Second	416	31.1	25.9	36.8	18.0	14.0	23.0	12.0	8.6	16.4	1.1	0.3	3.4
Third	462	25.5	20.9	30.7	15.2	11.6	19.6	10.1	7.2	14.1	0.2	0.0	1.1
Fourth	435	22.5	18.1	27.6	11.3	8.4	15.1	9.9	6.8	14.2	1.2	0.4	3.4
Wealthiest	297	21.7	16.8	27.7	13.8	9.9	19.0	7.3	4.6	11.6	0.6	0.1	3.9
Maternal age													
< 20 years	14	43.8	17.3	74.5	6.2	1.3	25.5	37.6	13.3	70.3	0.0	0.0	0.0
20-29 years	833	31.2	27.5	35.2	16.0	13.3	19.2	13.6	10.9	16.8	1.6	0.7	3.4
30-39 years	881	24.2	20.9	27.7	14.5	11.9	17.6	9.2	7.2	11.6	0.4	0.2	1.0
40-49 years	168	25.2	18.0	34.1	17.0	11.1	25.3	7.7	4.0	14.4	0.4	0.1	2.9
Ethnicity of household head													
Khalkh	1693	26.1	23.6	28.7	15.0	13.1	17.2	10.3	8.6	12.2	0.8	0.4	1.5
Kazak	114	37.5	28.5	47.6	21.5	14.3	30.9	14.5	9.3	22.0	1.5	0.4	5.9
Others	391	26.7	21.6	32.6	12.9	9.5	17.3	13.0	9.2	18.1	0.8	0.1	5.5
Maternal education													
No education	22	38.4	17.4	64.9	19.9	4.5	56.7	18.5	6.8	41.4	0.0	0.0	0.0

Table UF.8: Overall prevalence of anaemia and severity of anaemia

Percent distribution of mild, moderate, and severe anaemia in children 0-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Anaemia [a]			Mild anaemia [b]			Moderate anaemia [c]			Severe anaemia [d]		
		%	95%CI		%	95%CI		%	95%CI		%	95%CI	
			Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Primary	63	32.2	21.1	45.7	16.4	8.9	28.2	14.0	7.2	25.4	1.9	0.3	12.1
Secondary	832	33.6	29.7	37.7	17.3	14.4	20.6	15.5	12.6	18.9	0.8	0.3	2.4
Higher	979	22.3	19.3	25.5	13.6	11.3	16.4	7.6	5.9	9.8	1.0	0.4	2.1
Maternal employment													
Unemployed	747	31.5	27.6	35.7	17.2	14.2	20.8	12.9	10.3	16.0	1.4	0.6	3.1
Employed	1149	24.1	21.3	27.1	13.7	11.6	16.1	9.9	8.0	12.2	0.5	0.2	1.1
Maternal marital status													
Married	1559	27.4	24.8	30.1	15.3	13.2	17.5	11.1	9.3	13.1	1.0	0.5	1.9
Not married	209	26.4	20.0	34.1	15.5	10.7	22.1	10.9	6.8	17.1	0.0	0.0	0.0
Cohabitating	128	31.0	22.1	41.6	15.5	9.4	24.6	13.7	7.9	22.9	1.8	0.3	11.5
Maternal anaemia													
No anaemia	737	26.9	23.3	30.9	16.5	13.6	19.9	9.2	7.0	11.9	1.3	0.5	3.1
Anaemic	140	39.6	30.1	49.9	16.1	9.8	25.4	22.5	14.9	32.4	1.0	1.0	3.9

a Haemoglobin < 110 g/l.
b Haemoglobin 100-109 g/l.
c Haemoglobin 70-99 g/l.
d Haemoglobin < 70 g/l.

Table UF.9: Prevalence of anaemia and iron deficiency anaemia

Percent distribution of anaemia in children 0-59 months and iron deficiency anaemia in children 6-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Anaemia [a]				Iron deficiency anaemia [b]			
	Unweighted Number	%	95% CI		Unweighted Number	%	95% CI	
			Lower	Upper			Lower	Upper
Total	**2198**	**26.6**	**24.4**	**28.9**	**1732**	**10.9**	**9.3**	**12.8**
Child gender								
Female	1078	24.2	21.2	27.4	848	9.2	7.1	11.8
Male	1120	29.1	26.0	32.5	884	12.8	10.3	15.7
Child age								
0-5 months	161	43.1	34.2	52.5	-	-	-	-
6-11 months	301	43.8	37.1	50.7	210	21.5	15.5	29.0
12-23 months	594	36.5	31.9	41.2	495	19.2	15.5	23.5
24-35 months	456	17.9	14.1	22.5	406	7.9	5.3	11.5
36-59 months	686	10.5	8.0	13.6	621	1.8	0.8	3.7
Maternal age								
< 20 years	14	-	-	-	12	-	-	-
20-29 years	833	31.2	27.5	35.2	629	25.1	21.1	29.6
30-39 years	881	24.2	20.9	27.7	675	19.6	16.2	23.5
40-49 years	168	25.2	18.0	34.1	149	19.3	12.9	28.0
Economic region								
Western	444	30.9	26.8	35.4	372	12.6	9.6	16.4

Table UF.9: Prevalence of anaemia and iron deficiency anaemia

Percent distribution of anaemia in children 0-59 months and iron deficiency anaemia in children 6-59 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Anaemia [a]				Iron deficiency anaemia [b]			
	Unweighted Number	%	95% CI		Unweighted Number	%	95% CI	
			Lower	Upper			Lower	Upper
Khangai	447	37.8	33.4	42.4	339	17.1	13.5	21.5
Central	447	23.3	19.6	27.4	328	9.1	6.5	12.8
Eastern	442	15.8	12.7	19.5	369	9.2	6.7	12.6
Ulaanbaatar	418	23.7	19.9	28.0	324	9.0	6.3	12.6
Area								
Urban	1043	24.6	21.6	27.8	806	10.0	7.9	12.7
Rural	1155	30.6	27.8	33.5	926	12.7	10.6	15.3
Location								
Capital city	418	23.7	19.9	28.0	324	9.0	6.3	12.6
Aimag center	625	26.7	23.3	30.5	482	12.6	9.8	16.0
Soum center	859	26.9	23.8	30.2	703	10.2	8.1	12.9
Bagh/Rural	296	40.7	34.8	46.8	223	20.4	15.2	26.9
Wealth index quintile								
Poorest	588	32.2	27.9	36.8	481	17.1	13.3	21.6
Second	416	31.1	25.9	36.8	329	12.6	8.9	17.7
Third	462	25.5	20.9	30.7	359	9.2	6.2	13.5
Fourth	435	22.5	18.1	27.6	333	6.9	4.4	10.7
Wealthiest	297	21.7	16.8	27.7	230	8.7	5.3	13.9
Ethnicity of household head								
Khalkh	1693	26.1	23.6	28.7	1321	10.2	8.4	12.4
Kazak	114	37.5	28.5	47.6	89	23.1	14.7	34.2
Other	391	26.7	21.6	32.6	322	11.6	7.9	16.7
Maternal employment								
Not Employed	747	31.5	27.6	35.7	561	26.0	21.8	30.6
Employed	1149	24.1	21.3	27.1	904	18.7	15.8	21.9
Maternal marital status								
Married	1559	27.4	24.8	30.1	1217	21.4	18.7	24.3
Not Married	209	26.4	20.0	34.1	146	21.2	14.3	30.3
Cohabitating	128	31.0	22.1	41.6	102	28.7	19.4	40.3
Maternal education								
No education	22	-	-	-	17	-	-	-
Primary	63	32.2	21.1	45.7	52	31.5	19.5	46.6
Secondary	832	33.6	29.7	37.7	651	28.0	23.9	32.5
Higher	979	22.3	19.3	25.5	745	16.5	13.6	20.0
Maternal anaemia								
No anaemia	737	26.9	23.3	30.9	567	11.9	9.1	15.5
Anaemic	140	39.6	30.1	49.9	107	13.8	7.8	23.3

a Haemoglobin < 110 g/l.
b Haemoglobin < 110 g/l and ferritin < 12 µg/l.
(-) Based on fewer than 25 unweighted cases.

Iron deficiency is the most common nutrition deficiency worldwide[34] and negatively impacts growth, immunity, and cognitive performance of children. The prevalence of iron deficiency in Mongolian children 6-59 months of age was 20.7% and 27.7% as measured by serum ferritin and soluble transferrin receptor (sTfR), respectively (Table UF.10). Measured by both serum ferritin and soluble transferrin receptor, children 6-11 months of age (31.9%, 46.9%) and 12-23 months of age (32.1%, 41.9%) had higher prevalence of iron deficiency and boys (23.4%, 31.4%) had higher prevalence than girls (18.1%, 24.3%). The higher prevalence of iron deficiency as measured by sTfR was expected since sTfR is widely held as a more sensitive indicator of iron status, especially in cases of inflammation and infection, though serum ferritin is a more common and accepted measure of iron status[35]. Iron deficiency was more common among children in rural households (23.3%, 32.9%) versus urban households (19.4%, 25.1%), poorest households (25.0%, 33.6%) versus wealthier households (18.2%-21.2%, 23.9%-29.7%), and among children of mothers who were not employed (26.0%, 32.3%) versus employed (18.7%, 26.6%). Iron deficiency was highest in Western (25.5%, 32.8%), Khangai (24.5%, 34.5%) and Central (17.4%, 30.5%) regions and the prevalence was almost double in the Kazak ethnic minority population (41.5%, 49.9%) compared to the Khalkh population (19.5%, 26.5%).

Table UF.10. Iron deficiency							
Percent distribution of iron deficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017							
Characteristics	Unweighted Count	By ferritin level			By soluble transferrin receptor		
		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper
Total	1732	20.7%	18.5%	23.2%	27.7	25.3	30.4
Child gender							
Girls	848	18.1	15.2	21.5	24.3	21.0	27.9
Boys	884	23.4	20.2	27.1	31.4	27.8	35.3
Child age							
6-11 months	210	31.9	24.8	40.0	46.9	38.8	55.1
12-23 months	495	32.1	27.4	37.3	41.9	36.8	47.3
24-35 months	406	19.5	15.3	24.6	22.6	18.0	27.9
36-59 months	621	7.4	5.1	10.6	11.5	8.8	14.9
Maternal age							
≤ 19	12	16.2	4.7	43.1	24.7	8.4	54.0
20-29	629	25.1	21.1	29.6	32.3	28.0	37.1
30-39	675	19.6	16.2	23.5	25.8	22.1	29.9
40-49	149	19.3	12.9	28.0	31.2	23.0	40.8
Economic region							
Western	372	25.5	21.4	30.2	32.8	28.2	37.7
Khangai	339	24.5	20.2	29.3	34.5	29.6	39.7
Central	328	17.4	13.7	21.9	30.5	25.8	35.7
Eastern	369	21.1	17.3	25.6	25.7	21.5	30.5
Ulaanbaatar	324	18.8	14.9	23.5	23.1	18.9	28.1
Area							
Urban	806	19.4	16.4	22.8	25.1	21.8	28.8
Rural	926	23.3	20.5	26.3	32.9	29.7	36.2
Location							
Capital city	324	18.8	14.9	23.5	23.1	18.9	28.1
Aimag center	482	20.9	17.4	24.9	29.9	25.9	34.4

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34   WHO Micronutrient Deficiencies webpage: http://www.who.int/nutrition/topics/ida/en.

35   Choi JW. Sensitivity, specificity, and predictive value of serum soluble transferrin receptor at different stages of iron deficiency. Ann Clin Lab Sci 2005;35(4):435-9.

Table UF.10. Iron deficiency							
Percent distribution of iron deficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017							
Characteristics	Unweighted Count	By ferritin level			By soluble transferrin receptor		
		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper
Soum center	703	21.6	18.6	25.0	30.9	27.4	34.6
Bagh/Rural	223	28.2	22.2	35.0	38.8	32.1	45.9
Wealth index quintile							
Poorest	481	25.0	20.6	29.9	33.6	28.8	38.9
Second	329	20.7	16.0	26.4	29.7	24.1	35.9
Third	359	21.2	16.5	26.9	27.3	22.1	33.2
Fourth	333	18.3	13.7	24.0	23.9	18.7	30.0
Wealthiest	230	18.2	13.0	24.8	23.9	18.2	30.7
Sex of household head							
Male	1628	20.6	18.3	23.2	28.4	25.8	31.2
Female	104	21.7	13.7	32.8	19.1	11.7	29.7
Ethnicity of household head							
Khalkh	1321	19.5	17.0	22.2	26.5	23.7	29.5
Kazak	89	41.5	30.8	53.1	49.9	38.3	61.5
Other	322	22.0	16.9	28.2	28.5	22.8	35.0
Maternal employment							
Not employed	561	26.0	21.8	30.6	32.3	27.8	37.1
Employed	904	18.7	15.8	21.9	26.6	23.3	30.3
Maternal marital status							
Married	1217	21.4	18.7	24.3	28.4	25.5	31.5
Not married	146	21.2	14.3	30.3	34.1	25.5	43.9
Cohabitating	102	28.7	19.4	40.3	27.9	18.7	39.5
Maternal education level							
None	17	22.6	7.6	50.9	31.9	13.6	58.1
Primary	52	31.5	19.5	46.6	31.6	19.6	46.6
Secondary	651	28.0	23.9	32.5	33.9	29.6	38.6
Higher	745	16.5	13.6	20.0	25.1	21.6	29.1

The percentage of children 6-59 months with low body iron stores was 22.6% (Table UF.11). Children 6-11 and 12-23 months of age had higher prevalence of low body iron stores and boys had higher prevalence than girls. Low body iron stores were more prevalent among children in rural households, poorest households, and among children of mothers who were not employed. Low body iron stores were highest in Western, Khangai and Eastern regions and the prevalence was more than double in the Kazak ethnic minority population compared to the Khalkh population.

Table UF.11: Low body iron stores *				
Percent distribution of low body iron stores in children 6-59 months by selected characteristics, National Nutrition Survey, 2017				
Characteristics	Unweighted Count	%	95% CI	
			Lower	Upper
Total	**1732**	**22.6**	**20.3**	**25.0**
Child gender				
Girls	848	19.3	16.3	22.7
Boys	884	26.0	22.6	29.7

Table UF.11: Low body iron stores *				
Percent distribution of low body iron stores in children 6-59 months by selected characteristics, National Nutrition Survey, 2017				
Characteristics	Unweighted Count	%	95% CI	
			Lower	Upper
Age groups				
6-11 months	210	36.7	29.3	44.9
12-23 months	495	35.4	30.6	40.7
24-35 months	406	19.6	15.3	24.7
36-59 months	621	8.0	5.7	11.2
Maternal age in years				
≤ 19	12	24.7	8.4	54.0
20-29	629	25.9	21.9	30.4
30-39	675	23.2	19.5	27.2
40-49	149	21.6	14.8	30.3
Region				
Western	372	30.4	25.9	35.2
Khangai	339	26.0	21.6	30.9
Central	328	19.8	15.9	24.5
Eastern	369	24.7	20.5	29.3
Ulaanbaatar	324	19.4	15.5	24.1
Area				
Urban	806	20.5	17.4	24.0
Rural	926	26.6	23.7	29.7
Location				
Capital city	324	19.4	15.5	24.1
Aimag center	482	23.1	19.4	27.2
Soum center	703	24.8	21.6	28.3
Bagh/Rural	223	31.9	25.7	38.9
Wealth index quintile				
Poorest	481	28.0	23.5	33.1
Second	329	23.2	18.3	29.0
Third	359	22.4	17.5	28.1
Fourth	333	17.9	13.4	23.5
Wealthiest	230	21.1	15.6	27.9
Sex of household head				
Male	1628	22.7	20.4	25.3
Female	104	20.4	12.5	31.5
Ethnicity of household head				
Khalkh	1321	20.5	18.0	23.3
Kazak	89	43.7	33.0	55.2
Other	322	28.3	22.4	35.0
Maternal employment status				
Employed	561	27.2	23.0	31.9
Not Employed	904	21.8	18.7	25.2
Maternal marital status				
Married	1217	23.6	20.9	26.6
Not Married	146	25.5	18.0	34.8
Cohabitating	102	28.1	18.7	40.0

Table UF.11: Low body iron stores *				
Percent distribution of low body iron stores in children 6-59 months by selected characteristics, National Nutrition Survey, 2017				
Characteristics	Unweighted Count	%	95% CI	
			Lower	Upper
Maternal education Level				
None	17	28.9	11.5	56.0
Primary	52	31.2	19.3	46.2
Secondary	651	29.4	25.3	34.0
Higher	745	19.6	16.4	23.3

The percentage of children with vitamin A deficiency was moderate at 9.5% and prevalence of vitamin A insufficiency was 60.1% (Table UF.12). Low vitamin A levels were common in all child age groups, though prevalence of vitamin A deficiency was higher in children 6-11 months of age (17.7%) and 12-23 months of age (13.9%). Vitamin A insufficiency prevalence was high in all regions and across all household wealth index quintiles.

Table UF.12. Vitamin A status										
Percent distribution of vitamin A deficiency, vitamin A insufficiency, and vitamin A sufficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017										
Characteristics	Unweighted count	Vitamin A deficiency			Vitamin A insufficiency			Vitamin A sufficiency		
		%	95% CI		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper		Lower	Upper
Total	1732	9.5	7.9	11.3	60.1	57.2	63.0	30.4	27.8	33.2
Child gender										
Girls	848	9.1	6.9	11.7	59.9	55.8	63.9	31.0	27.3	35.0
Boys	884	9.9	7.8	12.5	60.3	56.2	64.3	29.8	26.1	33.7
Age groups										
6-11 months	210	17.7	12.4	24.6	59.0	50.6	66.9	23.3	16.8	31.4
12-23 months	495	13.9	10.6	17.9	58.1	52.6	63.4	28.0	23.3	33.2
24-35 months	406	4.7	2.9	7.6	61.4	55.4	67.0	33.9	28.4	39.8
36-59 months	621	5.6	3.7	8.4	61.5	56.6	66.1	32.9	28.5	37.7
Maternal age in years										
≤ 19	12	6.2	0.8	35.2	47.6	17.4	79.7	46.2	16.5	78.8
20-29	629	9.7	7.3	12.8	61.4	56.6	66.0	28.9	24.7	33.6
30-39	675	10.5	7.9	13.7	60.8	56.2	65.3	28.7	24.7	33.1
40-49	149	5.0	2.2	11.0	55.4	45.3	65.1	39.6	30.1	49.9
Region										
Western	372	10.5	7.8	14.0	59.1	54.1	64.0	30.4	25.9	35.2
Khangai	339	8.6	6.0	12.0	56.6	51.3	61.8	34.8	29.9	40.0
Central	328	11.9	8.8	15.9	60.1	54.7	65.3	28.0	23.4	33.1
Eastern	369	12.2	9.2	15.9	60.2	55.1	65.0	27.6	23.3	32.4
Ulaanbaatar	324	8.3	5.8	11.9	61.7	56.3	66.9	29.9	25.2	35.2
Area										
Urban	806	9.3	7.3	11.9	61.9	57.9	65.8	28.7	25.2	32.6
Rural	926	9.7	7.9	11.9	56.6	53.2	60.0	33.7	30.5	37.0

Table UF.12. Vitamin A status

Percent distribution of vitamin A deficiency, vitamin A insufficiency, and vitamin A sufficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017

Characteristics	Unweighted count	Vitamin A deficiency			Vitamin A insufficiency			Vitamin A sufficiency		
		%	95% CI		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper		Lower	Upper
Location										
Capital city	324	8.3	5.8	11.9	61.7	56.3	66.9	29.9	25.2	35.2
Aimag center	482	11.8	9.1	15.1	62.4	57.8	66.8	25.8	21.9	30.1
Soum center	703	10.5	8.3	13.1	57.5	53.6	61.3	32.0	28.5	35.8
Bagh/Rural	223	7.5	4.6	12.0	54.0	46.9	60.9	38.5	31.9	45.6
Wealth index quintile										
Poorest	481	9.2	6.6	12.6	55.4	50.1	60.6	35.4	30.6	40.6
Second	329	10.5	7.2	15.2	59.8	53.1	66.2	29.6	23.8	36.2
Third	359	9.8	6.7	14.1	63.4	57.1	69.3	26.8	21.6	32.7
Fourth	333	8.8	5.6	13.6	57.4	50.6	64.0	33.8	27.6	40.5
Wealthiest	230	9.0	5.7	14.0	64.6	57.1	71.5	26.3	20.1	33.6
Sex of household head										
Male	1628	9.7	8.1%	11.7	60.7	57.7	63.6	29.6	26.9	32.4
Female	104	6.0	3.1%	11.2	53.1	41.2	64.6	40.9	29.7	53.1
Ethnicity of household head										
Khalkh	1321	9.4	7.7	11.5	59.5	56.2	62.7	31.1	28.1	34.2
Kazak	89	8.7	4.5	16.2	67.9	56.4	77.6	23.3	14.9	34.6
Other	322	9.9	6.9	14.0	61.5	54.7	67.9	28.6	22.9	35.1
Maternal employment										
Not Employed	561	10.1	7.5	13.5	64.8	59.8	69.5	25.1	21.0	29.8
Employed	904	9.1	7.1	11.7	56.8	52.8	60.8	34.1	30.3	38.0
Maternal marital status										
Married	1217	10.2	8.3	12.5	60.5	57.0	63.9	29.3	26.2	32.6
Not Married	146	5.4	2.6	11.0	58.9	49.1	68.0	35.7	27.0	45.5
Cohabitating	102	10.2	5.1	19.4	61.9	49.9	72.6	27.9	18.5	39.8
Maternal education Level										
None	17	0.0	0.0	0.0	45.5	23.6	69.3	54.5	30.7	76.4
Primary	52	3.9	1.0	14.5	75.9	62.1	85.9	20.2	11.3	33.4
Secondary	651	12.1	9.2	15.7	57.9	53.0	62.6	30.0	25.8	34.6
Higher	745	7.9	5.9	10.3	61.9	57.5	66.1	30.2	26.3	34.5

The percentage of children with inadequate vitamin D status (25(OH)D ≤ 29 ng/ml) was high with 89.9% having either deficient (61.0%) or insufficient levels (28.9%) (Table UF.13). Low vitamin D status was prevalent across all child age groups, all regions, ethnic communities, and household wealth index quintiles. Prevalence of vitamin D sufficiency was higher in children under 2 years of age, children in Central region (11.1%) and Ulaanbaatar (11.5%), urban areas (11.6%), and capital city (11.5%) and aimag center (11.9%) locations. Children of unemployed mothers had higher prevalence of vitamin D sufficiency (13.2%) compared to children of employed mothers (8.3%) and children of mothers with secondary (10.6%) or higher (10.6%) education had higher prevalence of vitamin D sufficiency than children of mothers with only primary level education (5.7%).

Table UF.13. Vitamin D status														
Percent distribution of vitamin D deficiency, vitamin D insufficiency, and vitamin D sufficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017														
Characteristics	Un-weighted count	Vitamin D deficiency			Vitamin D insufficiency			Vitamin D sufficiency			Vitamin D toxcity		
		%	95% CI		%	95% CI		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Total	1711	61.0	58.1	63.8	28.9	26.3	31.6	10.1	8.4	12.1	0.0	0.0	0.3
Child gender														
Girls	839	61.9	57.7	65.9	28.9	25.2	32.8	9.1	7.0	11.9	0.1	0.0	0.6
Boys	872	60.1	55.9	64.1	28.9	25.3	32.7	11.1	8.6	14.2	0.0	0.0	0.0
Age groups														
6-11 months	206	57.9	49.5	65.9	21.7	15.7	29.3	20.0	14.1	27.6	0.3	0.0	2.3
12-23 months	487	59.1	53.6	64.5	29.1	24.4	34.4	11.7	8.5	15.9	0.0	0.0	0.0
24-35 months	401	63.1	57.0	68.8	31.3	25.9	37.2	5.6	3.2	9.7	0.0	0.0	0.0
36-59 months	617	62.3	57.5	67.0	30.0	25.7	34.6	7.7	5.4	10.8	0.0	0.0	0.0
Maternal age in years														
≤ 19	12	55.5	22.2	84.5	9.2	2.8	26.3	35.4	9.8	73.4	0.0	0.0	0.0
20-29	620	59.9	55.0	64.6	28.7	24.5	33.4	11.4	8.5	15.1	0.0	0.0	0.0
30-39	668	61.2	56.5	65.6	29.5	25.5	33.9	9.2	6.7	12.4	0.1	0.0	0.8
40-49	148	65.6	55.9	74.1	24.2	17.3	32.9	10.2	5.4	18.4	0.0	0.0	0.0
Region														
Western	370	52.2	47.1	57.2	38.6	33.8	43.7	9.2	6.6	12.6	0.0	0.0	0.0
Khangai	330	60.6	55.2	65.7	31.5	26.7	36.7	7.9	5.4	11.3	0.0	0.0	0.0
Central	323	67.8	62.5	72.7	20.7	16.6	25.5	11.1	8.1	15.1	0.3	0.0	2.2
Eastern	366	65.0	60.0	69.7	29.2	24.8	34.1	5.7	3.8	8.6	0.0	0.0	0.0
Ulaanbaatar	322	61.2	55.7	66.4	27.3	22.7	32.5	11.5	8.4	15.5	0.0	0.0	0.0
Area														
Urban	799	60.1	56.0	64.0	28.2	24.7	32.0	11.6	9.2	14.5	0.1	0.0	0.5
Rural	912	62.8	59.4	66.0	30.1	27.1	33.4	7.1	5.6	9.1	0.0	0.0	0.0
Location														
Capital city	322	61.2	55.7	66.4	27.3	22.7	32.5	11.5	8.4	15.5	0.0	0.0	0.0
Aimag center	477	57.5	52.8	62.0	30.4	26.3	34.9	11.9	9.1	15.3	0.2	0.0	1.6
Soum center	695	63.3	59.4	66.9	29.5	26.1	33.2	7.2	5.5	9.5	0.0	0.0	0.0
Bagh/Rural	217	61.2	54.1	67.9	32.0	25.8	39.0	6.8	3.9	11.4	0.0	0.0	0.0
Wealth index quintile														
Poorest	472	63.1	57.8	68.1	30.0	25.5	35.0	6.9	4.5	10.6	0.0	0.0	0.0
Second	325	53.3	46.6	60.0	36.3	30.1	43.0	10.2	6.6	15.2	0.2	0.0	1.6
Third	358	57.9	51.4	64.1	32.4	26.6	38.7	9.8	6.6	14.3	0.0	0.0	0.0
Fourth	328	65.4	58.6	71.5	22.4	17.3	28.4	12.3	8.2	17.9	0.0	0.0	0.0
Wealthiest	228	65.6	58.0	72.4	22.9	17.0	30.1	11.5	7.6	17.0	0.0	0.0	0.0
Sex of household head														
Male	1607	61.4	58.4	64.3	28.5	25.9	31.3	10.0	8.3	12.1	0.0	0.0	0.3
Female	104	55.8	43.8	67.2	33.0	22.7	45.3	11.1	5.4	21.6	0.0	0.0	0.0
Ethnicity of household head														
Khalkh	1303	62.4	59.0	65.6	27.5	24.6	30.7	10.0	8.1	12.3	0.1	0.0	0.4
Kazak	88	56.8	45.3	67.6	35.3	25.7	46.4	7.9	3.9	15.1	0.0	0.0	0.0
Other	320	54.5	47.5	61.3	34.5	28.3	41.2	11.1	7.3	16.4	0.0	0.0	0.0

Table UF.13. Vitamin D status

Percent distribution of vitamin D deficiency, vitamin D insufficiency, and vitamin D sufficiency in children 6-59 months by selected characteristics, National Nutrition Survey, 2017

Characteristics	Un-weighted count	Vitamin D deficiency			Vitamin D insufficiency			Vitamin D sufficiency			Vitamin D toxcity		
		%	95% CI		%	95% CI		%	95% CI		%	95% CI	
			Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Maternal employment													
Not Employed	555	60.1	54.9	65.0	26.6	22.3	31.3	13.2	10.0	17.3	0.1	0.0	0.8
Employed	893	61.7	57.8	65.5	30.0	26.5	33.7	8.3	6.3	10.8	0.0	0.0	0.0
Maternal marital status													
Married	1202	60.0	56.5	63.4	29.6	26.5	32.8	10.4	8.3	12.9	0.1	0.0	0.5
Not Married	144	68.1	58.4	76.4	21.3	14.5	30.3	10.6	5.9	18.4	0.0	0.0	0.0
Cohabitating	102	58.7	46.6	69.7	29.7	20.1	41.5	11.7	5.9	21.9	0.0	0.0	0.0
Maternal education Level													
None	17	47.4	25.0	70.9	37.3	17.9	61.9	15.3	3.9	44.4	0.0	0.0	0.0
Primary	52	68.2	53.5	80.0	26.1	15.7	40.2	5.7	1.7	17.4	0.0	0.0	0.0
Secondary	643	61.2	56.4	65.8	28.2	24.2	32.6	10.6	7.8	14.2	0.0	0.0	0.0
Higher	736	60.7	56.2	64.9	28.6	24.8	32.8	10.6	8.1	13.8	0.1	0.0	0.7

Inflammation occurs when the immune system mounts a response to protect the body from disease-causing pathogens. 28% of children 6-59 months of age had some level of inflammation, with a higher prevalence in children 12-23 months (35%) compared to children 24-35 months (30%) and children 36-59 months (23%) (Table UF.14). Higher prevalence of inflammation was found in children in urban areas (30%) compared to rural areas (25%) and poorer households. The prevalence of inflammation in children was much lower in Eastern region (18%) compared to other regions (26% to 31%).

Table UF14. Inflammation status

Percent distribution of inflammation in children 6-59 months by selected characteristics, National Nutrition Survey, 2017

Characteristics	Unweighted count	%	95% CI	
			Lower	Upper
Total	**1732**	**28.4**	**25.8**	**31.2**
Child gender				
Girls	848	28.2	24.6	32.2
Boys	884	28.6	25.0	32.5
Age groups				
≤ 23 months	495	34.5	29.5	39.8
24-35 months	406	30.0	24.7	35.8
36-59 months	621	23.2	19.1	27.9
Maternal age in years				
≤ 19	12	59.2	26.0	85.7
20-29	629	33.9	29.4	38.8
30-39	675	26.9	22.9	31.3
40-49	149	16.6	10.0	26.3
Region				
Western	372	26.3	22.1	31.1
Khangai	339	27.7	23.2	32.7
Central	328	29.3	24.6	34.4
Eastern	369	18.2	14.5	22.4
Ulaanbaatar	324	30.6	25.8	35.8

Table UF14. Inflammation status				
Percent distribution of inflammation in children 6-59 months by selected characteristics, National Nutrition Survey, 2017				
Characteristics	Unweighted count	%	95% CI	
			Lower	Upper
Area				
Urban	806	30.3	26.7	34.2
Rural	926	24.7	21.8	27.8
Location				
Capital city	324	30.6	25.8	35.8
Aimag center	482	29.8	25.7	34.2
Soum center	703	25.0	21.8	28.6
Bagh/Rural	223	23.7	18.2	30.2
Wealth index quintile				
Poorest	481	31.2	26.3	36.6
Second	329	33.2	27.0	40.0
Third	359	27.3	21.9	33.4
Fourth	333	23.5	18.2	29.8
Wealthiest	230	26.7	20.7	33.8
Sex of household head				
Male	1628	28.2	25.5	31.0
Female	104	31.4	21.5	43.4
Ethnicity of household head				
Khalkh	1321	28.9	26.0	32.1
Kazak	89	18.5	11.8	27.7
Other	322	28.2	22.3	35.1
Maternal employment				
Not Employed	561	30.3	25.7	35.3
Employed	904	28.4	24.8	32.2
Maternal marital status				
Married	1217	27.2	24.2	30.5
Not Married	146	34.3	25.6	44.2
Cohabitating	102	40.3	29.2	52.5
Maternal education Level				
None	17	24.5	9.1	51.3
Primary	52	39.2	24.4	56.2
Secondary	651	32.1	27.5	37.0
Higher	745	26.5	22.8	30.5

MULTIPLE MICRONUTRIENT POWDER SUPPLEMENTATION

Provision of multiple micronutrient powders (MMPs) to young children was previously a national programme in Mongolia, though coverage has diminished due to a lack of funding in recent years with MMPs provided in 2016 as part of emergency response services. The percentage of children 6-59 months of age who consumed MMPs during the year before the survey was 15.4% (Table UF.15). There was very little difference in MMP consumption between boys (15.6%) and girls (15.2%), though there was substantially higher use for children 12-23 months of age. MMP consumption was higher in rural areas (17.8%) compared to urban areas (14.2%) and was much higher in Khangai region (28.7%) than in the other regions (7.1% to 15.4%). MMPs were more commonly used in the poorest households (24.8%) and in children with low birth weight (21.3%). The mean number of MMP sachets consumed during the previous 6 months by children who received MMPs was 41.3; less than the desired 60 MMP sachets per 6-month period (Table UF.15).

Table UF.15: Receipt and consumption of Multiple Micronutrient Powder (MMP) sachets				
Percent of children 6-59 months who received Multiple Micronutrient Powder sachets during the last year and mean number of MMP sachets consumed by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Unweighted Number	Mean	Unweighted Number
Total	15.4	2251	41.3	309
Child gender				
Female	15.2	1107	37.7	147
Male	15.6	1134	45.0	162
Child age				
0-5 months	1.4	199	53.1	2
6-11 months	14.7	304	32.8	40
12-23 months	29.9	599	42.0	157
24-35 months	13.9	457	43.4	61
36-59 months	8.1	692	44.1	49
Area				
Urban	14.2	1080	37.8	137
Rural	17.8	1171	46.9	172
Economic region				
Western	7.1	449	34.2	32
Khangai	28.7	450	50.6	129
Central	10.8	453	40.5	49
Eastern	7.1	450	37.2	32
Ulaanbaatar	15.4	449	36.3	67
Location				
Capital city	15.4	449	36.3	67
Aimag center	11.3	631	43.1	70
Soum center	15.9	872	45.1	117
Bagh/rural	23.2	299	50.2	55
Ethnicity of household head				
Khalkh	16.3	1740	40.5	260
Kazak	3.6	114	37.7	2
Other	13.4	397	47.8	47
Wealth index quintile				
Poorest	24.8	595	43.0	116
Second	14.7	425	37.8	55
Third	15.6	469	43.8	66
Fourth	14.0	441	38.9	52
Wealthiest	8.0	311	41.9	20
Maternal age				
< 20 years	-	16	27.9	3
20-29 years	15.0	858	37.8	114
30-39 years	14.3	900	49.5	110
40-49 years	16.8	170	35.9	26
Maternal education				
No education	-	22	0	0
Primary	21.3	64	44.1	10
Secondary	18.0	850	41.5	131
Higher	12.3	1008	43.9	112

Table UF.15: Receipt and consumption of Multiple Micronutrient Powder (MMP) sachets				
Percent of children 6-59 months who received Multiple Micronutrient Powder sachets during the last year and mean number of MMP sachets consumed by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Unweighted Number	Mean	Unweighted Number
Maternal employment				
Not employed	16.2	774	39.37	107
Employed	13.6	1170	46.04	146
Maternal marital status				
Married	15.3	1594	43.80	205
Not married	15.0	216	37.03	29
Cohabitating	10.6	134	40.90	19
Child birth weight				
Low birth weight	21.3	97	35.8	17
Normal weight	14.9	1865	40.1	249
High birth weight	17.8	268	50.0	43

(-) Based on fewer than 25 unweighted cases

For children who received MMPs, the most commonly used method of providing them to the child was by adding to a cooled meal into the child's cup (91.1%) with Bantan (meat porridge) being the most common food to which it was added (78.2%) (Table UF.16). The main source of information mothers and caretakers received about MMPs was from the *Soum* family doctor (89.2%). Almost half of mothers (46.4%) reported no positive effects from giving the child MMPs, although some mothers reported improved physical growth (15.0%) and increased appetite (16.6%) (Table UF.16). While almost 50% of mothers (46.4%) reported no positive effects from MMP's, more than 70% of mothers (71.9%) reported no negative effects associated with using MMPs and 70.2% of mothers said they will continue providing MMPs to their children.

Table UF.16: Multiple Micronutrient Powder utilization and effects		
Percent distribution of Multiple Micronutrient Powder utilization practices and effects in children 6-59 months, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	100.0	311
To what kind of food did you usually add MMP?		
Porridge with milk	1.8	6
Flour gruel	2.4	8
Yogurt	0.4	2
Bantan	78.2	235
Vegetable or fruit juice	0.2	1
Family food	16.1	57
Other	0.9	2
When did you usually add MMP into child's meal?		
During the cooking into the pot	0.9	2
Just cooked hot meal into the pot	1.7	6
Just cooked hot meal into the cup	5.4	21
Chilled meal into the cup	91.1	278
Don't know	0.6	3
Other	0.2	1

Table UF.16: Multiple Micronutrient Powder utilization and effects		
Percent distribution of Multiple Micronutrient Powder utilization practices and effects in children 6-59 months, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Where did you get information about MMP?		
From soum/family doctor	89.2	286
From soum family nurses	6.8	14
Volunteer workers	0.3	1
From soum/family clinic PHW	0.7	1
TV	0.2	1
Newspaper/journal	0.3	1
Other	2.6	7
What did you hear were the reasons to give MMP?		
For brain development	14.6	44
Make child active/strong	20.2	50
Increase appetite	21.5	62
Reduce anaemia	7.6	30
Can't recall	3.7	14
Don't know	5.7	23
Other	26.8	88
What positive effects did you observe after using MMP?		
Increased appetite	16.6	53
Increased energy	1.2	3
Mental development	0.7	3
Less sickly	4.3	12
Made child healthy	1.9	5
Improved physical growth	15.0	49
No positive effects	46.4	143
Don't know	11.2	34
Other	2.7	9
What negative effects did you observe after using MMP?		
Black stool	13.6	33
Loose stool/Diarrhoea	2.3	10
Constipation	0.9	2
Vomiting	1.6	3
Nausea	0.3	1
Decreased appetite	8.3	25
No negative effects	71.9	231
Don't know	0.3	2
Other	0.8	4
Will you still continue using MMP in your child's foods?		
Yes	70.2	235
No	28.5	70
Don't know	1.3	6

RECEIPT OF MICRONUTRIENT SUPPLEMENTATION

In the NNS V, mothers or caretakers were asked whether children received iron supplementation during the year before the survey. As shown in Table UF.17, very few children 0-59 months of age received iron supplementation (4%). Children 6-11 months (5.0%) and 6-23 months (6.0%) and those with low birth weight (8.8%) were more likely to receive iron supplementation than children 24-35 months (2.7%), children 36-59 months (2.9%) and children with normal birth weight (4.1%) or high birth weight (1.3%).

Table UF.17: Iron supplementation		
Percent of children 0-59 months who received iron supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	4.0	2251
Child Gender		
Girls	3.8	1110
Boys	4.1	1141
Child age		
≤ 05 mos	2.3	199
06-11 mos	5.0	304
12-23 mos	6.0	599
24-35 mos	2.7	457
36-59 mos	2.9	692
Area		
Urban	3.6	1080
Rural	4.7	1171
Region		
Western	3.0	449
Khangai	5.1	450
Central	6.2	453
Eastern	4.0	450
Ulaanbaatar	3.1	449
Location		
Capital city	3.1	449
Aimag center	4.7	631
Soum center	5.5	872
Bagh/rural	2.6	299
Ethnicity of household head		
Khalk	4.2	1740
Kazak	3.6	114
Other	2.6	397
Wealth index quintile		
Poorest	5.4	597
Second	2.4	428
Third	2.8	471
Fourth	4.2	444
Wealthiest	4.8	311
Maternal age		
≤ 19 years	1.6	16
20-29 years	4.7	858

Table UF.17: Iron supplementation		
Percent of children 0-59 months who received iron supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
30-39 years	4.1	900
40-49 years	4.1	170
Maternal education level		
No education	0.0	22
Primary	5.8	64
Secondary	5.8	850
Higher	3.3	1008
Maternal employment status		
Not employed	4.3	774
Employed	4.4	1170
Maternal marital status		
Married	4.4	1594
Not married	4.2	216
Cohabitating	4.5	134
Maternal nutrition status		
Underweight	2.7	59
Normal weight	4.2	935
Overweight	4.3	623
Obese	4.7	320
Birth weight		
Low birth weight	8.8	97
Normal birth weight	4.1	1865
High birth weight	1.3	268

Vitamin A supplementation (VAS) for children 6-59 months of age is a national programme in Mongolia. Mothers or caretakers were asked whether their children received a vitamin A supplement during the May VAS distribution round in the previous 6 months before the survey. VAS coverage was 58.1% with highest coverage in the 12-23 month age group and slightly higher among girls than boys (Table UF.18). A larger percentage of children received supplementation in rural areas (66.9%) compared to urban areas (53.4%) and coverage was highest in the poorest households (65.2%). Central region had the highest VAS coverage (70.7%) while coverage was lowest in Ulaanbaatar (51.5%).

Table UF.18: Vitamin A supplementation coverage *		
Percent of children 6-59 months who received vitamin A supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted count
Total	**58.1**	**1927**
Child gender		
Female	59.9	936
Male	56.2	991
Child age		
6-11 mos	45.8	281
12-23 mos	67.4	566
24-35 mos	57.7	430
36-59 mos	55.8	650

Table UF.18: Vitamin A supplementation coverage*		
Percent of children 6-59 months who received vitamin A supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted count
Location		
Urban	53.4	902
Rural	66.9	1025
Region		
Western	58.8	391
Khangai	61.5	382
Central	70.7	376
Eastern	64.1	421
Ulaanbaatar	51.5	357
Area		
Capital city	51.5	357
Aimag center	58.0	545
Soum center	65.3	760
Bagh/rural	71.4	265
Ethnicity of household head		
Khalk	57.6	1491
Kazak	60.9	83
Other	60.2	353
Wealth index quintile		
Poorest	65.2	524
Second	52.3	368
Third	58.0	396
Fourth	57.0	374
Wealthiest	57.7	265
Maternal age		
≤ 19 years	83.0	11
20-29 years	57.0	713
30-39 years	60.4	776
40-49 years	47.8	154
Maternal education level		
No education	62.6	16
Primary	68.1	54
Secondary	58.2	733
Higher	57.2	851
Maternal employment status		
Not employed	56.3	626
Employed	59.2	1028
Maternal marital status		
Married	57.0	1387
Not married	60.6	164
Cohabitating	63.6	103
Maternal nutrition status		
Underweight	58.7	48
Normal weight	57.2	804
Overweight	58.8	521
Obese	58.2	274

Table UF.18: Vitamin A supplementation coverage *		
Percent of children 6-59 months who received vitamin A supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted count
Birth weight		
Low birth weight	61.8	84
Normal weight	57.7	1595
High birth weight	60.2	235

Nearly 60% of children received some type of vitamin D supplementation (58.0%) during the year before the survey (Table UF.19), with highest coverage among children 6-11 months (86.7%) and 12-23 months (80.3%). Overall supplementation coverage was higher in households in the highest wealth index quintile (70.6%) and was substantially lower in Western region (37.5%) and in the Kazak ethnic minority population (17.4%).

Table UF.19: Vitamin D supplementation						
Percent of children 0-59 months who received vitamin D supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Any type of Vitamin D %	Unweighted Number	High-dose Vitamin D %	Low-dose Vitamin D %	Both types of Vitamin D %	Unweighted Number
Total	58.0	2251	55.7	38.4	5.9	1236
Child gender						
Female	59.4	1110	54.6	39.6	5.8	633
Male	56.6	1141	56.9	37.2	5.9	603
Child age						
0-5 months	49.6	199	36.7	58.9	4.4	94
6-11 months	86.7	304	41.9	52.4	5.7	251
12-23 months	80.3	599	57.1	35.1	7.8	464
24-35 months	50.3	457	66.9	29.8	3.3	226
36-59 months	30.5	692	70.6	24.2	5.2	201
Area						
Urban	59.9	1080	53.1	40.6	6.2	613
Rural	54.2	1171	61.4	33.5	5.1	623
Economic region						
Western	37.5	449	60.6	38.2	1.2	168
Khangai	58.9	450	57.4	33.6	9.1	265
Central	65.3	453	45.6	50.7	3.7	296
Eastern	50.7	450	70.2	28.9	0.9	228
Ulaanbaatar	62.1	449	55.9	37.3	6.8	279
Location						
Capital city	62.1	449	55.9	37.3	6.8	279
Aimag center	54.2	631	44.9	50.5	4.5	334
Soum center	51.8	872	60.0	35.1	4.9	445
Bagh/rural	60.8	299	64.8	29.7	5.5	178
Ethnicity of household head						
Khalkh	60.5	1740	53.7	40.3	6.0	1021
Kazak	17.4	114	-	-	-	17
Other	54.6	397	68.5	27.8	3.6	198

Table UF.19: Vitamin D supplementation					
Percent of children 0-59 months who received vitamin D supplementation during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Any type of Vitamin D	Unweighted Number	High-dose Vitamin D	Low-dose Vitamin D	Both types of Vitamin D	Unweighted Number
	%		%	%	%	
Wealth index quintile						
Poorest	55.4	597	73.0	23.7	3.3	328
Second	53.3	428	66.7	27.2	6.1	216
Third	51.5	471	58.0	35.6	6.4	228
Fourth	59.1	444	49.9	44.6	5.5	246
Wealthiest	70.6	311	37.4	54.9	7.7	218
Maternal age						
< 20 years	-	16	-	-	-	12
20-29 years	61.5	858	59.3	36.5	4.2	509
30-39 years	57.5	900	49.0	45.4	5.6	487
40-49 years	46.6	170	53.0	30.6	16.4	77
Maternal education level						
No education	-	22	-	-	-	7
Primary	53.2	64	86.9	13.1	0.0	30
Secondary	58.5	850	64.8	30.8	4.4	474
Higher	59.1	1008	44.4	48.7	6.8	574
Maternal employment status						
Not employed	65.0	774	55.7	38.8	5.5	468
Employed	52.7	1170	47.9	41.5	5.7	617
Maternal marital status						
Married	58.7	1594	52.6	41.7	5.7	876
Not married	56.6	216	57.3	34.8	7.9	127
Cohabitating	59.3	134	65.3	34.3	0.4	82
Maternal nutrition status						
Underweight	47.0	59	50.6	42.9	6.5	30
Normal weight	60.1	935	55.2	39.5	5.3	530
Overweight	55.8	623	54.9	38.9	6.2	339
Obese	60.0	320	50.8	43.7	5.5	181

(-) Based on fewer than 25 unweighted cases.

More than 60% of children who received vitamin D supplementation received it with the appropriate frequency to meet their requirements (Table UF.20). A higher percentage of children under 6 months and children 6-11 months received adequate supplementation compared to older children. Children under 6 months of age (76.3%) and children 6-11 months of age (70.8%) received adequate supplementation at a higher percentage than older children (47.8% to 62.6%). A higher percentage of children in urban areas received adequate supplementation compared to children in rural areas and a higher percentage received adequate supplementation in wealthiest compared to poorer households. Children in urban areas (66.4%) received adequate supplementation at a higher percentage than in rural areas (51.4%) and wealthiest households (78.3%) at a higher percentage than those in poorer wealth index quintiles (46.7% to 62.8%).

Table UF. 20: Appropriate frequency of vitamin D supplementation *		
Percent of children 0-59 months who received vitamin D supplementation with appropriate frequency during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted count
Total	61.7	1236
Child gender		
Females	63.6	633
Males	59.8	603
Child age		
≤ 05 mos	76.3	96
06-11 mos	70.8	252
12-23 mos	62.6	463
24-35 mos	53.1	226
36-59 mos	47.8	199
Area		
Urban	66.4	613
Rural	51.4	623
Region		
Western	61.2	168
Khangai	50.2	265
Central	60.1	296
Eastern	46.1	228
Ulaanbaatar	68.1	279
Area		
Capital city	68.1	279
Aimag center	61.4	334
Soum center	54.4	445
Bagh/rural	44.3	178
Ethnicity of household head		
Khalkh	61.2	1021
Kazak	51.1	17
Other	66.5	198
Wealth index quintile		
Poorest	46.7	328
Second	56.2	216
Third	59.4	228
Fourth	62.8	246
Wealthiest	78.3	218
Maternal age		
≤ 19 years	86.3	12
20-29 years	55.9	509
30-39 years	66.9	487
40-49 years	76.2	77

Table UF. 20: Appropriate frequency of vitamin D supplementation *		
Percent of children 0-59 months who received vitamin D supplementation with appropriate frequency during the past year by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted count
Maternal Education level		
No education	32.6	7
Primary level	18.0	30
secondary level	61.0	474
Higher	66.0	574
Maternal employment status		
Not employed	64.9	468
Employed	60.3	617
Maternal marital status		
Married	64.2	876
Not married	53.2	127
Cohabitating	64.6	82
Maternal nutrition status		
Underweight	62.0	30
Normal weight	63.1	530
Overweight	62.2	339
Obese	62.2	181

* Appropriate frequency is daily supplementation for low-dose vitamin D and monthly supplementation for high-dose vitamin D.

CARE OF ILLNESS

Diarrhoeal diseases, respiratory and parasitic infections are leading causes of childhood morbidity and mortality worldwide. Table UF.21 presents the percentage of children 0-59 months of age with a reported episode of diarrhoea, cough, or fever during the 2 weeks preceding the survey and the percentage of children reported to have had a parasitic infection during the past 6 months. These results are not measures of true prevalence, and should not be used as such, but represent the period-prevalence of illness over a 2-week time period. In the survey, the definition of a case of diarrhoea, cough, fever or parasitic infection was the mother's (or caretaker's) report that the child had such symptoms during the specified time period.

Overall, 20.5% of children were reported to have had an episode of diarrhoea in the 2 weeks preceding the survey, while 49.5% had a cough, and 17.5% had a fever (Table UF.21). Parasitic infection during the past 6 months was less prevalent (6.2%). Diarrheal episodes were more prevalent in the 12-23 month age group (31.2%) than in other age groups (10.0% to 25.8%). Episodes of diarrhoea, cough, and fever were more prevalent in urban areas (22.7%, 54.1%, 19.4%) compared to rural areas (16.1%, 40.2%, 14.8%), while parasitic infections were more prevalent in older children 36-59 months (13.8%) compared to younger age groups (0.0% to 9.1%) and in rural areas (7.9%) compared to urban areas (5.8%).

Table UF.21: Prevalence of disease					
Percent of children 0-59 months for whom the mother/caretaker reported an episode of diarrhoea, cough, or fever in the last two weeks or parasitic infection in the last 6 months by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Percentage of children 0-59 months who in the last two weeks had:			Percentage of children 0-59 months who in the last 6 months had:	Unweighted Number
	Diarrhoea	Cough	Fever	Any parasitic infection	
Total	20.5	49.5	17.5	6.2	2251
Child gender					
Female	20.2	48.5	17.6	6.6	1110
Male	20.8	50.4	18.1	6.5	1141
Child age					
0-5 months	16.8	34.1	15.8	0.0	201
6-11 months	25.8	55.1	19.4	0.4	305
12-23 months	31.2	56.3	21.2	2.8	598
24-35 months	19.1	55.4	19.3	9.1	457
36-59 months	10.0	41.5	13.6	13.8	690
Economic region					
Western	19.0	39.8	18.5	6.9	449
Khangai	22.0	48.2	20.2	7.9	450
Central	15.7	49.9	18.7	5.5	453
Eastern	14.2	37.3	11.8	13.0	450
Ulaanbaatar	22.7	54.1	17.4	5.4	449
Area					
Urban	22.7	54.1	19.4	5.8	1080
Rural	16.1	40.2	14.8	7.9	1171
Location					
Capital city	22.7	54.1	17.4	5.4	449
Aimag center	22.6	54.0	24.5	7.0	631
Soum center	15.5	40.0	15.2	7.8	872
Bagh/Rural	17.7	40.5	13.5	8.5	299
Wealth index quintile					
Poorest	22.2	40.3	13.1	8.6	597
Second	23.9	50.2	19.3	4.2	428
Third	19.8	51.2	15.9	5.0	471
Fourth	18.1	52.1	17.6	9.5	444
Wealthiest	18.5	53.5	23.2	5.4	311
Ethnicity of household head					
Khalkh	21.0	51.0	17.7	6.4	1740
Kazak	18.6	28.8	13.0	2.3	114
Other	18.0	45.9	20.1	8.7	397
Maternal age					
< 20 years	-	-	-	-	16
20-29 years	21.3	48.2	14.9	6.5	858
30-39 years	20.3	50.9	19.8	5.9	900
40-49 years	18.9	51.4	18.9	6.7	170

Table UF.21: Prevalence of disease					
Percent of children 0-59 months for whom the mother/caretaker reported an episode of diarrhoea, cough, or fever in the last two weeks or parasitic infection in the last 6 months by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Percentage of children 0-59 months who in the last two weeks had:			Percentage of children 0-59 months who in the last 6 months had:	Unweighted Number
	Diarrhoea	Cough	Fever	Any parasitic infection	
Maternal nutrition status					
Underweight	26.1	51.6	20.6	3.9	59
Normal weight	20.2	50.4	17.2	5.2	935
Overweight	21.9	47.3	18.7	6.2	623
Obese	17.6	51.8	15.8	9.8	320
Maternal employment					
Not employed	24.7	53.5	20.0	3.8	774
Employed	17.2	47.0	15.8	8.3	1170
Maternal marital status					
Married	20.1	49.0	17.4	6.3	1594
Not married	22.1	54.2	16.6	5.5	216
Cohabitating	24.4	51.9	22.8	6.9	134
Maternal education					
No education	-	-	-	-	22
Primary	11.1	35.4	13.6	1.5	64
Secondary	23.0	48.6	19.3	6.0	850
Higher	19.6	51.9	16.8	6.6	1008

(-) Based on fewer than 25 unweighted cases.

BREASTFEEDING AND INFANT AND YOUNG CHILD FEEDING

Proper feeding of infants and young children promotes optimal growth and development, especially in the critical window from birth to 2 years of age. Exclusive breastfeeding for 6 months and continued breastfeeding for the first 2 years of life protects children from infection, provides an ideal source of nutrients, and is economical and safe. However, many mothers do not start to breastfeed early enough, do not breastfeed exclusively for the recommended 6 months, or stop breastfeeding too soon. There are often pressures to switch to infant formula, which can contribute to growth faltering and micronutrient malnutrition and can be unsafe if hygienic conditions such as safe drinking water are not readily available. From the age of 6 months with continued breastfeeding, consumption of safe, appropriate, and adequate solid, semi-solid, and soft foods leads to better health and growth outcomes, with the potential to prevent stunting during the first 2 years of life.[36]

UNICEF and WHO recommend infants be breastfed within 1 hour of birth, breastfed exclusively for the first 6 months of life, and continue to be breastfed up to 2 years of age. Starting at 6 months, breastfeeding should be combined with age-appropriate feeding of safe, nutritionly-adequate, solid, semi-solid, and soft, complementary foods.[37]

The guiding principles for which proximate measures and indicators exist for appropriate child feeding for children 6-23 months of age are:

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36   Bhutta ZA, Das JK, Rizvi A, et al. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? Lancet 2013;382:452–77.

37   WHO. Global strategy for infant and young child feeding. WHO Geneva, 2003.

1. continued breastfeeding;
2. appropriate frequency of meals (but not energy density); and
3. appropriate nutrient content of food.

Feeding frequency is used as a proxy for energy intake. Appropriate feeding frequency requires children to receive a minimum number of meals/snacks (and milk feeds for non-breastfed children) for their age. Dietary diversity is used to ascertain the adequacy of the nutrient content of the food (not including iron) consumed. For dietary diversity, a child consuming at least 4 of 7 food groups is considered to have a better-quality diet. In most populations, consumption of at least 4 food groups means the child has a high likelihood of consuming at least 1 animal source food and at least 1 fruit or vegetable, in addition to a staple food (grain, root, or tubers).[38] The infant and young child feeding indicators assessed in the NNS V were based on the mother's or caretaker's report of breastfeeding and consumption of foods and fluids by the child during the day or night prior to being interviewed.

The three dimensions of breastfeeding (or at least 2 milk feeds for non-breastfed children), feeding frequency, and dietary diversity are combined into the composite indicator of "minimum acceptable diet".

To have had a minimum acceptable diet the previous day, a child must have received:

1. breast milk or at least 2 milk feeds for non-breastfed children;

2. the appropriate number of meals/snacks/milk feeds; and

3. food items from at least 4 food groups

A summary of the key guiding principles[39] [40] for feeding 6-23 month old children is provided below in Table UF.22 along with proximate measures for these guidelines collected in the survey.

Table UF.22: Key guiding principles and proximate measures for feeding children 6-23 months of age		
Guiding principle	Proximate measure	Table
Continue frequent, on-demand breastfeeding for 2 years and beyond	Breastfed in the last 24 hours	UF.24
Appropriate frequency of meals	Breastfed children Depending on age, 2 or 3 meals/snacks provided in the last 24 hours Non-breastfed children 4 meals/snacks and/or milk feeds provided in the last 24 hours	UF.27
Appropriate nutrient content of food	Foods from 4 of 7 food groups eaten in the last 24 hours: 1) Grains, roots, and tubers; 2) legumes and nuts; 3) dairy products (milk, yogurt, cheese); 4) flesh foods (meat, fish, poultry, and liver/organ meats); 5) eggs; 6) vitamin-A rich fruits and vegetables; and 7) other fruits and vegetables.	UF.27

Table UF.23 presents the proportion of children born in the last 2 years who were ever breastfed and those who were breastfed within 1 hour of birth, a very important step in management of lactation and establishment of a physical and emotional bond between mother and baby. 83.7% of children under 2 years started breastfeeding within 1 hour of birth and though almost all children were ever breastfed (97.9%), a slightly higher percentage of girls were ever breastfed overall and within 1 hour of birth. Overall breastfeeding was high in urban areas (97.7%) and rural areas (98.5%) and in all regions (97.1% to 100.0%) and household wealth quintiles (96.6% to 98.9%). Children of underweight mothers (69.1%) and those in urban areas (81.9%) were less likely to be breastfed within 1 hour of birth.

38   WHO. Indicators for assessing infant and young child feeding practices; Part 1: Definitions. WHO Geneva, 2008.
39   PAHO. Guiding principles for complementary feeding of the breastfed child. PAHO, 2003.
40   WHO. Guiding principles for feeding non-breastfed children 6-24 months of age. WHO Geneva, 2005.

Table UF.23: Ever breastfed and early initiation of breastfeeding		
Percent of children born in the last two years who were ever breastfed and received early initiation of breastfeeding within one hour of birth by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	Percentage who were ever breastfed[1]	Percentage who were first breastfed within one hour of birth [2]	Number of last live-born children in the last two years
Total	97.9	83.7	1104
Child gender			
Female	98.9	86.8	550
Male	96.9	80.3	554
Child age			
0-5 months	99.9	85.5	201
6-11 months	96.6	78.1	305
12-23 months	97.9	86.3	598
Economic region			
Western	100.0	85.3	195
Khangai	98.3	86.3	233
Central	98.4	87.9	247
Eastern	98.4	89.4	185
Ulaanbaatar	97.1	80.5	244
Location			
Urban	97.7	81.9	559
Rural	98.5	87.6	545
Area			
Capital city	97.1	80.5	244
Aimag center	99.1	85.7	315
Soum center	98.7	89.1	393
Bagh/Rural	98.0	84.0	152
Wealth index quintile			
Poorest	96.6	86.3	280
Second	98.3	83.5	209
Third	98.7	79.5	223
Fourth	96.9	82.4	221
Wealthiest	98.9	86.3	171
Ethnicity of household head			
Khalkh	97.9	84.3	869
Kazak	98.1	70.7	52
Other	98.0	83.6	183
Maternal age in years			
≤ 19	83.8	78.9	13
20-29	99.1	84.6	495
30-39	97.9	83.5	435
40-49	94.8	79.3	64
Maternal nutrition status			
Underweight	98.4	69.1	38
Normal weight	99.1	85.6	505

Table UF.23: Ever breastfed and early initiation of breastfeeding

Percent of children born in the last two years who were ever breastfed and received early initiation of breastfeeding within one hour of birth by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Percentage who were ever breastfed[1]	Percentage who were first breastfed within one hour of birth [2]	Number of last live-born children in the last two years
Overweight	95.8	82.0	313
Obese	99.1	84.1	150
Maternal employment status			
Not employed	98.1	85.6	496
Employed	98.1	81.3	511
Maternal marital status			
Married	97.8	84.4	810
Not married	98.6	83.0	127
Cohabitating	100.0	78.4	70
Maternal education level			
None	100.0	92.3	11
Primary	98.4	70.9	27
Secondary	97.2	84.3	439
High	98.8	83.6	530

Table UF.24 presents the breastfeeding status of children 0-23 months of age. Children 0-5 months were categorized according to whether they were e*xclusively breastfed* or *predominantly breastfed,* with the former only allowing vitamins, mineral supplements, and medicine and the latter also including plain water and non-milk liquids. Among children 0-5 months of age, 58.3% were exclusively breastfed and 65.3% were predominantly breastfed, having received other liquids or foods in addition to breast milk. The prevalence of exclusive breastfeeding was lowest in the 4th wealth index quintile (46.5%) and wealthiest quintile (54.0%) households.

By age 12-15 months, 81.1% of children were still breastfed and, at age 20-23 months, 47.3% of children were still breastfed. Continued breastfeeding at 1 year and at 2 years of age was higher for boys (83.5% and 51.2%) and in rural areas (84.8% and 57.3%). Ulaanbaatar, at 74.3%, had the lowest prevalence of continued breastfeeding after 12 months of age.

Table UF.24: Exclusive and continued breastfeeding

Percent distribution of exclusive, predominant and continued breastfeeding status of children 0-23 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Children 0-5 months			Children 12-15 months		Children 20-23 months	
	Percent exclusively breastfed [a]	Percent predominantly breastfed [b]	Un-weighted Number	Percent breastfed (Continued breast-feeding at 1 year) [c]	Un-weighted Number	Percent breastfed (Continued breast-feeding at 2 years) [d]	Un-weighted Number
Total	**58.3**	**65.3**	**201**	**81.1**	**206**	**47.3**	**170**
Child gender							
Female	56.0	64.0	102	78.7	101	43.3	84
Male	61.0	66.8	99	83.5	105	51.2	86
Economic region							
Western	76.5	76.5	34	81.1	37	50.0	32
Khangai	63.0	71.7	46	86.7	45	65.0	40
Central	52.1	58.3	48	91.5	47	51.4	35
Eastern	-	-	24	86.8	38	45.1	31
Ulaanbaatar	55.1	63.3	49	74.3	39	37.5	32

Table UF.24: Exclusive and continued breastfeeding

Percent distribution of exclusive, predominant and continued breastfeeding status of children 0-23 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteris-tics	Children 0-5 months			Children 12-15 months		Children 20-23 months	
	Percent exclusively breastfed [a]	Percent pre-dominantly breastfed [b]	Un-weighted Number	Percent breastfed (Continued breast-feeding at 1 year) [c]	Un-weighted Number	Percent breastfed (Continued breast-feeding at 2 years) [d]	Un-weighted Number
Area							
Urban	57.2	65.0	110	79.3	99	41.9	83
Rural	61.2	66.2	91	84.8	107	57.3	87
Location							
Capital city	55.1	63.3	49	74.3	39	37.5	32
Aimag center	63.1	69.8	61	90.5	60	52.5	51
Soum center	58.4	63.3	71	84.2	83	54.8	59
Bagh/Rural	-	-	20	-	24	61.6	28
Wealth index quintile							
Poorest	60.7	65.3	41	83.1	47	52.4	55
Second	64.6	72.0	38	84.7	35	56.1	27
Third	65.5	78.7	53	77.1	44	48.4	29
Fourth	46.5	46.5	41	84.8	56	50.6	33
Wealthiest	54.0	62.8	28	-	24	32.6	26
Ethnicity of household head							
Khalkh	57.0	64.8	158	79.6	161	45.3	133
Kazak	-	-	14	-	12	-	9
Other	61.2	64.4	29	91.0	33	62.7	28
Maternal age							
< 20 years	-	-	3	-	3	59.2	74
20-29 years	65.8	68.0	101	86.8	88	43.3	64
30-39 years	48.8	62.1	87	88.9	82	-	11
40-49 years	-	-	4	-	14	51.2	149
Maternal nutrition status							
Underweight	-	-	6	-	7	57.7	78
Normal weight	64.0	67.3	84	91.4	99	40.8	45
Overweight	61.7	67.6	69	82.1	54	-	22
Obese	54.0	68.0	36	81.5	26	51.2	149
Maternal employment							
Not em-ployed	55.9	62.1	110	88.2	102	48.8	79
Employed	64.5	73.1	85	85.9	85	51.2	149
Maternal marital status							
Married	58.4	66.6	145	88.6	159	-	14
Not married	57.0	64.5	33	-	17	-	12
Cohabitating	-	-	17	-	11	51.2	149

Table UF.24: Exclusive and continued breastfeeding

Percent distribution of exclusive, predominant and continued breastfeeding status of children 0-23 months by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Children 0-5 months			Children 12-15 months		Children 20-23 months	
	Percent exclusively breastfed [a]	Percent predominantly breastfed [b]	Unweighted Number	Percent breastfed (Continued breastfeeding at 1 year) [c]	Unweighted Number	Percent breastfed (Continued breastfeeding at 2 years) [d]	Unweighted Number
Maternal education							
No education	-	-	4	-	1	-	5
Primary	-	-	6	-	3	53.2	62
Secondary	58.7	67.3	77	88.9	92	50.8	80
Higher	59.7	66.3	108	87.1	91	51.2	149

a Infants 0–5 months of age who received only breast milk, medicines or ORS during the previous day.
b Infants 0–5 months of age who received breast milk as the predominant source of nourishment during the previous day with only breast milk, medicines, ORS, water
    or other non-milk and non-formula liquids during the previous day.
c Children 12–15 months of age who received breast milk during the previous day.
d Children 20–23 months of age who received breast milk during the previous day.
(-) Based on fewer than 25 unweighted cases.

Table UF.25 indicates children's receipt of appropriate breastfeeding at 0-5 months and 6-23 months of age. For infants 0-5 months, exclusive breastfeeding is considered age-appropriate feeding, while children 6-23 months are considered to be appropriately breastfed if they receive daily breast milk in addition to solid, semi-solid, or soft foods. 71.8% of children 6-23 months received age-appropriate feeding and age-appropriate breastfeeding among all children 0-23 months of age was 69.2%.

Table UF.25: Age-appropriate breastfeeding

Percent of children 0-23 months who were appropriately breastfed the previous day by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Children 0-5 months		Children 6-23 months		Children 0-23 months	
	Percent exclusively breastfed [a]	Unweighted Number	Percent currently breastfeeding and receiving solid, semi-solid or soft foods [b]	Unweighted Number	Percent appropriately breastfed [c]	Unweighted Number
Total	**58.3**	**201**	**71.8**	**903**	**69.2**	**1104**
Child gender						
Female	56.0	102	68.8	448	66.3	550
Male	61.0	99	75.0	455	72.4	554
Area						
Urban	57.2	110	71.1	449	68.3	559
Rural	61.2	91	73.4	454	71.3	545
Economic region						
Western	76.5	34	75.2	161	75.4	195
Khangai	63.0	46	75.9	187	73.4	233
Central	52.1	48	74.9	199	70.4	247
Eastern	-	24	72.0	161	70.3	185
Ulaanbaatar	55.1	49	68.7	195	66.0	244
Location						
Capital city	55.1	49	68.7	195	66.0	244

Table UF.25: Age-appropriate breastfeeding					
Percent of children 0-23 months who were appropriately breastfed the previous day by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Children 0-5 months		Children 6-23 months		Children 0-23 months	
	Percent exclusively breastfed [a]	Unweighted Number	Percent currently breastfeeding and receiving solid, semi-solid or soft foods [b]	Unweighted Number	Percent appropriately breastfed [c]	Unweighted Number
Aimag center	63.1	61	77.7	254	74.8	315
Soum center	58.4	71	73.0	322	70.2	393
Bagh/Rural	-	10	74.5	132	73.8	152
Ethnicity of household head						
Khalkh	57.0	158	71.5	711	68.7	869
Kazak	-	14	51.8	38	58.2	52
Other	61.2	29	78.2	154	75.7	183
Wealth index quintile						
Poorest	60.7	41	73.5	239	71.3	280
Second	64.6	38	73.7	171	71.9	209
Third	65.5	53	67.9	170	67.4	223
Fourth	46.5	41	73.6	180	68.4	221
Wealthiest	54.0	28	70.2	143	67.3	171
Maternal age						
< 20 years	-	3	-	10	-	14
20-29 years	65.8	101	72.4	434	70.9	538
30-39 years	48.8	87	73.4	378	68.3	465
40-49 years	-	4	72.9	66	73.9	72
Maternal education						
No education	-	4	-	5	-	9
Primary	-	6	-	21	59.8	27
Secondary	58.7	77	79.4	359	75.4	436
Higher	59.7	108	72.7	421	69.9	529
Maternal employment						
Not employed	55.9	110	76.3	381	71.7	490
Employed	64.5	85	74.3	427	72.4	513
Maternal marital status						
Married	58.4	145	76.0	666	72.6	812
Not married	57.0	33	74.4	91	69.6	124
Cohabitating	-	17	68.9	50	69.5	66
Maternal nutrition status						
Underweight	-	6	80.3	32	66.5	38
Normal weight	64.0	84	78.2	417	75.7	500
Overweight	61.7	69	69.9	243	67.7	311
Obese	54.0	36	75.7	113	69.1	149

a Infants 0–5 months of age who received only breast milk, medicines or ORS during the previous day.
b Children 6–23 months of age who received breast milk, as well as solid, semi-solid or soft foods during the previous day.
c Sum of Infants 0–5 months of age who received only breast milk during the previous day and children 6-23 months of age who received breastmilk, as well as solid, semi-solid or soft foods during the previous day.
(-) Based on fewer than 25 unweighted cases.

Nearly all children received timely introduction of complementary foods with 96.5% of infants 6-8 months of age having received solid, semi-solid, or soft foods at least once during the previous day (Table UF.26). Among currently breastfeeding infants, 96.4% received complementary foods. As the number of infants 6-8 months not breastfeeding at the time of the survey was less than 25, prevalence for these children is not reported.

	Currently breastfeeding		Currently not breastfeeding		All children	
Characteristics	**Percent received solid, semi-solid or soft foods**	**Unweighted Number**	**Percent received solid, semi-solid or soft foods**	**Unweighted Number**	**Percent received solid, semi-solid or soft foods [a]**	**Unweighted Number**
Total	96.4	144	-	6	96.5	150
Child gender						
Female	96.9	61	-	4	97.1	65
Male	96.1	83	-	2	96.1	85
Area						
Urban	98.1	81	-	2	98.1	83
Rural	92.0	63	-	4	92.5	67
Economic region						
Western	82.8	29	-	1	83.3	30
Khangai	-	23	-	1	-	24
Central	97.2	36	-	3	97.4	39
Eastern	-	21	-	1	-	22
Ulaanbaatar	100.0	35	-	0	100.0	35
Location						
Capital city	100.0	35	-	0	100.0	35
Aimag center	92.7	46	-	2	93.0	48
Soum center	90.2	47	-	3	90.7	50
Bagh/Rural	-	16	-	1	-	17
Ethnicity of household head						
Khalkh	98.6	116	-	4	98.6	120
Kazak	-	5	-	1	-	6
Other	-	23	-	1	-	24
Wealth index quintile						
Poorest	96.3	32	-	2	96.5	34
Second	95.6	33	-	3	95.8	36
Third	91.5	26	-	0	91.5	26
Fourth	96.6	29	-	1	96.7	30
Wealthiest	-	24	-	0	-	24
Maternal age						
< 20 years	-	3	-	0	-	3
20-29 years	95.9	70	-	1	96.0	71
30-39 years	97.2	57	-	3	97.3	60
40-49 years	-	9	-	0	-	9
Maternal education						
Secondary	98.9	59	-	3	99.0	62
Higher	95.8	76	-	1	95.9	77

Table UF.26: Timely introduction of solid, semi-solid, or soft foods

Percent of infants 6-8 months who received solid, semi-solid, or soft foods the previous day by breastfeeding status and selected characteristics, Mongolia National Nutrition Survey, 2017

Table UF.26: Timely introduction of solid, semi-solid, or soft foods						
Percent of infants 6-8 months who received solid, semi-solid, or soft foods the previous day by breastfeeding status and selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Currently breastfeeding		Currently not breastfeeding		All children	
	Percent received solid, semi-solid or soft foods	Unweighted Number	Percent received solid, semi-solid or soft foods	Unweighted Number	Percent received solid, semi-solid or soft foods [a]	Unweighted Number
Maternal employment						
Not employed	96.7	68	-	3	96.8	71
Employed	97.1	71	-	1	97.1	72
Maternal marital status						
Married	96.6	108	-	3	96.6	111
Not married	-	20	-	1	-	21
Cohabitating	-	11	-	0	-	11
Maternal nutrition status						
Underweight	-	5	-	0	-	5
Normal weight	98.3	68	-	2	98.3	70
Overweight	94.1	43	-	1	94.2	44
Obese	-	23	-	1	-	24

a Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day.
(-) Based on fewer than 25 unweighted cases.

Table UF.27 presents indicators for minimum meal frequency, minimum dietary diversity, and minimum acceptable diet for currently breastfeeding and non-breastfeeding children. Feeding (meal) frequency is used as a proxy for energy intake and appropriate meal feeding requires children to receive a minimum number of meals/snacks (and milk feeds for non-breastfed children) for their age. Overall, nearly all children 6-23 months (92.1%) received minimum meal frequency, and received solid, semi-solid, or soft foods the minimum number of times the previous day. A slightly higher proportion of girls (94.6%) received minimum meal frequency compared to boys (89.6%) and prevalence was also higher in wealthier households (97.1%) compared to the poorer wealth index quintiles (87.5% to 94.5%). Minimum meal frequency was also higher for non-breastfeeding children (95.6%) compared to breastfeeding children (90.8%).

Minimum dietary diversity is used to ascertain the nutrition adequacy of the food consumed. For dietary diversity, children consuming foods from 4 of 7 food groups are considered to have a better-quality diet. The proportion of children who received minimum dietary diversity, or foods from at least 4 food groups, the previous day was much lower (49.6%) than for minimum meal frequency (92.1%). A larger proportion of 12-23 month-old children (54.8%) received minimum dietary diversity compared to 6-11 month-old children (40.3%). Greater dietary diversity was prevalent among girls (52.3%) versus boys (46.8%), in urban areas (53.7%) versus rural areas (40.8%), and among children in households in the 3 wealthier wealth index quintiles (55.9% to 62.6%) versus the 2 poorer wealth index quintiles (32.1% and 36.3%). Western region had the lowest prevalence of minimum dietary diversity for children (24.2%). The prevalence of minimum dietary diversity was similar between breastfeeding children (49.2%) and non-breastfeeding children (50.7%).

The overall dietary assessment using the minimum acceptable diet indicator revealed that 43.8% of children received a diet sufficient in both diversity and frequency. A lower percentage of non-breastfeeding children (30.3%) had a minimum acceptable diet compared to breastfeeding children (48.8%) (Table UF.28). 58.2% of non-breastfeeding children received the recommended 2 or more milk feeds the previous day. A higher percentage of girls (46.4%) received a minimum acceptable diet compared to boys (41.0%) as did children 12-23 months of age (46.9%) compared to children 6-11 months of age (38.2%) and children in households in the 3 wealthiest wealth index quintiles (47.9% to 56.5%) versus those in the 2 poorest wealth index quintiles (29.7% and 30.9%). A much lower percentage of children received a minimum acceptable diet in Western region (19.8%) compared to the other regions (39.6% to 52.8%) and in the Kazak ethnic minority population (24.6%) compared to the Khalkh population (44.3%).

Table UF.27: Infant and young child feeding (IYCF) practices

Percent of children 6–23 months who received minimum dietary diversity, minimum meal frequency, and a minimum acceptable diet the previous day by breastfeeding status and selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Currently breastfeeding				Currently not breastfeeding					All children			
	Percent of children who received:			Number of children 6–23 months	Percent of children who received:				Number of children 6–23 months	Percent of children who received:			Number of children 6–23 months
	Minimum dietary diversity [a]	Minimum meal frequency [b]	Minimum acceptable diet [c]		Minimum dietary diversity [a]	Minimum meal frequency [b]	Minimum acceptable diet [c]	At least 2 milk feeds		Minimum dietary diversity [a]	Minimum meal frequency [b]	Minimum acceptable diet [c]	
Total	**49.2**	**90.8**	**48.8**	**674**	**50.7**	**95.6**	**30.3**	**58.2**	**229**	**49.6**	**92.1**	**43.8**	**903**
Child gender													
Female	52.6	93.7	52.3	328	51.6	96.6	32.9	58.9	120	52.3	94.6	46.4	448
Male	45.9	88.0	45.5	346	49.7	94.3	26.9	57.3	109	46.8	89.6	41.0	455
Child age													
6–11 months	37.5	89.3	37.3	275	61.2	100.0	45.3	0.0	30	40.3	90.5	38.2	305
12–23 months	58.2	91.9	57.8	399	48.9	94.8	27.6	0.0	199	54.8	93.0	46.9	598
Economic region													
Western	22.6	81.8	21.8	128	30.3	87.9	12.1	45.5	33	24.2	83.1	19.8	161
Khangai	44.1	90.9	43.4	143	34.1	95.5	27.3	77.3	44	41.7	92.0	39.6	187
Central	56.0	94.7	56.0	150	59.2	98.0	42.9	67.3	49	56.8	95.5	52.8	199
Eastern	47.9	90.8	46.2	119	54.7	90.5	26.2	45.2	42	49.7	90.7	41.0	161
Ulaanbaatar	56.0	91.8	56.0	134	55.7	96.7	31.2	54.1	61	55.9	93.3	48.2	195
Area													
Urban	53.4	91.7	53.2	333	54.2	96.5	31.0	53.7	116	53.7	93.1	46.9	449
Rural	40.4	88.9	39.9	341	42.1	93.4	28.5	69.5	113	40.8	90.0	37.1	454
Location													
Capital city	56.0	91.8	56.0	134	55.7	96.7	31.2	54.1	61	55.9	93.3	48.2	195
Aimag center	47.4	91.5	46.5	199	48.1	95.6	30.6	51.8	55	47.5	92.3	43.2	254
Soum center	46.4	90.7	46.0	241	45.4	93.6	28.5	65.0	81	46.2	91.4	41.6	322
Bagh/Rural	26.2	84.8	25.7	100	34.4	93.0	28.4	80.0	32	28.3	86.8	26.4	132
Wealth index quintile													
Poorest	33.7	85.7	33.0	175	27.3	92.6	20.1	60.8	64	32.1	87.5	29.7	239
Second	36.6	87.6	35.7	131	35.4	98.2	16.9	54.1	40	36.3	90.3	30.9	171
Third	53.7	91.4	53.7	124	61.0	87.5	34.3	53.0	46	55.9	90.2	47.9	170
Fourth	60.2	92.6	60.2	140	59.9	100.0	31.0	53.3	40	60.1	94.5	52.7	180
Wealthiest	61.6	96.3	61.6	104	65.1	98.9	44.6	67.1	39	62.6	97.1	56.5	143
Ethnicity of household head													
Khalkh	49.0	92.4	48.8	530	54.4	95.9	32.7	58.1	181	50.5	93.4	44.3	711
Kazak	36.2	58.7	32.4	24	-	-	-	-	14	31.4	68.0	24.6	38
Other	52.3	87.3	51.6	120	31.4	98.7	17.7	56.3	34	48.1	89.6	44.8	154

Table UF.27: Infant and young child feeding (IYCF) practices

Percent of children 6-23 months who received minimum dietary diversity, minimum meal frequency, and a minimum acceptable diet the previous day by breastfeeding status and selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Currently breastfeeding				Currently not breastfeeding					All children			
	Percent of children who received:			Number of children 6-23 months	Percent of children who received:				Number of children 6-23 months	Percent of children who received:			Number of children 6-23 months
	Minimum dietary diversity a	Minimum meal frequency b	Minimum acceptable diet c		Minimum dietary diversity a	Minimum meal frequency b	Minimum acceptable diet c	At least 2 milk feeds		Minimum dietary diversity a	Minimum meal frequency b	Minimum acceptable diet c	
Maternal age													
< 20 years	-	-	-	7	-	-	-	-	3	-	-	-	10
20-29 years	48.9	91.5	48.8	312	45.8	90.1	28.7	56.6	82	48.2	91.2	44.5	394
30-39 years	51.4	90.0	50.7	277	62.2	98.1	30.5	57.7	71	54.0	91.9	45.8	348
40-49 years	41.2	90.9	41.2	44	-	-	-	-	16	47.6	93.7	43.8	60
Maternal nutrition status													
Underweight	67.9	91.8	67.9	24	-	-	-	-	8	58.4	93.4	56.5	32
Normal weight	46.7	89.0	46.3	339	55.1	93.2	36.3	61.5	82	48.4	89.9	44.3	421
Overweight	49.4	91.7	48.8	186	52.9	98.0	25.2	51.3	58	50.4	93.6	41.8	244
Obese	51.9	95.3	51.9	90	62.2	89.5	33.5	60.8	24	54.3	94.0	47.7	114
Maternal employment													
Not employed	49.2	88.9	48.8	310	54.2	92.7	27.9	57.5	76	50.3	89.7	44.1	386
Employed	48.5	93.1	48.2	330	53.9	96.7	34.7	60.4	96	49.8	94.0	44.9	426
Maternal marital status													
Married	51.2	91.1	50.7	527	54.4	95.3	30.0	55.7	138	51.9	92.1	46.0	665
Not married	40.8	89.7	40.8	74	-	-	-	-	20	46.0	89.4	42.5	94
Cohabitating	37.8	88.2	37.8	39	-	-	-	-	14	35.9	91.3	30.0	53
Maternal education													
No education	-	-	-	5	-	-	-	-	2	-	-	-	7
Primary	-	-	-	16	-	-	-	-	5	-	-	-	21
Secondary	39.9	87.7	39.6	299	45.9	96.7	30.2	62.5	63	41.0	89.5	37.8	362
Higher	58.4	94.0	57.9	320	62.0	95.7	33.6	57.8	102	59.3	94.5	51.6	422

a   Proportion of children 6–23 months who received foods from 4 or more food groups.

b   Proportion of breastfed and non-breastfed children 6–23 months who received solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. Minimum is defined as: 2 times for breastfed infants 6–8 months; 3 times for breastfed children 9–23 months; 4 times for non-breastfed children 6–23 months.

c   Proportion of breastfed children 6–23 months who had at least the minimum dietary diversity and the minimum meal frequency during the previous day; proportion of non-breastfed children 6–23 months who received at least 2 milk feedings and had at least the minimum dietary diversity (not including milk feeds) and the minimum meal frequency during the previous day.

(-) Based on fewer than 25 unweighted cases.

DISCUSSION

Nutrition status

According to WHO classification criteria to assess prevalence protein energy malnutrition for public health significance (underweight <10%, stunting < 20% and wasting < 5%), Mongolia remains at "low" level of protein energy malnutrition, with the prevalence of underweight, stunting and wasting in children under 5 remain lower than threshold values aforementioned, at national level.

In general, the prevalence of protein and energy malnutrition among children under 5 years of age, as we can see from national nutrition survey findings from 1992 to 2017, has been gradually going down, as compared to the prevalence of obesity, which rose 3.4 times since 2004, a manifest public health concern (Figure UF.1).
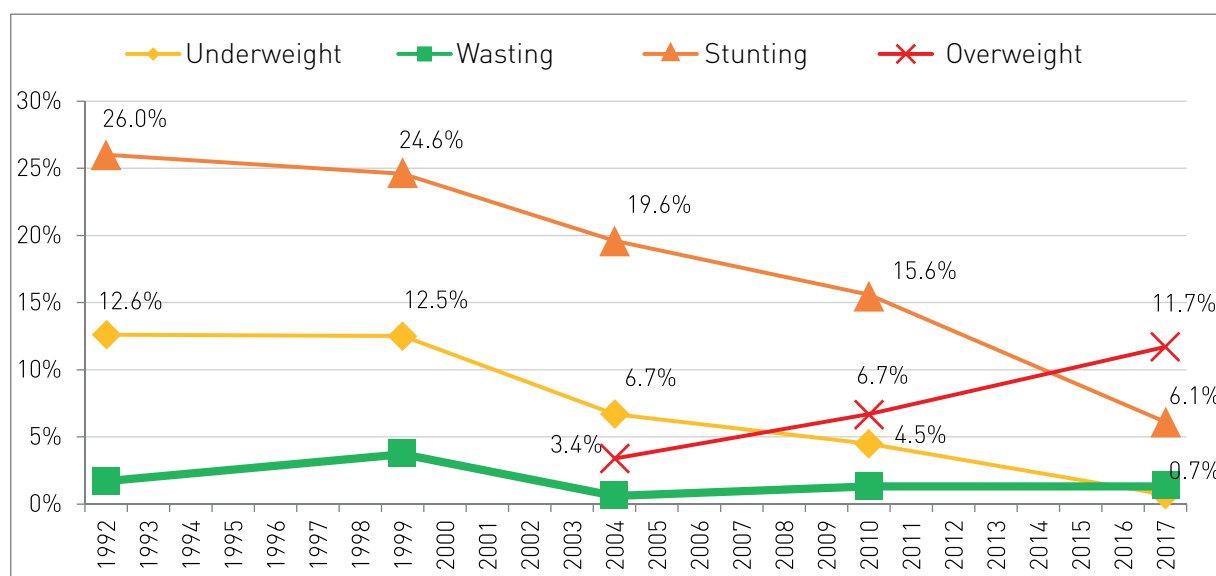
Figure UF.1. Trends of malnutrition in children under 5 years of age in Mongolia, 1992-2017

Sustainable decrease in the prevalence of stunting and underweight has been achieved through implementation of a series of government policies such as "Promotion of maternal and child feeding" and "Prevention of micronutrients deficiencies", and programmes, such as "Food security, safety and nutrition", and "Food security" and "National nutrition", aimed at preventing and reducing prevalence of malnutrition in children under 5 years of age.

Micronutrient deficiency

Since 1992, assessment of micronutrients deficiencies and prevalence of related disorders among children under 5 years of age has been integral part of national nutrition surveys. The national nutrition survey findings had presented that prevalence of iron; vitamin A and D deficiencies are common among children 6-59 months of age and highlighted them as greatest public health concerns in Mongolia.

Prevalence of anemia in children under 5 years of age (48.5%) was first assessed during 2nd National nutrition survey in 1999. Though the percentage of children, having anemia decreased during 1999-2004, it then again increased by from 24.3 to 33.2 percents, as identified by 4th and recent National nutrition surveys, conducted in 2010 and 2017. In 2011, iron status of children 6-59 months of age was initially assessed. According to WHO defined cut-off values, the prevalence of iron deficiency in Mongolian children 6-59 months of age remains at "moderate" level, without significant decrease in last decade, as shown in below (Figure UF.2).
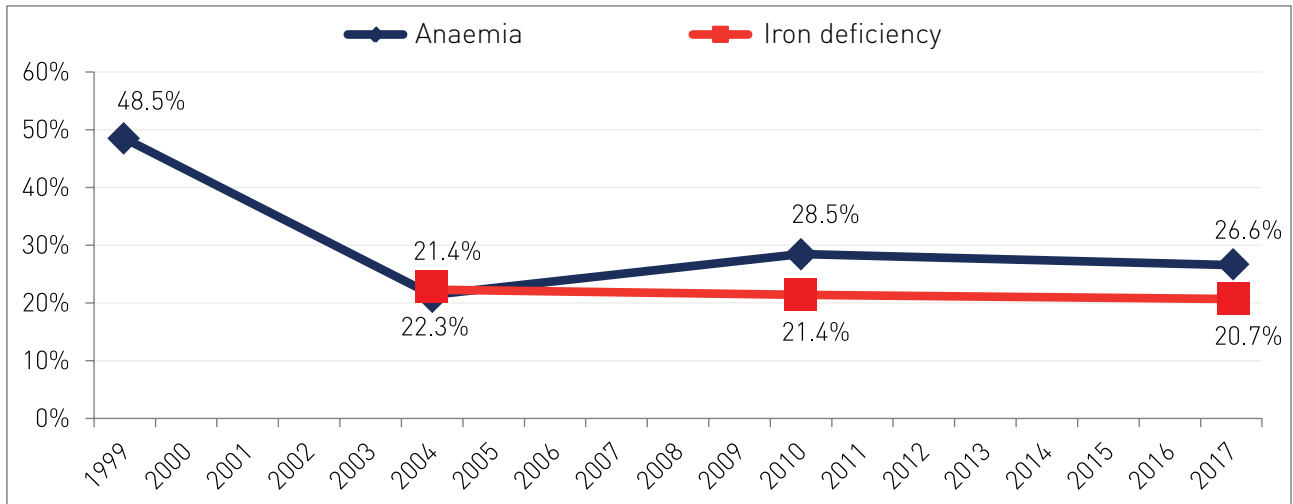
Figure UF.2. Trends of anaemia and iron deficiency in children under 5, 1999-2017

Vitamin A is an essential micronutrient for body maintenance, cell and immune functions, and helps to fight infections, which explains why body's need for vitamin A and D is particularly highest in stages of rapid growth and development in the period of pregnancy, infant and young children, and adolescents. High prevalence of vitamin A and D deficiencies have been revealed in nutrition surveys, including the latest one, which indicated vitamin A deficiency (9.5%) in children aged 6-59 months, substantially decreased from 2010 status (4th NNS), but the prevalence of vitamin A insufficiency or the percentage of children who are at risk for deficiency was far greater (60.1%), as shown in Figure UF.3.

Vitamin D plays important role in normal growth of bone and body requires it to absorb calcium, especially during the stage of body rapid growth. Insufficiency of vitamin D adversely results in bone mineralization, which leads to growth faltering in children, and increased risk of osteoporosis, osteomalacia and bone fractures among adults. Rickets is the manifestation of severe vitamin D deficiency. During nutrition survey, rickets diagnosis was carried out among children under 5 years of age, with any of the clinical symptoms of rickets determined in as much as 75% of children. The recent NNS findings revealed that vitamin D deficiency was highly prevalent, with 61% of (6 out of every 10) children aged 6-59 months, and another 28.9% of them had insufficient level of vitamin D. Comparative analysis of the current prevalence of rickets and vitamin D deficiency in children under 5 years of age with results from all preceding nutrition surveys during 1992-2010 suggested the extent of "hidden hunger" in children to be still persistent without visible downtrends (Figure UF.3).
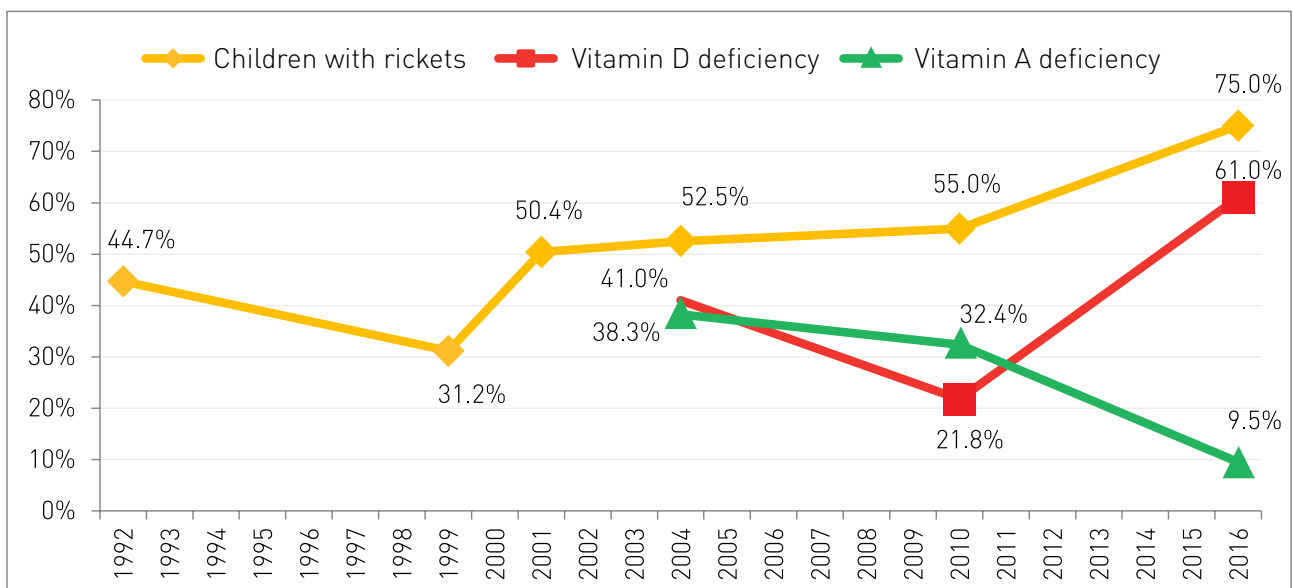
Figure UF. 3: Trends in the prevalence of rickets, vitamin A and D deficiency among children under 5 years of age, 1992-2016

Micronutrient supplementation

In order to address anemia and deficiencies of iron and vitamin A, D that are common among children under 5 years of age, series of interventions, aimed at promoting breastfeeding, diversification of complementary food, and distribution of high dose vitamin A and D, including MMPs, have been implemented. In the recent survey were assessed consumption of vitamin A, D, MMPs, iron supplements and other micronutrients in children under 5 years of age. According to the Health Minister decree on provisions of VMS to children, in particular, high dose vitamin A to all children under 5 years of age twice a year, year around provision of high dose vitamin D to children 0-36 months of age, and MMPs to children 6-23 months of age, however, an example of poor enforcement of this order can be seen from Figure UF.4.
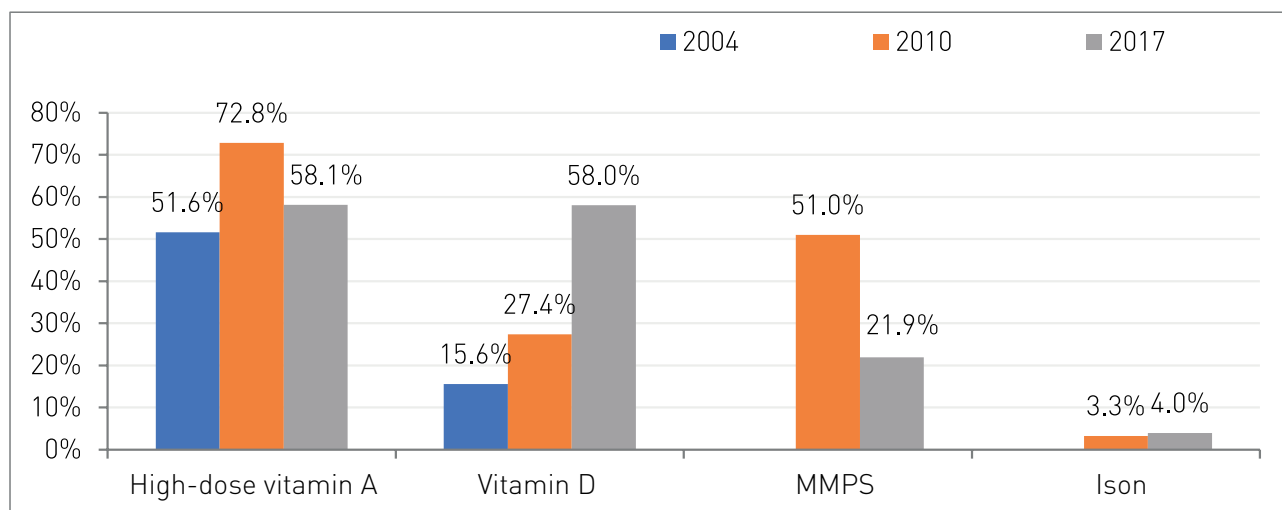
Figure UF. 4: Comparison of consumption of micronutrients among children under 5 years of age, 2004-2017

Provision of MMPs to children 6-23 months of age had been fully funded with grant aids from international organizations and with no budgetary allocation for procurement of MMPs by GoM, no MMPs have been provided to children in recent years. This situation may explain why MMPs consumption dropped so drastically, and prevalence of iron and vitamin D deficiencies still persist.

Though the present survey revealed an increase in vitamin D supplements consumption in children under 5, the percentage of those who reportedly have taken them according to the appropriate frequency was 61.7% only. There are two assumptions that can possibly explain the increased prevalence of vitamin D deficiency despite palpable increase in vitamin D supplements use among children under 5 years. First, the cur-off values for vitamin D deficiency [serum 25(OH) D < 20 ng/ml] and insufficiency (serum 25(OH)D 20-29 ng/ml) used in 5th NNS were different from those used in NNS IV (< 18 ng/ml and 18-23 ng/ml for deficiency and insufficiency, respectively). Second, substantial proportion of children under 5 years of age didn't reportedly take vitamin D supplements as prescribed, and that couldn't help them to prevent from vitamin D deficiency.

In order to address vitamin A deficiency, Mongolia has been providing high dose vitamin A to children under 5 years of age since 2000, but the coverage of the program is still far from being ideal, as revealed by the results of 3rd and all subsequent nutrition surveys (Figure UF.4). Generally, the coverage of vitamin A supplementation can be increased in ways of ensuring effective monitoring and evaluation system in place, which should be an integral part of any activities for distribution of vitamin A supplements at Soum and family health centers.

Infant and young child feeding

The findings from 5th national nutrition survey, regarding breastfeeding and complementary feeding of infants and young children were compared with the results from 4th National Nutrition survey 2010 and Social indicators survey 2013, in which similar methods and indicators had been used to determine the statuses of breastfeeding and complementary feeding of children.

International indicators were used to assess breastfeeding and complementary feeding practices of infant and young children and the results are shown in chronological sequence (Figure UF. 5). Early initiation of breastfeeding within half an hour of birth had been previously recommended by WHO, which later extended to an hour starting from 2007. This had been major cause of decreased rate of early initiation of breastfeeding in 2004 survey, nevertheless, no drastic change has been observed after 2010. A length of exclusive breastfeeding of infants for their first four months of life, as initially recommended by WHO, was later extended to 6 months. This may provide some explanations for drastic decrease in the percentage of children who were exclusively breastfed during periods of 1999-2004, however, the prevalence of exclusive breastfeeding as of 2017 was 13 percentage points lower than it was in 2010 (NNS IV). Moreover, the prevalence of children who were continuously breastfed up to 24 months has been decreasing year after year, as revealed by the findings of all national nutrition surveys (Figure UF. 5).
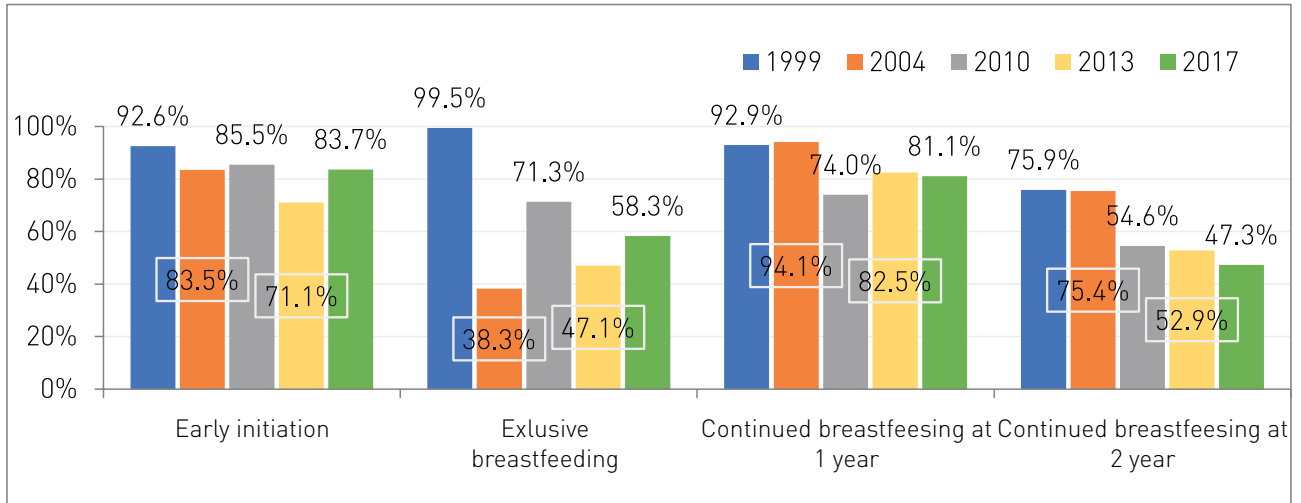
Figure UF. 5. Trends in breastfeeding of young children in Mongolia, 1999-2017

Quality and frequency of complementary feeding practices of infants and young children was assessed against complementary feeding index, the results of which were analyzed in conjunction with other results from 4th NNS in 2010 and national level Social indicator survey in 2013. Quality of complementary feeding practices didn't show much improvement, but the prevalence of minimum meal frequency increased, as provided by the analysis. Consumption of at least 4 food groups by infants and young children is an indication that infants and young children have minimum dietary diversity, an important indicator of adequacy of complementary feeding. The prevalence of minimum dietary diversity as of 2017 hasn't increased from levels in 2010 and 2013. The percentage of children having adequate diet the previous day increased slightly from level in 2013, but this change cannot be taken as real due to differences in sampling methodologies used (Figure UF. 6).
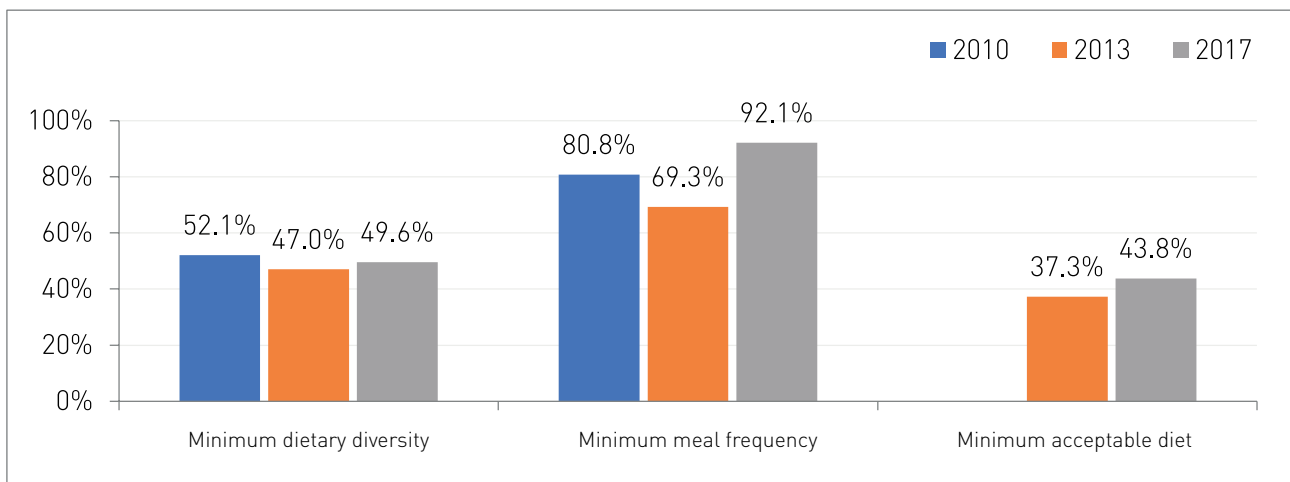
Figure UF. 6. Comparison of complementary feeding practices of young children in Mongolia, 2010-2017

It is now concluded that prevalence of exclusive breastfeeding and the continuation of breastfeeding of infants and young children decreased, with percentage of children having adequate diets remaining unchanged. Survey results reveal greater needs to improve public, particularly the caretakers' knowledge and practices of complementary feeding of young children, and strengthen infants and young child feeding counseling.

CONCLUSION

1. Sustainable decline in prevalence of protein and energy malnutrition among Mongolian children under 5 is observed over the years, with prevalence of stunting, underweight and wasting at 6.1%, 0.7% and 1.3% respectively. Stunting is more prevalent among children from poorer households, Kazakh ethnic group, and with mothers with lower education in Western region.

2. Birth weight of children is a major determinant of children's susceptibility to malnutrition. Prevalence of stunting among children with low birth weight is 4.3 times higher compared to children with normal birth weight. Prevalence of child obesity is 1.8 times higher in children with high birth weight, as compared to those with normal birth weight.

3. 26.6% of Mongolian children under 5 are anemic, with another 10.9% has iron deficiency anemia. Anemia is most prevalent among children under 2 years of age, children from poorer households and with anemic mothers, and children in Western and Khangai regions.

4. Iron deficiency and low body iron stores prevalence among children 6-59 months of age are 20.7% and 22.6%, respectively. Iron deficiency and low body iron stores are most prevalent in children 6-23 months of age, children in Western and Khangai regions, children from poorer households and rural children.

5. 9 out of every 10 children 6-59 months of age in Mongolia have vitamin D deficiency or insufficiency. Though, the prevalence of vitamin A deficiency among children (9.5%) decreased from level in 2010, 6 out of every 10 children still have vitamin A insufficiency.

6. The prevalence of micronutrient supplements use among children under 5 is still not ideal, with 6 out of 10 children reported taking high dose vitamin A, and any of the vitamin D supplements. The consumption of Multiple-micronutrient supplements among all children is extremely low, with only 15.4% of them reported taking on average of 41.3 sachets of MMPs.

7. 83.7% of newborns were breastfed within 1 hour of birth, with 58.3% of children under 6 months of age are exclusively breastfed. The percentage of children who are breastfed until 2 years of age dropped by 7.3 percentage points from level in 2010.

8. More than half of all children 6-23 months of age in Mongolia doesn't have minimum dietary diversity, and 6 out of 10 children don't have adequate diets.

MOTHERS 15-49 YEARS OF AGE

SAMPLE CHARACTERISTICS

Table W.1 provides background characteristics for sampled mothers 15-49 years of age who had a child aged 0-59 months. 90.5% of mothers were between 20-39 years of age and 77.3% were married. A larger percentage of mothers were sampled in urban (66.5%) compared to rural (33.5%) areas. 90% of mothers completed secondary or higher education. Eastern and Khangai regions had the highest percentage of mothers in the poorest wealth quintile (Table W.2). Prevalence of Kazak and other ethnic minority mothers was highest in Eastern (24.6%) and Western (58.7%) regions compared to the other regions (6.9% to 9.5%).

Table W.1: Mothers 15-49 characteristics (National level)			
Percent of mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Total	100.0	1948	1944
Economic region			
Western	12.7	248	408
Khangai	18.0	350	378
Central	14.9	290	389
Eastern	6.5	128	390
Ulaanbaatar	47.9	932	379
Area			
Urban	66.5	1295	925
Rural	33.5	653	1,019
Location			
Capital city	47.9	932	379
Aimag center	18.6	363	546
Soum center	24.3	473	759
Bagh/rural	9.3	180	260
Age			
15-19 years	1.1	20	16
20-29 years	44.1	860	858
30-39 years	46.4	904	901
40-49 years	8.4	164	169
Marital status			
Married	77.3	1506	1,593
Not married	14.7	286	216
Cohabitating	8.0	156	135
Ethnicity			
Khalkh	83.8	1633	1,513
Kazak	3.8	74	102
Durvud	3.0	59	72
Buriad	0.9	18	27
Bayad	1.8	35	37
Dariganga	1.2	23	54
Other	5.5	106	139

Table W.1: Mothers 15-49 characteristics (National level)			
Percent of mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Education			
No education	0.8	25	22
Primary	2.4	47	64
Secondary	42.8	833	851
Higher	54.0	1053	1,007
Employment status			
Not employed	46.5	905	774
Employed	53.5	1043	1,170
Wealth index quintile			
Poorest	20.1	391	523
Second	20.0	390	369
Third	19.6	382	402
Fourth	19.4	378	379
Wealthiest	20.9	408	271

Table W.2: Mothers 15-49 characteristics (Regional level)										
Percent of mothers 15-49 years by selected characteristics in each region, Mongolia National Nutrition Survey, 2017										
Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Total	**100.0**	**66.5**	**33.3**	**12.7**	**18.0**	**14.9**	**6.5**	**47.9**	**1948**	**1944**
Area										
Urban	66.5	100.0	0.0	43.8	34.9	33.9	26.4	100.0	1295	925
Rural	33.5	0.0	100.0	56.2	65.1	66.1	73.6	0.0	653	1,019
Location										
Capital city	47.9	72.0	0.0	0.0	0.0	0.0	0.0	100.0	932	379
Aimag center	18.6	28.0	0.0	43.8	34.9	33.9	26.4	0.0	363	546
Soum center	24.3	0.0	72.4	49.7	29.4	62.0	52.3	0.0	473	759
Bagh/rural	9.3	0.0	72.4	6.5	35.7	4.1	21.3	0.0	180	260
Age										
15-19 years	-	-	-	-	-	-	-	-	-	-
20-29 years	44.1	44.2	43.9	41.1	43.1	47.8	44.6	44.1	860	858
30-39 years	46.4	46.4	46.5	49.6	47.9	43.7	44.4	46.2	904	901
40-49 years	8.4	8.1	9.1	9.3	8.5	7.7	9.7	8.2	164	169
Marital status										
Not married	77.3	17.7	8.7	2.2	10.8	14.9	7.9	20.3	1506	1,593
Married	14.7	72.8	86.1	94.4	80.7	78.9	84.9	69.9	286	216
Cohabitating	8.0	9.4	5.2	3.4	8.5	6.2	7.2	9.8	156	135
Ethnicity										
Khalkh	83.8	86.7	78.1	41.3	91.5	93.1	75.4	90.5	1633	1,513
Kazak	3.8	2.5	6.4	22.8	0.3	0.5	0.0	1.6	74	102
Durvud	3.0	3.0	3.0	14.2	0.5	0.5	0.5	2.1	59	72

Table W.2: Mothers 15-49 characteristics (Regional level)										
Percent of mothers 15-49 years by selected characteristics in each region, Mongolia National Nutrition Survey, 2017										
Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Buriad	0.9	0.9	1.1	0.0	0.3	0.3	5.4	1.1	18	27
Bayad	1.8	2.6	0.3	5.1	0.5	2.1	0.0	1.6	35	37
Dariganga	1.2	0.9	1.8	0.0	0.3	0.3	12.8	0.5	23	54
Other	5.5	3.5	9.4	16.6	6.6	3.3	5.9	2.6	106	139
Education										
No education	0.8	0.5	1.4	2.2	1.3	0.3	1.5	0.3	15	22
Primary	2.4	1.5	4.3	4.9	5.8	0.8	4.1	0.8	47	64
Secondary	42.8	40.7	46.8	33.3	47.9	42.4	53.8	42.0	833	851
Higher	54.0	57.3	47.5	59.6	45.0	56.6	40.5	57.0	1053	1,007
Employment status										
Not employed	46.5	56.0	27.6	35.2	26.7	43.7	34.4	59.4	905	774
Employed	53.5	44.0	72.4	64.8	73.3	56.3	65.6	40.6	1043	1,170
Wealth index quintile										
Poorest	20.1	8.0	44.0	26.6	46.3	13.9	40.3	7.7	391	523
Second	20.0	22.3	15.4	25.0	17.2	16.2	14.6	21.6	390	369
Third	19.6	18.8	21.3	21.3	21.4	21.3	21.5	17.7	382	402
Fourth	19.4	21.3	15.6	16.6	11.4	30.0	19.5	19.8	378	379
Wealthiest	20.9	29.7	3.7	10.5	3.7	18.5	4.1	33.2	408	271

(-) Based on fewer than 25 unweighted cases.

NUTRITION STATUS

Table W.3 presents a summary of the nutrition status and dietary quality of sampled mothers in the NNS V.

Table W.3: Nutrition status and dietary quality		
Percent distribution of weight, height, and anaemia status and minimum dietary diversity among mothers 15-49 years, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Nutrition status [a]		
Underweight	4.1	59
Normal weight	49.6	935
Overweight	29.7	624
Obese	16.5	319
Maternal stature [b]		
< 145 cm	1.3	32
145-149 cm	7.3	159
150-159 cm	52.1	1043
> 160 cm	39.3	702
Anaemia [c]		

Table W.3: Nutrition status and dietary quality		
Percent distribution of weight, height, and anaemia status and minimum dietary diversity among mothers 15-49 years, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
No anaemia	83.8	755
Mild anaemia	12.6	108
Moderate anaemia	3.6	38
Severe anaemia	-	0
Dietary diversity		
Minimum dietary diversity [d]	70.2	1278

a BMI < 18.5 kg/m^2 (underweight); BMI 18.5-24.9 kg/m^2 (normal weight); BMI ⩾ 25.0 kg/m^2 (overweight); BMI ⩾ 30.0 kg/m^2 (obese).

b Height < 145 cm is classified as short stature with women 145-149.9 cm classified as borderline short stature.

c Haemoglobin ⩾ 120 g/l (no anaemia); haemoglobin 110-119 g/l (mild anaemia); haemoglobin 80-109 g/l (moderate anaemia); haemoglobin < 80 g/l (severe anaemia).

d Proportion of mothers who consumed food items from at least 5 out of 10 defined food groups the previous day.
(-) Based on fewer than 25 unweighted cases.

Nearly half of mothers (46.2%) were overweight with 16.5% of mothers obese and 4.1% underweight (Table W.4). The prevalence of underweight was highest among mothers living in urban areas (5.2%), in Ulaanbaatar (6.1%), in the ethnic minority Kazak population (11.6%), and among mothers who were not employed (5.5%) and mothers who were not married (8.6%). The prevalence of overweight in mothers was highest in rural areas (50.1%), married status (49.3%), and lowest in Ulaanbaatar (42.3%) compared to other regions (48.6% to 52.6%). There were no significant differences in the prevalence of underweight (3.2% to 4.7%), overweight (42.3% to 49.2%) or obesity (14.6% to 19.2%) by wealth index quintiles.

Table W.4: Nutrition status										
Percent distribution of nutrition status among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Underweight [a]			Overweight [b]			Obese [c]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Total	4.1	3.0	5.5	46.2	41.9	51.0	16.5	14.5	18.7	1937
Age										
15-19 years	-	-	-	-	-	-	-	-	-	16
20-29 years	6.8	4.8	9.5	34.0	29.8	37.4	11.2	8.8	13.8	855
30-39 years	2.0	1.0	3.8	54.1	49.8	57.8	19.9	16.5	23.0	900
40-49 years	1.4	0.4	4.4	72.4	63.1	78.5	27.7	21.8	37.8	166
Economic region										
Western	3.4	2.0	5.7	48.6	43.5	53.1	14.9	11.6	18.5	408
Khangai	0.8	0.3	2.4	48.9	43.7	57.3	18.4	14.8	22.6	376
Central	3.4	2.0	5.7	50.9	46.1	55.8	16.5	13.5	22.8	387
Eastern	1.5	0.7	3.4	52.6	47.3	57.0	16.4	13.2	20.4	390
Ulaanbaatar	6.1	4.1	9.0	42.3	36.8	46.8	16.2	12.9	20.8	376
Area										
Urban	5.2	3.7	7.3	44.3	40.0	47.6	16.7	14.1	19.8	919
Rural	2.0	1.3	3.1	50.1	47.0	53.4	16.0	14.0	18.7	1,018
Location										

Table W.4: Nutrition status

Percent distribution of nutrition status among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Underweight [a]			Overweight [b]			Obese [c]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Capital city	6.1	4.1	9.0	42.3	36.8	46.8	16.2	12.9	20.4	376
Aimag center	2.8	1.7	4.6	49.4	44.5	53.2	18.1	14.8	21.6	543
Soum center	2.3	1.4	3.7	51.6	47.8	55.2	16.1	13.8	19.3	758
Bagh/rural	1.2	0.4	3.5	46.4	40.2	53.1	15.9	11.7	21.1	260
Ethnicity										
Khalkh	3.9	2.8	5.5	46.2	42.8	48.9	17.2	15.0	19.7	1,507
Kazak	11.6	5.1	24.4	41.7	31.2	53.0	10.9	6.3	18.2	102
Other	3.3	1.3	8.0	48.0	40.8	54.3	13.6	9.7	18.6	328
Education										
No education	-	-	-	-	-	-	-	-	-	22
Primary	3.8	1.2	11.4	45.6	31.3	58.9	20.5	9.8	37.0	64
Secondary	3.4	2.1	5.5	50.7	46.0	54.2	18.4	15.3	21.7	845
Higher	4.7	3.2	6.9	43.0	39.2	46.6	14.9	12.6	17.9	1,006
Employment status										
Not employed	5.5	3.8	8.0	41.5	36.3	47.4	15.3	12.0	18.1	772
Employed	2.9	1.7	4.7	50.4	47.2	54.2	17.5	15.5	20.9	1,165
Marital status										
Married	2.9	1.9	4.3	49.3	43.6	52.4	17.7	15.5	20.2	1,588
Not married	8.6	4.9	14.6	37.8	32.1	46.6	12.7	8.5	19.2	215
Cohabitating	7.6	3.6	15.4	32.1	21.0	38.6	12.2	7.2	20.3	134
Wealth index quintile										
Poorest	3.2	1.5	6.4	47.6	42.7	52.7	14.7	11.5	18.3	522
Second	4.2	2.2	8.2	49.2	41.8	54.4	19.2	14.5	24.1	367
Third	4.2	2.2	7.8	43.7	38.9	50.8	17.6	12.8	22.3	400
Fourth	4.3	2.2	8.0	48.7	41.7	54.0	14.6	10.2	19.0	378
Wealthiest	4.7	2.4	8.9	42.3	35.1	48.5	16.4	12.0	22.3	270

a BMI < 18.5 kg/m^2

b BMI ⩾ 25.0 kg/m^2

c BMI ⩾ 30.0 kg/m^2

(-) Based on fewer than 25 unweighted cases.

The prevalence of short stature among mothers (< 145 cm) was 1.3% with 8.6% of mothers having borderline short stature (< 150 cm) (Table W.5). Mothers in Western (2.4%), Khangai (1.6%) and Eastern (2.6%) regions had higher prevalence of short stature than mothers in Central region (0.8%) and Ulaanbaatar (0.8%) and there was higher prevalence of short stature in Kazak (2.5%) and other ethnic minority (1.8%) mothers compared to Khalkh (1.1%) mothers. Maternal short stature was highest in the poorest mothers with prevalence decreasing with increasing wealth index quintiles.

Table W.5: Maternal short stature						
Percent distribution of short stature among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	< 145 cm [a]			< 150 cm [b]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Total	1.3	0.8	2.0	8.6	7.2	10.2	1937
Age							
15-19 years	-	-	-	-	-	-	16
20-29 years	1.0	0.5	2.0	9.3	7.2	11.9	855
30-39 years	1.1	0.5	2.0	7.0	5.3	9.1	900
40-49 years	4.2	1.8	9.9	12.6	7.5	20.6	166
Economic region							
Western	2.4	1.3	4.5	12.7	9.8	16.3	408
Khangai	1.6	0.7	3.5	10.6	7.9	14.2	376
Central	0.8	0.3	2.4	4.9	3.2	7.6	387
Eastern	2.6	1.4	4.7	13.6	10.5	17.4	390
Ulaanbaatar	0.8	0.3	2.4	7.2	5.0	10.3	376
Area							
Urban	0.9	0.4	2.0	8.3	6.5	10.6	919
Rural	1.9	1.2	3.0	9.1	7.4	11.2	1018
Location							
Capital city	0.8	0.3	2.4	7.2	5.0	10.3	376
Aimag center	1.3	0.6	2.8	11.3	8.8	14.3	543
Soum center	2.0	1.2	3.3	8.1	6.3	10.4	758
Bagh/rural	1.6	0.6	4.1	11.7	8.2	16.6	260
Ethnicity							
Khalkh	1.1	0.7	1.9	7.9	6.4	9.7	1507
Kazak	2.5	0.8	7.5	14.9	8.4	25.0	102
Other	1.8	0.9	3.5	11.3	7.7	16.2	328
Type of dwelling							
Ger	1.2	0.7	2.1	10.7	8.5	13.4	788
Apartment, condominium	0.3	0.1	1.2	4.7	2.7	8.2	402
Convenient family house	2.8	1.0	7.7	8.3	4.9	13.9	208
Single family house	1.4	0.6	3.3	9.0	6.3	12.6	500
Public accommodation	0.0	0.0	0.0	14.3	5.0	34.7	28
Education							
No education	-	-	-	-	-	-	22
Primary	0.0	0.0	0.0	11.9	6.0	22.2	64
Secondary	1.5	0.8	2.6	10.2	8.0	12.9	845
Higher	1.2	0.6	2.2	7.0	5.3	9.2	1006
Employment status							
Not employed	0.7	0.4	1.3	9.2	7.0	11.9	772
Employed	1.8	1.0	3.0	8.1	6.4	10.1	1165

Table W.5: Maternal short stature						
Percent distribution of short stature among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	< 145 cm [a]			< 150 cm [b]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Marital status							
Married	1.2	0.8	2.0	8.3	6.8	10.0	1588
Not married	0.4	0.1	1.7	5.2	2.9	9.1	215
Cohabitating	3.2	1.0	9.4	17.8	10.9	27.6	134
Wealth index quintile							
Poorest	2.1	1.2	3.7	13.0	10.1	16.5	522
Second	1.7	0.7	4.1	10.1	7.0	14.4	367
Third	1.9	0.7	5.0	9.9	6.8	14.2	400
Fourth	0.3	0.1	1.3	5.8	3.4	9.8	378
Wealthiest	0.4	0.1	1.5	4.3	2.2	8.4	270

a Maternal height < 145 cm is classified as short stature.

b Maternal height < 150 cm is classified as borderline short stature.

(-) Based on fewer than 25 unweighted cases.

The overall prevalence of anaemia among mothers was 16.2% with highest prevalence among Kazak (31.9%) and other ethnic minority mothers (25.1%), mothers with secondary education (20.3%) and unemployed mothers (19.9%) (Table W.6). There were no significant differences in the prevalence of anaemia by region, area or wealth index quintiles for mothers.

Table W.6: Anaemia[a]				
Percent distribution of anaemia among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Total	**16.2**	**13.4**	**19.4**	**902**
Age				
15-19 years	-	-	-	8
20-29 years	19.7	15.2	25.2	405
30-39 years	12.0	8.8	16.0	413
40-49 years	20.9	11.1	35.7	76
Economic region				
Western	23.8	18.2	30.6	180
Khangai	14.0	9.7	20.0	178
Central	15.1	10.5	21.3	172
Eastern	12.4	8.3	18.1	178
Ulaanbaatar	16.0	11.5	21.8	194
Area				
Urban	15.3	11.7	19.7	446
Rural	18.3	14.9	22.4	456
Location				
Capital city	16.0	11.5	21.8	194
Aimag center	13.2	9.4	18.2	252

Table W.6: Anaemia[a]				
Percent distribution of anaemia among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Soum center	18.7	14.7	23.5	331
Bagh/rural	17.3	11.3	25.5	125
Ethnicity				
Khalkh	14.3	11.4	17.8	700
Kazak	31.9	19.6	47.3	44
Other	25.1	17.2	35.1	158
Type of dwelling				
Ger	20.4	15.6	26.3	357
Apartment, condominium	11.5	7.0	18.2	184
Convenient family house	17.1	10.6	26.6	95
Single family house	14.9	10.1	21.4	247
Public accommodation	-	-	-	14
Education				
No education	-	-	-	13
Primary	8.7	3.0	22.8	33
Secondary	20.3	15.7	25.9	377
Higher	13.5	10.2	17.7	479
Employment status				
Not employed	19.9	15.3	25.6	365
Employed	12.8	10.0	16.4	537
Marital status				
Married	15.6	12.6	19.2	734
Not married	16.2	9.2	26.8	101
Cohabitating	21.9	12.1	36.3	67
Wealth index quintile				
Poorest	18.3	13.1	24.9	238
Second	21.5	14.4	30.8	157
Third	17.2	11.6	24.6	198
Fourth	15.2	9.6	23.2	176
Wealthiest	10.5	5.7	18.3	133

a Haemoglobin < 120 g/l.

(-) Based on fewer than 25 unweighted cases.

About 60% of mothers had awareness of anaemia, with awareness increasing with maternal age (Table W.7). Awareness was highest among mothers in Ulaanbaatar (63.6%) and those living in wealthier households and was lowest in the Kazak ethnic minority population (43.2%) and mothers with a primary only education level (16.9%) compared to secondary (52.2%) and higher (68.5%).

Table W.7: Awareness of anaemia		
Percent of mothers 15-49 years who were aware of anaemia by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	59.8	1944
Age		
15-19 years	-	16
20-29 years	55.2	858
30-39 years	61.9	901
40-49 years	71.6	169
Economic region		
Western	53.2	408
Khangai	52.9	378
Central	62.4	389
Eastern	57.7	390
Ulaanbaatar	63.6	379
Area		
Urban	60.6	925
Rural	58.2	1019
Location		
Capital city	63.6	379
Aimag center	52.9	546
Soum center	61.7	759
Bagh/rural	49.1	260
Ethnicity		
Khalkh	60.5	1514
Kazak	43.2	102
Other	60.3	328
Type of dwelling		
Ger	51.1	792
Apartment, condominium	69.5	404
Convenient family house	58.0	208
Single family house	63.6	501
Public accommodation	31.9	28
Education		
No education	-	22
Primary	16.9	64
Secondary	52.2	851
Higher	68.5	1007
Employment status		
Not employed	55.3	774
Employed	63.7	1170
Marital status		
Married	62.1	1593
Not married	50.5	216
Cohabitating	54.2	135

Table W.7: Awareness of anaemia

Percent of mothers 15-49 years who were aware of anaemia by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	%	Unweighted Number
Wealth index quintile		
Poorest	50.0	523
Second	53.0	369
Third	57.7	402
Fourth	67.3	379
Wealthiest	70.6	271

(-) Based on fewer than 25 unweighted cases.

Minimum dietary diversity is a proxy indicator for the nutrient content of an adult diet based on consumption of at least 5 of 10 food groups. People who consume food items from at least 5 food groups are likely to consume at least 1 animal-source food and items from 2 or more of the fruit and vegetable food groups. In the NNS V, 70.2% of mothers met the minimum dietary diversity requirement with a higher prevalence in urban areas (74.8%) and Ulaanbaatar (77.5%) (Table W.8). Prevalence of minimum dietary diversity was lowest among mothers living in the poorest households (46.2%) compared to wealthier quintiles (59.7% to 87.6%), those residing in Ger dwellings (52.9%) compared to other types of dwellings (75.1% to 85.6%), and among mothers with a primary only education level (34.4%) compared to secondary (59.5%) and higher (80.8%).

Table W.8: Minimum dietary diversity [a]

Percent distribution of minimum dietary diversity among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Total	**70.2**	**67.7**	**72.6**	**1943**
Age				
15-19 years	-	-	-	16
20-29 years	71.1	67.4	74.6	857
30-39 years	70.1	66.4	73.5	901
40-49 years	66.8	57.5	75.0	169
Economic region				
Western	66.1	61.3	70.5	408
Khangai	59.3	54.2	64.1	378
Central	69.1	64.4	73.5	389
Eastern	56.9	52.0	61.8	390
Ulaanbaatar	77.5	73.0	81.4	378
Area				
Urban	74.8	71.4	77.9	924
Rural	61.1	57.9	64.2	1019
Location				
Capital city	77.5	73.0	81.4	378
Aimag center	67.7	63.5	71.6	546
Soum center	68.2	64.6	71.5	759
Bagh/rural	42.6	36.3	49.2	260
Ethnicity				

Table W.8: Minimum dietary diversity [a]				
Percent distribution of minimum dietary diversity among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Khalkh	71.0	68.2	73.6	1513
Kazak	61.1	49.5	71.6	102
Other	67.4	61.0	73.3	328
Type of dwelling				
Ger	52.9	48.6	57.1	792
Apartment, condominium	85.6	81.1	89.1	404
Convenient family house	75.1	67.5	81.4	208
Single family house	76.8	72.1	80.8	500
Public accommodation	79.4	58.7	91.3	28
Education				
No education	-	-	-	22
Primary	34.4	21.7	49.9	64
Secondary	59.5	55.3	63.5	850
Higher	80.8	77.8	83.5	1007
Employment status				
Not employed	69.0	65.0	72.7	773
Employed	71.2	68.0	74.2	1170
Marital status				
Married	71.8	69.1	74.3	1592
Not married	66.9	59.1	73.8	216
Cohabitating	61.0	50.6	70.5	135
Wealth index quintile				
Poorest	46.2	41.2	51.3	523
Second	59.7	53.4	65.8	368
Third	75.2	69.8	79.9	402
Fourth	81.8	76.8	86.0	379
Wealthiest	87.6	82.4	91.4	271

a Proportion of mothers who consumed food items from at least 5 out of the following 10 food groups the previous day: Grains, white roots, tubers, plantains; pulses (beans, peas, lentils); nuts and seeds; dairy; meat, poultry, fish; eggs; dark green leafy vegetables; other vitamin A-rich fruits and vegetables; other vegetables; other fruits.

(-) Based on fewer than 25 unweighted cases.

RECEIPT OF VITAMIN AND MINERAL SUPPLEMENTATION

About 40% of mothers (39.7%) reported consuming a vitamin and mineral supplement in the previous year (Table W.9). Consumption was higher among mothers in urban areas (42.7%) compared to rural areas (34.0%) with the highest consumption in Ulaanbaatar (45.1%) compared to the other regions (31.0% to 38.1%). Wealth index quintiles were strongly associated with receipt of a vitamin and mineral supplement in the previous year with 60.2% of mothers in the wealthiest households consuming supplementation compared to poorer households (26.5% to 45.6%).

Table W.9: Consumption of vitamin and mineral supplements in previous year		
Percent distribution of vitamin and mineral supplement consumption among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	39.7	1944
Age		
15-19 years	-	16
20-29 years	43.4	858
30-39 years	38.0	901
40-49 years	30.2	169
Economic region		
Western	32.8	408
Khangai	34.9	378
Central	38.1	389
Eastern	31.0	390
Ulaanbaatar	45.1	379
Area		
Urban	42.7	925
Rural	34.0	1019
Location		
Capital city	45.1	379
Aimag center	36.4	546
Soum center	36.1	759
Bagh/rural	28.4	260
Ethnicity		
Khalkh	40.2	1514
Kazak	31.6	102
Other	38.9	328
Education		
No education	-	22
Primary	18.9	64
Secondary	27.8	851
Higher	50.4	1007
Employment status		
Not employed	38.7	774
Employed	40.6	1170
Marital status		
Married	40.6	1593
Not Married	34.6	216
Cohabitating	41.3	135
Wealth index quintile		
Poorest	26.5	523
Second	31.6	369
Third	34.0	402
Fourth	45.6	379
Wealthiest	60.2	271

(-) Based on fewer than 25 unweighted cases.

Approximately 80% of mothers reported receiving a vitamin and mineral supplement during their last pregnancy (82.3%) (Table W.10). Of the mothers who consumed a vitamin and mineral supplement, the majority purchased privately from pharmacies, including those in the poorest households. While most mothers consumed vitamin and mineral supplements during their pregnancy, mothers did not take supplementation with adequate frequency; the median number of vitamin and mineral tablets taken by mothers during their last pregnancy was 60 in all regions which is lower than the WHO recommendation of 180 tablets during pregnancy.

Table W.10: Receipt of vitamin and mineral supplements during last pregnancy								
Percent distribution of vitamin and mineral supplement consumption among mothers 15-49 years during last pregnancy and the source of supplements by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Received vitamin mineral tablets in last pregnancy (%)	Source of vitamins and minerals					Median number tablets taken in last pregnancy	Unweighted Number
		Soum/family health center	Health worker home visit	Private hospital	Purchased from drug store	Don't Know		
Total	82.3	21.8	2.3	0.8	74.8	0.3	60	1621
Age								
15-19 years	-	-	-	-	-	-	-	11
20-29 years	83.3	20.8	2.4	1.1	75.5	0.1	60	728
30-39 years	82.9	22.1	1.9	0.6	74.9	0.4	60	749
40-49 years	77.0	26.9	4.2	0.0	68.4	0.6	60	133
Economic region								
Western	81.9	29.3	1.8	0.0	68.9	0.0	60	334
Khangai	86.8	40.5	2.7	0.6	55.5	0.6	60	328
Central	82.5	15.9	7.5	0.9	74.8	0.9	60	321
Eastern	85.6	34.7	2.1	0.6	61.7	0.9	60	334
Ulaanbaatar	80.2	12.2	0.7	1.0	86.2	0.0	60	304
Area								
Urban	81.3	15.3	1.2	0.9	82.4	0.3	60	767
Rural	84.3	34.3	4.4	0.6	60.3	0.4	60	854
Location								
Capital city	80.2	12.2	0.7	1.0	86.2	0.0	60	304
Aimag center	84.1	22.9	2.6	0.5	73.0	0.9	60	463
Soum center	83.0	32.1	4.3	0.7	62.6	0.4	60	627
Bagh/rural	87.7	39.8	4.7	0.2	54.7	0.6	60	227
Ethnicity								
Khalkh	82.8	20.3	2.6	0.9	75.8	0.4	60	1279
Kazak	61.4	37.8	1.3	0.0	60.8	0.0	30	62
Other	85.3	28.1	0.8	0.0	71.0	0.2	60	280
Education								
No education	-	-	-	-	-	-	-	13
Primary	68.8	66.8	2.8	0.0	27.5	2.8	30	41
Secondary	77.9	27.4	2.6	0.9	68.8	0.3	60	687
Higher	86.6	16.0	1.9	0.7	81.2	0.2	60	880
Employment status								
Not employed	79.2	19.1	1.7	0.8	78.1	0.3	60	611
Employed	85.0	24.0	2.8	0.7	72.1	0.3	60	1010
Marital status								
Married	83.7	21.3	2.2	0.9	75.3	0.3	60	1335
Not Married	77.0	19.9	2.8	0.0	76.7	0.7	60	173
Cohabitating	78.4	30.8	2.3	0.6	66.2	0.0	59	113

Table W.10: Receipt of vitamin and mineral supplements during last pregnancy								
Percent distribution of vitamin and mineral supplement consumption among mothers 15-49 years during last pregnancy and the source of supplements by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Received vitamin mineral tablets in last pregnancy (%)	Source of vitamins and minerals					Median number tablets taken in last pregnancy	Unweighted Number
		Soum/family health center	Health worker home visit	Private hospital	Purchased from drug store	Don't Know		
Wealth index quintile								
Poorest	84.3	41.6	3.6	0.4	54.0	0.4	60	448
Second	80.3	25.7	3.2	0.2	70.6	0.3	57	303
Third	79.4	19.4	2.8	1.7	75.9	0.2	60	323
Fourth	79.4	15.8	1.6	0.8	81.6	0.2	60	312
Wealthiest	87.6	7.3	0.6	0.7	91.0	0.4	90	235

(-) Based on fewer than 25 unweighted cases.

ANTENATAL CARE COVERAGE

About 90% of mothers possessed an ANC guide (87.4%) or MCH (90.9%) handbook (Table W.11). Receipt of at least one antenatal care (ANC) visit by a skilled provider was universally high (99.0%) among mothers who gave birth in the previous two years (Table W.12). There were no significant differences in the receipt of at least one ANC visit from a skilled provider by area, wealth index quintiles, region or ethnic groups.

Table W.11: Possession of ANC guide book or MCH handbook		
Percent of mothers 15-49 years who had ANC guide or MCH handbook, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	100.0	1944
ANC guide book		
Yes	87.4	1701
No	12.6	243
MCH guide book		
Yes	90.9	1752
No	9.1	192

Table W.12: Antenatal care coverage				
Percent distribution of at least one antenatal care (ANC) visit and provider of ANC among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Provider of antenatal care		No antenatal care	Unweighted Number
	Unskilled provider	Skilled provider [a]		
Total	0.7	99.0	0.3	1944
Economic region				
Western	0.5	99.3	0.2	408
Khangai	0.3	99.7	0.0	378
Central	0.3	99.7	0.0	389
Eastern	0.0	99.7	0.3	390
Ulaanbaatar	1.1	98.4	0.5	379
Area				
Urban	0.9	98.7	0.5	925
Rural	0.2	99.8	0.0	1019

Table W.12: Antenatal care coverage

Percent distribution of at least one antenatal care (ANC) visit and provider of ANC among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Provider of antenatal care		No antenatal care	Unweighted Number
	Unskilled provider	Skilled provider [a]		
Location				
Capital city	1.1	98.4	0.5	379
Aimag center	0.4	99.4	0.3	546
Soum center	0.3	99.7	0.0	759
Bagh/rural	0.0	100.0	0.0	260
Age				
15-19 years	-	-	-	16
20-29 years	0.8	99.1	0.0	858
30-39 years	0.5	99.4	0.1	901
40-49 years	0.4	98.1	1.5	169
Marital status				
Not married	2.9	97.1	0.0	216
Married	0.3	99.5	0.2	1593
Cohabitating	0.0	98.2	1.8	135
Ethnicity				
Khalkh	0.7	99.0	0.3	1514
Kazak	0.8	99.2	0.0	102
Other	0.3	99.5	0.3	328
Education				
No education	-	-	-	22
Primary	0.0	100.0	0.0	64
Secondary	1.0	98.3	0.7	851
Higher	0.4	99.6	0.0	1007
Employment status				
Not employed	1.1	98.3	0.6	774
Employed	0.3	99.7	0.0	1170
Wealth index quintile				
Poorest	0.0	99.8	0.2	523
Second	1.7	97.0	1.3	369
Third	0.8	99.2	0.0	402
Fourth	0.7	99.3	0.0	379
Wealthiest	0.2	99.8	0.0	271

a Skilled health provider includes doctor, nurse, midwife or other medically-trained personnel.

(-) Based on fewer than 25 unweighted cases.

The WHO recommends that expectant mothers receive at least 4 ANC visits during their pregnancy with the first visit occurring during the first trimester. More than 90% of mothers (94.3%) had 4 or more ANC visits during their last pregnancy (Table W.13). Nearly half of mothers (46.4%) received their first ANC visit during the first trimester with nearly all other mothers (50.7%) receiving their first ANC visit in the second trimester (Table W.14). Appropriate receipt of ANC in the first trimester was highest in the wealthiest mothers (61.6%) with only 30.7% of the poorest mothers receiving ANC in the first trimester. Prevalence was also highest in Ulaanbaatar (52.8%) with lowest prevalence in Western region (35.0%).

Table W.13: Number of antenatal care visits							
Percent distribution of the number of antenatal care (ANC) visits among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Percent distribution of mothers who had:						Unweighted Number
	No antenatal care visits	1 visit	2 visits	3 visits	4 or more visits	Don't know	
Total	0.3	0.3	1.4	3.3	94.3	0.4	1944
Economic region							
Western	0.2	0.2	0.7	7.8	90.5	0.5	408
Khangai	0.0	0.5	1.6	4.5	93.1	0.3	378
Central	0.0	0.5	0.3	2.8	96.1	0.3	389
Eastern	0.3	0.0	1.0	2.6	96.2	0.0	390
Ulaanbaatar	0.5	0.3	1.8	1.8	95.0	0.5	379
Area							
Urban	0.5	0.2	1.7	3.0	94.2	0.6	925
Rural	0.0	0.6	0.8	3.9	94.6	0.1	1019
Location							
Capital city	0.5	0.3	1.8	1.8	95.0	0.5	379
Aimag center	0.3	0.0	1.2	5.9	92.1	0.6	546
Soum center	0.0	0.8	0.4	3.6	95.0	0.1	759
Bagh/rural	0.0	0.0	1.8	4.6	93.6	0.0	260
Age							
15-19 years	-	-	-	-	-	-	16
20-29 years	0.0	0.5	2.1	4.3	92.8	0.3	858
30-39 years	0.1	0.0	0.6	2.0	96.8	0.5	901
40-49 years	1.5	1.5	1.9	3.2	91.5	0.4	169
Marital status							
Not married	0.0	0.0	3.8	4.4	91.5	0.3	216
Married	0.2	0.3	1.0	2.8	95.4	0.2	1593
Cohabitating	1.8	1.0	0.6	5.4	89.1	2.2	135
Ethnicity							
Khalkh	0.3	0.4	1.3	2.8	94.8	0.4	1514
Kazak	0.0	0.0	0.8	12.4	86.8	0.0	102
Other	0.3	0.3	1.7	3.9	93.7	0.3	328
Education							
No education	-	-	-	-	-	-	22
Primary	0.0	1.3	2.6	7.1	89.0	0.0	64
Secondary	0.7	0.1	1.7	4.5	92.6	0.4	851
Higher	0.0	0.5	1.1	1.9	96.1	0.4	1007
Employment status							
Not employed	0.6	0.0	2.0	3.6	93.4	0.4	774
Employed	0.0	0.6	0.8	3.0	95.2	0.4	1170
Wealth index quintile							
Poorest	0.2	0.3	1.7	4.5	93.0	0.3	523
Second	1.3	0.0	0.2	5.0	93.3	0.2	369
Third	0.0	0.2	2.1	4.1	93.5	0.0	402
Fourth	0.0	1.1	1.5	2.1	95.1	0.2	379
Wealthiest	0.0	0.0	1.2	0.9	96.7	1.2	271

(-) Based on fewer than 25 unweighted cases.

Table W.14: Timing of the receipt of the first antenatal care visit

Percent distribution of the first antenatal care (ANC) visit by trimester of pregnancy among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	First trimester	Second trimester	Third trimester	No antenatal care visits	Don't know or missing	Unweighted Number
Total	**46.4**	**50.8**	**2.1**	**0.3**	**0.4**	**1944**
Economic region						
Western	35.0	62.3	2.0	0.2	0.5	407
Khangai	42.6	53.7	2.9	0.0	0.8	378
Central	41.9	55.3	2.6	0.0	0.3	389
Eastern	43.3	54.1	1.5	0.3	0.8	389
Ulaanbaatar	52.8	44.6	1.8	0.5	0.3	377
Area						
Urban	50.2	47.1	1.9	0.5	0.3	921
Rural	38.9	57.8	2.6	0.0	0.6	1019
Location						
Capital city	52.8	44.6	1.8	0.5	0.3	377
Aimag center	43.7	53.6	2.0	0.3	0.5	544
Soum center	39.7	57.1	2.5	0.0	0.6	759
Bagh/rural	36.9	59.7	2.9	0.0	0.5	260
Age						
15-19 years	-	-	-	-	-	15
20-29 years	47.0	50.5	2.4	0.0	0.2	857
30-39 years	46.2	51.9	1.3	0.1	0.6	900
40-49 years	48.2	45.2	4.2	1.5	0.9	168
Marital status						
Not married	43.3	52.6	3.2	0.0	0.9	216
Married	47.9	50.2	1.4	0.2	0.3	1591
Cohabitating	38.4	51.9	7.5	1.8	0.5	133
Ethnicity						
Khalkh	47.4	50.1	1.9	0.3	0.4	1511
Kazak	29.4	63.1	6.6	0.0	0.8	102
Other	45.1	51.2	2.7	0.3	0.7	327
Education						
No education	-	-	-	-	-	22
Primary	24.4	72.2	1.4	0.0	2.0	64
Secondary	40.6	55.4	2.7	0.7	0.6	848
Higher	52.1	46.0	1.7	0.0	0.1	1006
Employment status						
Not employed	47.4	49.0	2.5	0.6	0.4	771
Employed	45.6	52.1	1.9	0.0	0.4	1169
Wealth index quintile						
Poorest	30.7	65.0	3.5	0.2	0.7	522
Second	40.5	55.9	2.2	1.3	0.1	366
Third	46.3	51.2	2.2	0.0	0.2	402
Fourth	52.6	44.6	1.9	0.0	0.9	379
Wealthiest	61.6	37.2	1.0	0.0	0.2	271

(-) Based on fewer than 25 unweighted cases.

The majority of mothers received ANC from a *soum* health center (67.3%) with fewer of mothers receiving ANC from the *aimag* central hospital (25.7%) and maternity houses (5.9%) (Table W.15). Only 0.9% of mothers received ANC from a private hospital with nearly all mothers accessing ANC services from government health institutions (98.9%).

Table W.15: Place of receipt for antenatal care						
Percent distribution of the place of receipt for antenatal care among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Maternity House	Aimag Central Hospital	Soum Health Center	Private Hospital	Other	Unweighted Number
Total	**5.9**	**25.7**	**67.3**	**0.9**	**0.2**	**1940**
Economic region						
Western	2.2	8.3	89.4	0.0	0.0	407
Khangai	1.6	11.4	86.5	0.5	0.0	378
Central	6.4	25.5	67.6	0.3	0.3	389
Eastern	3.3	6.7	89.5	0.5	0.0	389
Ulaanbaatar	8.8	38.5	50.9	1.6	0.3	377
Area						
Urban	6.7	33.5	58.3	1.3	0.2	921
Rural	4.4	10.4	84.9	0.2	0.0	1019
Location						
Capital city	8.8	38.5	50.9	1.6	0.3	377
Aimag center	1.4	20.7	77.3	0.5	0.2	544
Soum center	5.8	11.8	82.1	0.3	0.0	759
Bagh/rural	0.9	6.8	92.3	0.0	0.0	260
Age						
15-19 years	-	-	-	-	-	15
20-29 years	6.8	25.7	66.7	0.7	0.1	857
30-39 years	5.3	25.2	68.6	0.6	0.3	900
40-49 years	4.0	26.8	65.4	3.8	0.0	168
Marital status						
Not married	4.2	38.3	57.2	0.3	0.0	216
Married	5.5	23.5	69.7	1.1	0.2	1591
Cohabitating	13.5	23.9	62.6	0.0	0.0	133
Ethnicity						
Khalkh	6.5	26.9	65.5	0.9	0.2	1511
Kazak	7.5	27.5	65.0	0.0	0.0	102
Other	1.8	16.9	80.1	1.2	0.0	327
Education						
No education	-	-	-	-	-	22
Primary	1.3	15.6	83.1	0.0	0.0	64
Secondary	5.7	22.5	71.3	0.4	0.0	848
Higher	6.3	28.9	63.1	1.4	0.3	1006
Employment status						
Not employed	5.7	31.8	62.1	0.4	0.1	771
Employed	6.1	20.5	71.7	1.4	0.2	1169

Table W.15: Place of receipt for antenatal care						
Percent distribution of the place of receipt for antenatal care among mothers 15-49 years with a live birth in the last two years by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Maternity House	Aimag Central Hospital	Soum Health Center	Private Hospital	Other	Unweighted Number
Wealth index quintile						
Poorest	3.2	13.9	82.9	0.0	0.0	522
Second	3.1	32.8	64.0	0.1	0.0	366
Third	6.3	19.4	74.0	0.2	0.0	402
Fourth	6.8	24.6	67.9	0.7	0.0	379
Wealthiest	10.0	37.3	48.5	3.4	0.8	271

(-) Based on fewer than 25 unweighted cases.

Nearly all mothers delivered their babies in a public hospital or maternity ward (97.6%) with only 1.5% of mothers delivering in a private hospital or maternity clinic and 0.1% of mothers delivering at home (Table W.16).

Table W.16: Place of delivery					
Percent distribution of the place of last delivery among mothers age 15-49 years with a live birth in the last two years, Mongolia National Nutrition Survey, 2017					
Characteristics	Public hospital/ maternity ward	Private hospital/ maternity clinic	At home	Other	Unweighted Number
Total	**97.7**	**1.5**	**0.1**	**0.7**	**1944**
Economic region					
Western	99.3	0.2	0.0	0.5	408
Khangai	98.9	0.8	0.3	0.0	378
Central	98.5	0.5	0.3	0.8	389
Eastern	98.7	0.3	0.3	0.8	390
Ulaanbaatar	96.3	2.6	0.0	1.1	379
Area					
Urban	96.9	2.1	0.1	0.9	925
Rural	99.1	0.3	0.2	0.4	1019
Location					
Capital city	96.3	2.6	0.0	1.1	379
Aimag center	98.4	0.8	0.3	0.5	546
Soum center	98.7	0.5	0.2	0.6	759
Bagh/rural	100.0	0.0	0.0	0.0	260
Age					
15-19 years	-	-	-	-	16
20-29 years	98.8	1.1	0.0	0.1	858
30-39 years	97.3	1.7	0.2	0.8	901
40-49 years	94.5	3.2	0.0	2.3	169
Marital status					
Not married	97.8	1.1	0.0	1.1	216
Married	97.7	1.7	0.0	0.5	1593
Cohabitating	96.6	0.6	1.1	1.8	135
Ethnicity					
Khalkh	97.6	1.5	0.1	0.8	1514
Kazak	98.4	0.0	0.0	1.6	102
Other	97.5	2.0	0.3	0.1	328

Table W.16: Place of delivery					
Percent distribution of the place of last delivery among mothers age 15-49 years with a live birth in the last two years, Mongolia National Nutrition Survey, 2017					
Characteristics	Public hospital/ maternity ward	Private hospital/ maternity clinic	At home	Other	Unweighted Number
Education					
No education	-	-	-	-	22
Primary	98.7	0.0	0.0	1.3	64
Secondary	98.5	0.7	0.2	0.6	851
Higher	96.9	2.3	0.0	0.8	1007
Employment status					
Not employed	98.2	1.1	0.0	0.7	774
Employed	97.1	1.9	0.2	0.8	1170
Wealth index quintile					
Poorest	99.7	0.0	0.3	0.0	523
Second	98.6	0.2	0.2	0.9	369
Third	98.6	0.5	0.0	1.0	402
Fourth	99.1	0.1	0.0	0.8	379
Wealthiest	92.5	6.5	0.0	0.9	271

(-) Based on fewer than 25 unweighted cases.

RECEIPT OF COUNSELING MESSAGES

As shown in Table W.17, there was wide variation in the counseling messages mothers received during child health visits to health centres. Counseling messages on immediate and exclusive breastfeeding were provided to 83.3% and 87.7% of mothers, respectively. Counseling on child meal frequency was provided to 77.0% of mothers and 74.7% of mothers received counseling on child dietary diversity, with 65.2% of mothers receiving specific messages about giving iron-rich foods to young children. There was little regional variation in the types of messages provided to mothers during child visits to health centres, though Central region had a higher prevalence of mothers reporting receipt of breastfeeding messages (Table W.18).

Table W.17: Receipt of counseling messages		
Percent of mothers 15-49 years who received counseling messages during child visits to health centres, Mongolia National Nutrition Survey, 2017		
Counseling message	%	Unweighted Number
Immediate breastfeeding after birth	83.3	1641
Exclusive breastfeeding for 6 months	87.7	1720
Giving complementary foods	77.9	1555
Giving semi-solid or solid foods after 6 months of age	89.4	1733
Giving food from 4 or more food groups after 6 months of age	74.7	1485
Giving food 3 or more times per day after 6 months of age	77.0	1532
Giving iron-rich foods to child	65.2	1281
Giving MMP after 6 months of age	63.4	1265
Hand washing with soap and water	86.7	1704
Giving high-dose vitamin A supplements	75.8	1484
Care of child during diarrhoea	67.0	1323
Oral rehydration for diarrhoea	76.3	1484
Safe disposal of child faeces	60.4	1235

Table W.18: Receipt of counseling messages by region

Percent of mothers 15-49 years who received counseling messages during child visits to health centres by region, Mongolia National Nutrition Survey, 2017

Counseling message	Western	Khangai	Central	Eastern	Ulaanbaatar	Total
Immediate breastfeeding after birth	80.9	83.9	90.7	85.6	81.0	83.3
Exclusive breastfeeding for 6 months	85.1	90.7	94.3	87.2	85.2	87.7
Giving complementary foods	79.2	78.3	83.0	84.4	74.9	77.9
Giving semi-solid or solid foods after 6 months of age	86.3	90.7	93.8	86.4	88.7	89.4
Giving food from 4 or more food groups after 6 months of age	76.7	69.8	83.5	79.0	72.6	74.7
Giving food 3 or more times per day after 6 months of age	77.7	78.3	84.6	79.7	73.6	77.0
Giving iron-rich foods to child	66.8	61.6	72.5	64.4	63.9	65.2
Giving MMP after 6 months of age	64.6	81.7	58.8	62.6	57.8	63.4
Hand washing with soap and water	88.6	89.2	93.3	83.6	83.6	86.7
Giving high-dose vitamin A supplements	76.5	80.2	78.4	73.1	73.6	75.8
Care of child during diarrhoea	70.9	60.6	74.5	67.9	66.0	67.0
Oral rehydration for diarrhoea	78.7	74.6	78.4	73.8	76.0	76.3
Safe disposal of child faeces	73.5	54.8	70.2	62.8	55.7	60.4

FIRST COMPLEMENTARY FOODS PROVIDED TO CHILDREN

Table W.19 presents the complementary foods mothers first provided to their children. The most commonly provided first foods were semolina (30.3%) and bantan (29.3%) in all areas, regions, and household wealth quintiles. Yogurt was commonly given to children in households in the two wealthiest quintiles (18.9% and 12.4%) compared to the poorer wealth index quintiles (8.7% to 9.5%). The feeding of bantan, a meat and wheat flour porridge, as an initial complementary food was highest in the poorest households (44.1%) and lowest in the wealthiest households (15.2%).

Table W.19: First complementary foods given to child

Percent distribution of first complementary foods given to children by mothers by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Bantan	Meat Broth	Porridge	Yogurt	Milk	Semolina	Nan/ Milasan baby food	Fruit puree (mashed/ industrial)	Vegetable puree (mashed/ industrial)	Not yet given foods	Unweighted Number
Total	29.3	5.3	3.8	11.8	2.8	30.3	3.7	2.9	0.5	4.7	1946
Economic region											
Western	35.2	6.3	2.7	6.6	7.1	33.0	0.7	0.7	0.0	3.4	409
Khangai	39.9	5.3	2.1	9.8	2.1	22.8	2.1	3.2	0.5	9.0	378
Central	27.6	4.9	5.6	12.5	2.3	32.2	3.8	4.1	0.0	3.3	391
Eastern	28.5	4.1	5.1	10.0	1.8	41.3	1.8	1.8	0.5	1.3	390
Ulaanbaatar	24.3	5.3	4.0	14.0	2.1	30.4	5.3	3.2	0.8	4.2	378
Area											
Urban	25.8	5.9	4.2	13.0	2.5	31.0	4.1	2.9	0.7	4.5	926
Rural	36.2	4.1	3.0	9.5	3.3	29.0	2.9	2.9	0.2	4.9	1020
Location											
Capital city	24.3	5.3	4.0	14.0	2.1	30.4	5.3	3.2	0.8	4.2	378
Aimag center	29.6	7.3	4.7	10.4	3.5	32.5	1.1	2.3	0.3	5.2	548

Table W.19: First complementary foods given to child											
Percent distribution of first complementary foods given to children by mothers by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Bantan	Meat Broth	Porridge	Yogurt	Milk	Semolina	Nan/ Milasan baby food	Fruit puree (mashed/ industrial)	Vegetable puree (mashed/ industrial)	Not yet given foods	Unweighted Number
Soum center	33.9	5.0	3.3	8.7	3.3	30.6	2.9	3.3	0.0	4.4	759
Bagh/rural	42.2	1.9	2.4	11.7	3.1	24.9	2.8	1.9	0.7	6.4	261
Age											
15-19 years	-	-	-	-	-	-	-	-	-	-	16
20-29 years	30.7	4.5	3.4	10.3	2.9	31.8	2.6	2.7	0.1	5.7	854
30-39 years	27.9	5.5	3.9	13.9	2.4	30.3	4.3	2.7	1.0	3.8	898
40-49 years	26.7	9.3	6.1	9.1	3.4	27.4	6.6	4.3	0.0	2.3	169
Marital status											
Not married	31.3	5.9	3.5	11.8	1.1	28.9	3.9	2.4	0.3	5.5	214
Married	27.6	5.3	4.0	12.4	3.0	30.7	3.9	3.3	0.6	4.7	1590
Cohabitating	38.2	4.1	2.4	7.3	1.6	32.6	1.3	0.6	0.0	3.5	133
Ethnicity											
Khalkh	29.6	5.2	4.2	12.4	2.0	28.8	4.1	3.4	0.6	4.9	1489
Kazak	24.3	20.0	4.4	15.4	7.6	18.9	0.0	0.0	0.0	4.2	101
Other	29.0	2.0	1.3	7.7	6.2	42.7	2.3	1.0	0.1	3.3	356
Education											
No education	-	-	-	-	-	-	-	-	-	-	22
Primary	36.3	5.8	2.6	9.1	0.0	24.5	5.2	0.0	0.0	3.9	64
Secondary	37.5	5.1	2.3	8.7	2.8	31.2	1.1	2.7	0.8	3.6	847
Higher	21.8	5.4	5.2	14.4	2.7	30.5	5.8	3.3	0.3	5.6	1004
Employment status											
Not employed	27.3	5.7	3.6	11.7	2.1	31.3	3.5	3.5	0.6	5.4	769
Employed	30.4	5.0	4.0	12.1	3.2	30.1	3.9	2.4	0.5	4.1	1168
Wealth index quintile											
Poorest	44.1	2.9	2.0	9.1	4.2	25.6	1.1	2.3	0.4	5.2	524
Second	34.1	7.3	1.8	9.5	2.8	33.5	2.2	0.6	0.2	2.3	369
Third	30.1	6.3	2.3	8.7	2.6	31.6	2.5	5.4	0.0	5.7	401
Fourth	23.3	5.5	6.4	12.4	2.9	33.9	3.7	3.0	0.0	3.8	380
Wealthiest	15.2	4.4	6.3	18.9	1.4	27.5	8.7	3.3	1.8	6.2	272

(-) Based on fewer than 25 unweighted cases.

MEDIA SOURCES FOR HEALTH INFORMATION

Mothers were asked about the media sources they access for health information. As shown in Table W.20, 95.3% of mothers received health information from watching television at least once per week, followed by reading the newspaper (44.0%) and listening to the radio (13.0%). Watching television was common in urban (95.0%) and rural (95.8%) areas and in all regions, ethnic groups, and household wealth quintiles. About two-thirds of mothers (66.0%) reported receiving health information from the internet at least once per week.

Table W.20: Media sources for health information							
Percent distribution of media sources for health information among mothers 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Newspaper at least once per week	Radio at least once per week	TV at least once per week	Newspaper, radio, and TV at least once per week	≥ 1 media source at least once per week	No newspaper, radio or TV	Internet at least once per week	Unweighted Number
Total	44.0	13.0	95.3	8.5	96.6	3.4	66.0	1944
Economic region								
Western	57.0	18.1	95.8	13.7	96.8	3.2	61.2	408
Khangai	32.0	10.8	95.2	4.5	96.0	4.0	46.0	378
Central	52.9	16.2	97.2	11.5	98.2	1.8	73.8	389
Eastern	42.6	12.3	92.3	8.5	94.9	5.1	52.3	390
Ulaanbaatar	42.5	11.6	95.0	7.7	96.6	3.4	74.1	379
Area								
Urban	42.2	11.7	95.0	7.6	96.6	3.4	71.7	925
Rural	47.5	15.7	95.8	10.3	96.8	3.2	54.6	1019
Location								
Capital city	42.5	11.6	95.0	7.7	96.6	3.4	74.1	379
Aimag center	41.6	11.8	95.1	7.4	96.5	3.5	65.4	546
Soum center	54.6	15.1	97.1	11.4	97.9	2.1	65.9	759
Bagh/rural	29.0	17.3	92.5	7.5	93.9	6.1	25.0	260
Age								
15-19 years	-	-	-	-	-	-	-	16
20-29 years	45.4	12.0	95.2	7.8	96.5	3.5	71.3	858
30-39 years	42.4	12.9	95.3	8.7	96.8	3.2	64.3	901
40-49 years	46.0	18.8	95.1	11.5	96.2	3.8	47.9	169
Marital status								
Not married	42.8	11.6	96.0	8.9	96.9	3.1	65.8	216
Married	44.4	12.6	95.7	8.1	96.8	3.2	66.6	1593
Cohabitating	42.5	19.6	89.7	11.1	94.4	5.6	59.9	135
Ethnicity								
Khalkh	42.7	12.4	95.3	8.0	96.5	3.5	66.4	1514
Kazak	45.6	24.8	91.8	16.5	93.4	6.6	50.2	102
Other	52.7	13.4	96.1	9.1	98.5	1.5	67.6	328
Education								
No education	-	-	-	-	-	-	-	22
Primary	11.8	9.7	84.4	4.5	87.7	12.3	9.8	64
Secondary	37.9	15.7	93.7	9.3	95.6	4.4	41.8	851
Higher	50.9	11.2	97.4	8.1	98.2	1.8	88.5	1007
Employment status								
Not employed	40.2	10.6	95.1	7.1	96.2	3.8	61.8	774
Employed	47.3	15.1	95.4	9.7	97.0	3.0	69.6	1170
Wealth index quintile								
Poorest	36.9	18.4	92.9	10.6	94.2	5.8	32.7	523
Second	44.9	9.7	94.8	7.2	96.4	3.6	54.3	369
Third	46.2	11.5	95.5	7.6	96.2	3.8	64.3	402
Fourth	50.1	15.2	95.0	10.7	96.8	3.2	82.4	379
Wealthiest	42.3	10.4	98.1	6.4	99.5	0.5	95.3	271

(-) Based on fewer than 25 unweighted cases.

DISCUSSION

Nutrition status

A current prevalence of overweight and obesity in mothers 15-49 years of age (62.7%) was about 30 percentage points higher than it was 5 years ago (32.9%) during the 4th National nutrition survey. It shows rapid increase, that is statistically significant (p<0.001), in the prevalence of overweight and obesity during last 5 years.

As we look at the relationship between age and prevalence of overweight and obesity, the prevalence increases with maternal age: 34.0% in mothers 20-29 years of age, followed by 54.1% in 30-39, and 72.4% in mothers 40-49 years of age. The prevalence of overweight and obesity increased by 10.7, 14.1 and 15.5 percentage points in mothers 20-29, 30-39 and 40-49 years of age, respectively, compared to results of previous survey (Figure W.1).
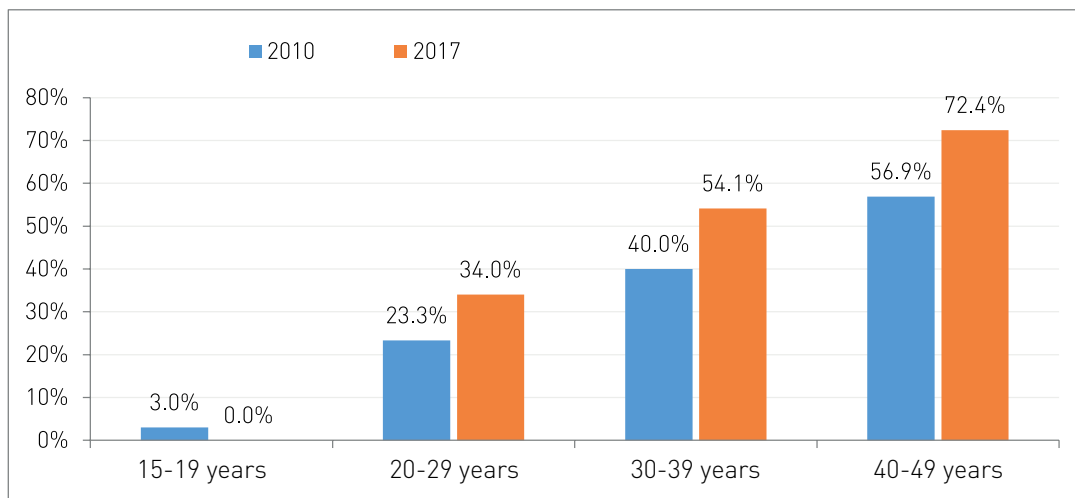
Figure W.1: Percent distribution of overweight in women of reproductive age, by age groups and survey years

Figure W.1 shows prevalence of overweight and obesity increases with maternal age. For example, every second mother in 30-39 age group, and 3/4 of mothers 40-49 years of age are overweight or obese, which stresses the need for an action.

The comparison of results from 4th and 5th National nutrition surveys suggests that the prevalence of overweight and obesity universally increased in all regions (Figure W.2).
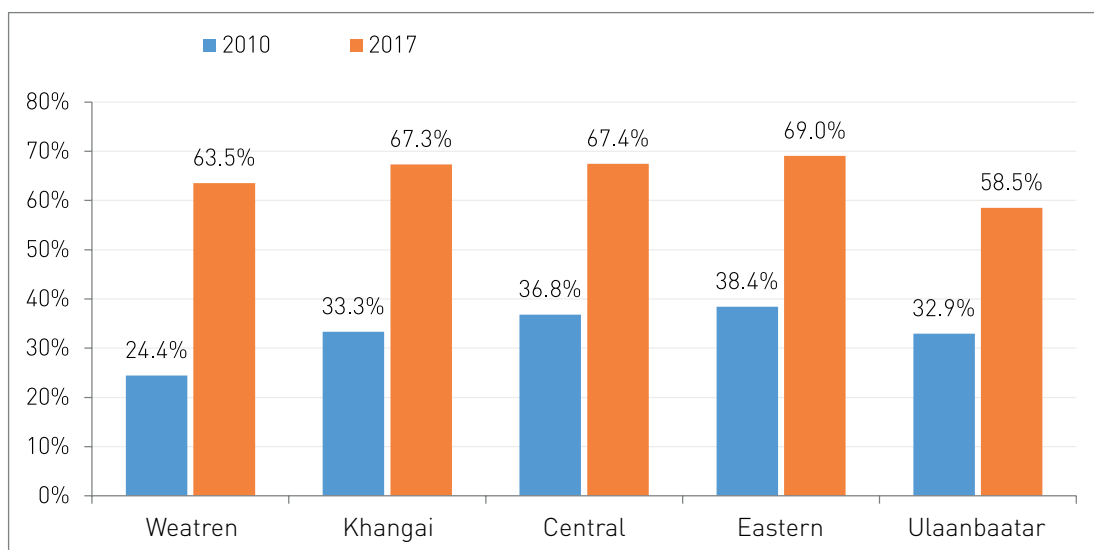
Figure W.2: Percent distribution of overweight and obesity among women of reproductive age, by regions and survey years

Figure W.2 provides regional increase in prevalence of overweight and obesity, with highest percentage point increase (39.1) among mothers in Western region, followed Khangai (34.0), Eastern and Central (30.6), and Ulaanbaatar (25.6) regions. The highest prevalence of overweight and obesity was in mothers of Eastern region.

Contrary to the relatively similar values for the prevalence of overweight and obesity among mothers in urban (33.5%) and rural (32.4%) areas, the variation in prevalence among mothers in urban (44.3%) and rural (50.1%) areas now widened to reach 5.8 percentage points, according to latest survey.

Another indicator, used in present survey was the prevalence of underweight, which was 4.1%. This is 1.8 percentage point lower than 6.0% in 2011.

If underweight was prevalent among mothers 15-19 years of age (17.6%) in the 4th National nutrition survey, no mother, in the same age group, was classified as underweight in present survey.

In spite of prevalence of overweight and obesity increase with maternal age, prevalence of underweight decreases with maternal age, as shown in Figure W.3.
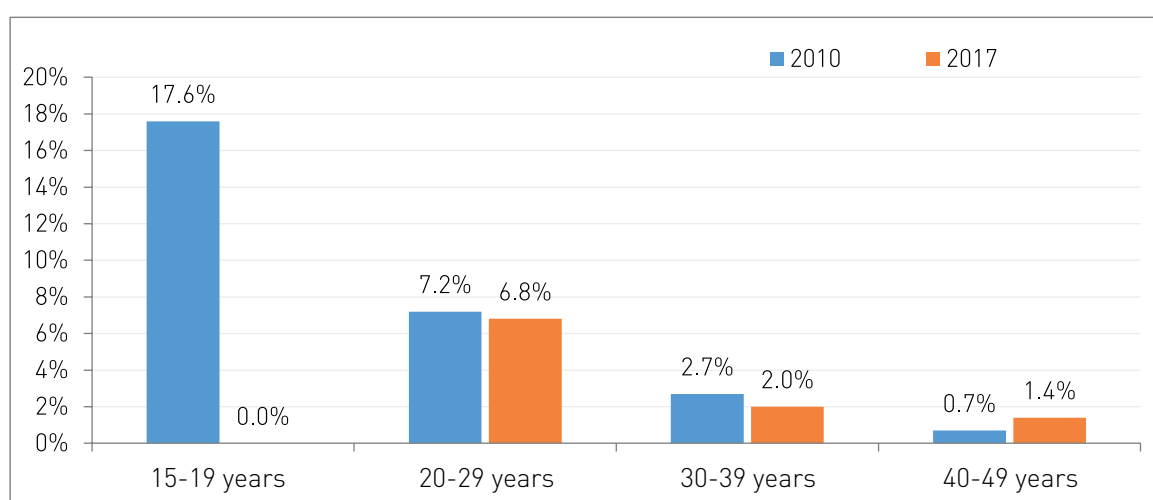
Figure W.3: Percent distribution of underweight among mothers of reproductive age, by age groups and survey years

The current survey reveals an increase in the prevalence of underweight among mothers in Ulaanbaatar (6.1%) compared to results of 2011 survey, when underweight was most prevalent among mothers in Eastern region (7.7%) while it stood lower in Ulaanbaatar (7.2%). Nevertheless, prevalence of underweight decreased at regional level (Figure W. 4).
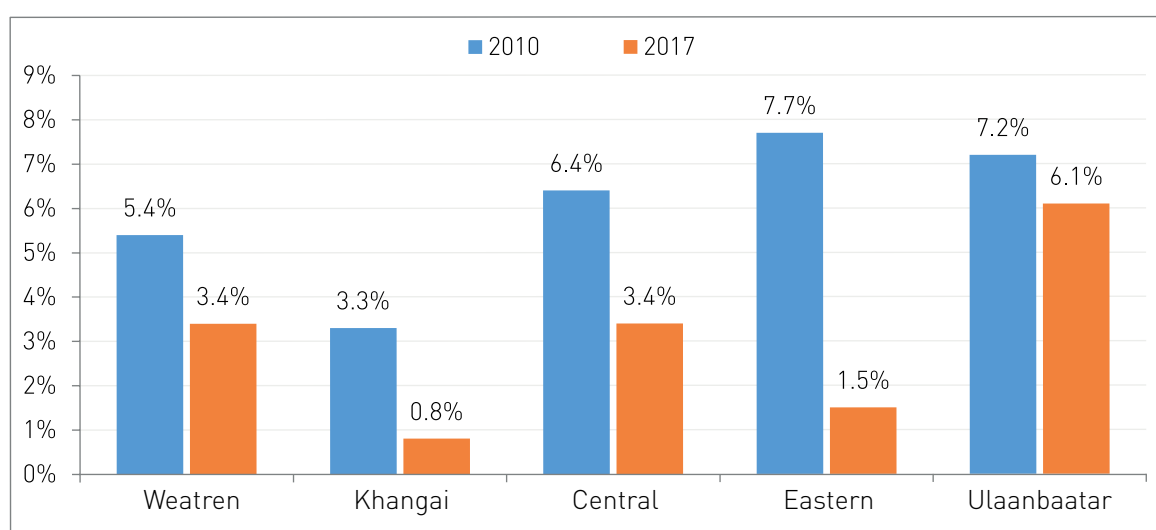
Figure W.4. Percent distribution of underweight among mothers of reproductive age, by regions and survey years

Prevalence of anemia in mothers

Current prevalence of anemia in mothers is 16.2%, compared to 14.4% in the 4th National nutrition survey. Comparative analysis indicated 1.8 percentage point increase in the prevalence of anemia in mothers 15-49 years of age.

As we look at the prevalence of anemia, 4.2% and 11.8% of mothers of reproductive age were classified as having moderate and mild anemia, with 2.8 percentage point increase in the prevalence of moderate anemia, compared to results of the previous survey.

The examination of distribution of anemia prevalence across age groups in 2011, did not show a big difference between age groups (14.7% in 20-29, 15.7% in 30-39 and 13.3% in 40-49 years). This difference widened today, as revealed by the present survey. In particular, prevalence of anemia was 19.7% in mothers 20-29 years of age, 12.0% in 30-39, and 20.9% in mothers 40-49 years of age, with the latter being highest increase compared to other age groups.

Figure W.5 shows regional variations in prevalence of anemia in mothers, with the biggest increase recorded in Western region by 11.4 percentage points compared to previous surveys.
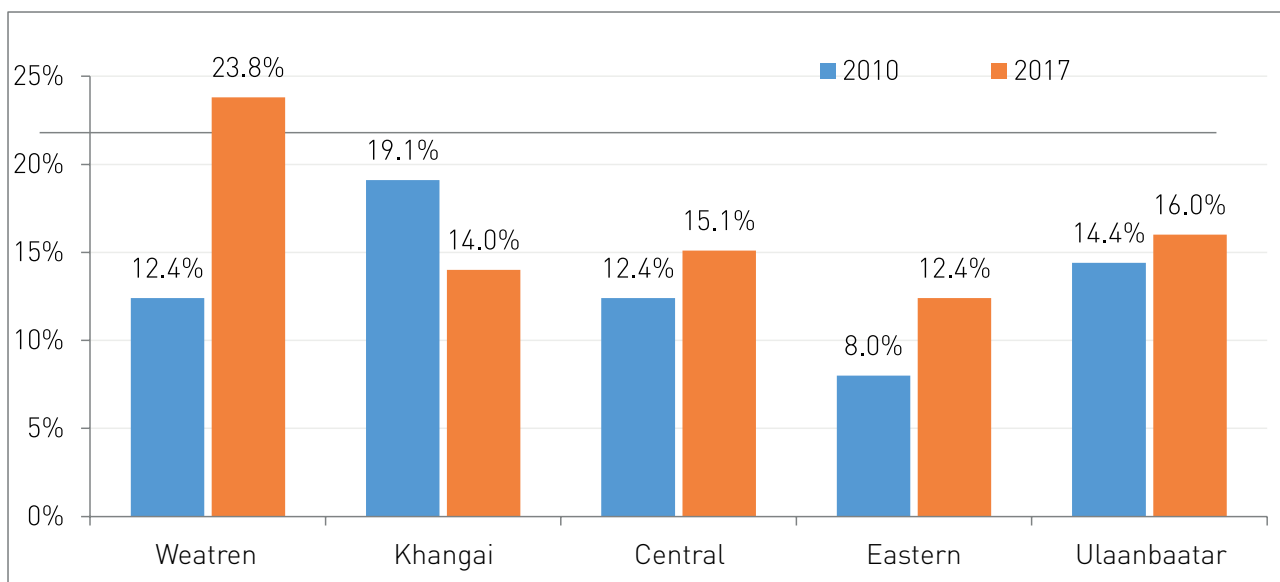
Figure 5. Percent distribution of anemia prevalence among mothers of reproductive age, by regions and survey years

Western region is home to many ethnic groups, and the examination of percent distribution of anemia among mothers by ethnic groups was carried out. Results showed anemia was most prevalent among Kazakh mothers (31.9%) with statistically significant difference (p<0.5).

Mothers of reproductive age were grouped into education levels, by which the distribution of anemia in mothers was also examined during the 4th and 5th National nutrition surveys. If previous survey suggested the distribution of anemia hadn't been associated with educational level of mothers, the present survey produced contradictory findings, that prevalence of anemia was higher among mothers with lower education level (20.3%) compared to those with higher education (13.5%).

Consumption of vitamins and minerals supplements

The distribution of vitamins and mineral supplements consumption among mothers of reproductive age in the last one year increased from 33.7% (4th National nutrition survey) to 39.7% (5th National nutrition survey). Consumption of vitamin and mineral supplements is highest among mothers 15-49 years of age living in Ulaanbaatar (45.1%), as indicated by the present survey.

Moreover, consumption of vitamin and mineral supplements among mothers 15-49 years of age, with live birth in the last year, jumped from 56.8% to 82.3%.

CONCLUSION

1. Prevalence of overweight and obesity in mothers of reproductive age is 46.2%, with the highest percentage of mothers with overweight and/or obesity being in rural areas (50.1%), which is 5.8 percentage points higher than that of urban mothers.

2. 16.2% of mothers of reproductive age are anemic, among which mild anemia is most prevalent.

3. Prevalence of Minimum dietary diversity among mothers of reproductive age is 70.2%, whereas it remains at 34.4% among mothers with lower education.

4. 39.7% of mothers of reproductive age took vitamin and mineral supplements in the last year.

5. 46.4% of mothers of reproductive age had first antenatal care visit during their first trimester, whereas this rate stood at 35.0% in Western region.

6. 94.3% of expectant mothers had 4 and more antenatal care visits during their pregnancy, as recommended by WHO.

7. Percentage of mothers who received counselling regarding types, frequency and forms of complementary foods is about 70%, with 30.3% and 29.3% of them starting complementary feeding of their children with semolina, meat and flour lumps soup, respectively.

8. 95.3% of mothers receive health related information from watching TV at least once a week, while internet and newspapers are secondary sources for 66% and 44% of sampled mothers, with radio being the source of information for 13% of mothers.

PREGNANT WOMEN

SAMPLE CHARACTERISTICS

Table PW.1 provides background characteristics for sampled pregnant women 15-49 years of age in the NNS V. In the sample, 14.4% of women were in their first trimester, 43.5% in their second trimester, and 42.1% in their third trimester. A larger percentage of women were sampled in urban (74.6%) compared to rural (25.4%) areas with a representative sample from each of the five regions.

Table PW.1: Pregnant women characteristics			
Percent of pregnant women 15-49 years of age by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Total	100.0	2220	2220
Age			
< 20 years	4.3	94	88
20-29 years	58.3	1294	1265
30-39 years	35.3	785	812
40-49 years	2.1	47	55
Economic region			
Western	5.7	126	458
Khangai	15.8	351	430
Central	17.7	394	448
Eastern	1.8	39	434
Ulaanbaatar	59.0	1310	450
Area			
Urban	74.6	1655	1136
Rural	25.4	565	1084
Location			
Capital city	59.0	1310	450
Aimag center	15.6	346	686
Soum center	19.0	423	853
Bagh/rural	6.4	142	231
Ethnicity			
Khalkh	86.6	1923	1740
Kazak	2.1	47	117
Durvud	3.3	74	92
Buriad	1.0	23	37
Bayad	1.4	32	50
Dariganga	0.7	16	44
Other	4.7	104	140
Education			
No education	0.8	15	22
Primary	2.5	55	73
Secondary	41.1	913	935
Higher	55.8	1238	1190

Table PW.1: Pregnant women characteristics			
Percent of pregnant women 15-49 years of age by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Employment status			
Not Employed	37.5	831	778
Employed	62.5	1389	1442
Marital status			
Married	64.7	1437	1572
Not Married	9.3	206	200
Cohabitating	26.0	576	448
Trimester of pregnancy			
First	14.4	320	281
Second	43.5	966	991
Third	42.1	933	947

As shown in Table PW.2, the majority of children's fathers lived in the family household (93.6%) with the highest prevalence of fathers living elsewhere found in Khangai (10.2%) and Central (10.0%) regions. Of the 6.4% of fathers who lived elsewhere, nearly a third (31.8%) lived in Ulaanbaatar with 63.9% of fathers who living elsewhere doing so for a work opportunity.

Table PW.2: Residence of child's father		
Percent of pregnant women living with or without child's father, Mongolia National Nutrition Survey, 2017		
Characteristics	Weighted Percent	Unweighted Number
Total		**2220**
Residence of father of child		
Living with woman	93.6	2063
Living elsewhere	6.4	157
Father of child living elsewhere		
Western	5.7	458
Khangai	10.2	430
Central	10.0	448
Eastern	5.1	434
Ulaanbaatar	4.4	450
Location of father of child (if living elsewhere)		
Abroad	-	14
Ulaanbaatar	31.8	47
Aimag Center	-	23
Soum center	16.7	29
Home village	21.9	40
Reason for living separately		
Work	63.9	98
Education	13.7	18
Other	22.4	37

(-) Based on fewer than 25 unweighted cases.

NUTRITION STATUS

Anthropometric Indicators

Nutrition status in pregnant women is measured through mid-upper arm circumference (MUAC) and short stature. As increases in MUAC during pregnancy are generally less than 0.05 cm, MUAC is used as a proxy indicator for women's pre-pregnancy nutritional status with low MUAC and short stature indicating increased risk of low birth weight and inter-uterine growth restriction in pregnant women. The NNS V revealed a low prevalence of MUAC < 22.5 cm among pregnant women (2.6%) (Table PW.3). Pregnant women who were over 40 years of age had higher prevalence (6.2%) of low MUAC compared to younger women and women who were not employed had higher prevalence (3.9%) of low MUAC compared to employed women (1.9%).

Table PW.3: Low mid-upper arm circumference				
Percent of pregnant women with low mid-upper arm circumference (MUAC < 22.5 cm) by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Low MUAC (< 22.5 cm)			Unweighted Number
	%	95%CI		
		Lower	Upper	
Total	2.6	1.8	3.8	2219
Trimester of pregnancy				
First	2.7	1.2	6.1	281
Second	2.9	1.7	4.9	990
Third	2.3	1.2	4.2	947
Age				
< 20 years	4.9	1.3	16.8	88
20-29 years	3.5	2.3	5.2	1264
30-39 years	0.7	0.2	2.2	812
40-49 years	6.2	0.9	33.0	55
Ethnicity				
Khalkh	2.4	1.6	3.5	1740
Kazak	2.3	0.8	6.2	117
Other	4.8	2.1	10.8	362
Economic region				
Western	2.4	1.3	4.3	458
Khangai	1.2	0.5	2.8	430
Central	3.8	2.4	6.0	447
Eastern	3.5	2.1	5.7	434
Ulaanbaatar	2.7	1.5	4.6	450
Area				
Urban	2.7	1.7	4.2	1136
Rural	2.4	1.5	3.8	1083
Education				
No education	-	-	-	22
Primary	1.5	0.5	4.7	73
Secondary	2.7	1.6	4.6	934
Higher	2.6	1.6	4.4	1190
Employment status				
Not employed	3.9	2.4	6.3	778
Employed	1.9	1.1	3.2	1441

Table PW.3: Low mid-upper arm circumference				
Percent of pregnant women with low mid-upper arm circumference (MUAC < 22.5 cm) by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Low MUAC (< 22.5 cm)			Unweighted Number
	%	95%CI		
		Lower	Upper	
Location				
Capital city	2.7	1.5	4.6	450
Aimag center	2.8	1.6	4.8	686
Soum center	2.9	1.8	4.7	852
Bagh/rural	1.0	0.3	3.3	231
Marital status				
Married	2.1	1.2	3.5	1571
Not married	5.1	2.2	11.4	200
Cohabitating	3.2	1.7	5.8	448

(-) Based on fewer than 25 unweighted cases.

Less than 1% of pregnant women (0.6%) had short stature (< 145 cm) and 7.2% of pregnant women had borderline short stature (< 150 cm) (Table PW.4). The prevalence of short stature and borderline short stature was highest in women whose education was limited to secondary level or less with prevalence of borderline short stature 17.1% in pregnant women with a primary only level education. Unmarried pregnant women also had higher prevalence of borderline short stature (16.6%) compared to married women (7.0%).

Table PW.4: Short stature							
Percent of pregnant women with short stature (height < 145 cm) and borderline short stature (height < 150 cm) by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	< 145 cm			< 150 cm			Unweighted Number
	%	95% CI Lower	95% CI Upper	%	95% CI Lower	95% CI Upper	
Total	**0.6**	**0.3**	**1.2**	**7.2**	**5.8**	**8.9**	**2215**
Trimester of pregnancy							
First	0.1	0.0	0.5	8.4	4.7	14.3	280
Second	0.5	0.2	1.8	6.8	4.9	9.3	988
Third	0.8	0.3	2.0	7.3	5.2	10.1	946
Age							
< 20 years	0.0	-	-	8.3	2.9	21.7	88
20-29 years	0.6	0.3	1.5	6.8	5.1	9.0	1262
30-39 years	0.6	0.2	2.2	7.4	5.1	10.4	810
40-49 years	0.0	-	-	15.1	4.9	38.2	55
Ethnicity							
Khalkh	0.6	0.2	1.3	6.8	5.3	8.6	1735
Kazak	1.1	0.3	4.6	8.6	4.8	14.7	117
Other	0.8	0.3	2.7	10.4	6.2	17.0	363
Economic region							
Western	0.9	0.3	2.3	9.8	7.4	12.9	457
Khangai	1.2	0.5	2.8	7.7	5.5	10.6	430
Central	0.4	0.1	1.8	5.4	3.6	7.9	448
Eastern	1.6	0.8	3.4	9.3	6.9	12.4	432
Ulaanbaatar	0.4	0.1	1.8	7.4	5.3	10.2	448

Table PW.4: Short stature

Percent of pregnant women with short stature (height < 145 cm) and borderline short stature (height < 150 cm) by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	< 145 cm			< 150 cm			Unweighted Number
	%	95% CI Lower	95% CI Upper	%	95% CI Lower	95% CI Upper	
Area							
Urban	0.6	0.3	1.5	7.1	5.4	9.3	1133
Rural	0.6	0.2	1.4	7.6	6.0	9.7	1082
Education							
No education	-	-	-	-	-	-	22
Primary	0.2	0.0	1.2	17.1	8.2	32.2	73
Secondary	1.2	0.6	2.7	9.7	7.3	12.8	932
Higher	0.2	0.1	0.5	4.9	3.4	7.0	1188
Employment status							
Not employed	0.9	0.3	2.7	8.1	5.8	11.2	777
Employed	0.4	0.2	0.8	6.7	5.1	8.8	1438
Location							
Capital city	0.4	0.1	1.8	7.4	5.3	10.2	448
Aimag center	1.2	0.6	2.7	6.1	4.3	8.5	685
Soum center	0.2	0.1	0.5	7.0	5.2	9.3	851
Bagh/rural	1.8	0.6	5.2	9.5	6.1	14.5	231
Marital status							
Married	0.6	0.3	1.3	7.0	5.4	9.1	1568
Not married	1.9	0.4	8.1	16.6	10.3	25.5	199
Cohabiting	0.2	0.0	1.0	4.3	2.5	7.4	448

(-) Based on fewer than 25 unweighted cases.

MICRONUTRIENT STATUS

Micronutrient status in a sub-sample of pregnant women was measured in the NNS V with determination of anaemia, iron status, vitamin A status, vitamin D status, and the presence of inflammation. Table PW.5 presents summary results for these indicators.

Table PW.5: Micronutrient status

Percent distribution of anaemia, iron, vitamin A, vitamin D, and inflammation status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	%	95% CI Lower	95% CI Upper	Unweighted Number
Anaemia				2211
Any anaemia [a]	21.4	19.1	23.9	473
Iron Status				918
Iron deficiency [b]	29.6	26.4	33.0	265
Iron sufficiency	70.4	67.0	73.6	652
Iron overload	0.0	0.0	0.3	1
Iron deficiency by soluble transferrin receptor (sTfR) [c]	8.7	6.9	11.0	80
Low body iron stores [d]	13.5	11.2	16.2	123
Iron deficiency anaemia [e]	10.5	8.5	12.9	92

Table PW.5: Micronutrient status

Percent distribution of anaemia, iron, vitamin A, vitamin D, and inflammation status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	%	95% CI		Unweighted Number
		Lower	Upper	
Vitamin A status [f]				918
Vitamin A deficiency	0.5	0.2	1.3	6
Vitamin A insufficiency	11.3	9.2	13.8	111
Vitamin A sufficiency	88.2	85.7	90.3	801
Vitamin D status [g]				924
Vitamin D deficiency	75.4	72.2	78.4	710
Vitamin D insufficiency	20.2	17.4	23.3	178
Vitamin D sufficiency	4.4	3.1	6.2	36
Inflammation				918
Any Inflammation [h]	27.1	24.0	30.5	918

a Haemoglobin < 110 g/l.

b Serum ferritin < 15 μg/l.

c sTfR > 8.3 mg/l.

d Body iron stores < 0 mg/kg.

e Haemoglobin < 110 g/l and ferritin < 15 μg/l.

f Serum retinol < 0.70 μmol/l (deficiency); ≥ 0.7–1.05 μmol/l (insufficiency); > 1.05 μmol/ (sufficiency).

g Serum 25(OH)D < 20 ng/ml (deficiency); 20 to < 30 ng/ml (insufficiency); 30 to ≤100 ng/ml (sufficiency).

h C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l.

The prevalence of anaemia, as measured by haemoglobin, was 21.4% and the prevalence of iron deficiency anaemia (IDA) was 10.5% (Table PW.6). Prevalence of both anaemia and iron deficiency anaemia was significantly higher as pregnancy progressed with the highest prevalence in the third trimester for both anaemia (28.5%) and iron deficiency anaemia (17.3%). Pregnant women who were of Kazak ethnicity had higher prevalence of both anaemia (28.0%) and iron deficiency anaemia (25.2%) compared to Khalkh women (21.8% and 10.2%) and women from other ethnic minorities (17.3% and 8.8%).

Table PW.6: Anaemia and iron deficiency anaemia

Percent distribution of anaemia and iron deficiency anaemia in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Anaemia by Hb [a]				Iron deficiency anaemia [b]			
	Unweighted Number	%	Lower 95% CI	Upper 95% CI	Unweighted Number	%	Lower 95% CI	Upper 95% CI
Total	**2211**	**21.4**	**19.1**	**23.9**	**918**	**10.5**	**8.5**	**12.9**
Trimester of pregnancy								
First	280	4.8	2.4	9.3	93	4.3	1.5	12.1
Second	985	20.0	16.6	23.7	418	5.2	3.3	8.0
Third	945	28.5	24.5	32.8	407	17.3	13.5	21.8
Age								
< 20 years	86	24.0	14.0	38.0	42	10.2	3.6	26.0
20-29 years	1261	21.6	18.6	24.9	520	12.2	9.4	15.7
30-39 years	810	19.5	15.8	23.8	336	7.0	4.5	10.8
40-49 years	54	42.1	24.0	62.6	20	-	-	-

Table PW.6: Anaemia and iron deficiency anaemia

Percent distribution of anaemia and iron deficiency anaemia in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Anaemia by Hb [a]				Iron deficiency anaemia [b]			
	Unweighted Number	%	Lower 95% CI	Upper 95% CI	Unweighted Number	%	Lower 95% CI	Upper 95% CI
Ethnicity								
Khalkh	1732	21.8	19.2	24.5	699	10.2	8.0	13.0
Kazak	116	28.0	17.0	42.5	48	25.2	13.8	41.4
Other	363	17.3	12.0	24.4	171	8.8	5.0	15.2
Economic region								
Western	457	25.3	21.5	29.4	188	13.3	9.1	18.9
Khangai	429	24.7	20.9	29.0	177	12.4	8.3	18.2
Central	447	19.2	15.8	23.2	192	8.9	5.6	13.8
Eastern	431	12.8	9.9	16.3	186	4.8	2.5	9.0
Ulaanbaatar	447	21.0	17.5	25.1	175	10.9	7.0	16.4
Area								
Urban	1131	21.1	18.2	24.3	453	10.6	7.8	14.1
Rural	1080	22.3	19.4	25.4	465	10.4	7.6	14.0
Education								
No education	21	-			10	-		
Primary	73	21.8	12.0	36.3	34	9.4	3.3	23.8
Secondary	933	26.3	22.4	30.5	396	12.3	9.1	16.5
Higher	1184	17.9	15.0	21.2	478	8.9	6.4	12.2
Employment status								
Not employed	773	21.7	18.0	25.9	350	12.9	9.5	17.2
Employed	1438	21.2	18.3	24.4	568	8.9	6.6	12.0
Location								
Capital city	447	21.0	17.5	25.1	175	10.9	7.0	16.4
Aimag center	684	21.3	17.9	25.2	278	10.2	6.9	14.9
Soum center	849	21.5	18.3	25.0	368	9.3	6.4	13.3
Bagh/rural	231	24.6	18.9	31.4	97	14.1	8.1	23.5
Marital status								
Married	1567	19.9	17.2	22.9	645	9.5	7.3	12.5
Not married	199	18.6	12.2	27.2	73	11.7	5.7	22.5
Cohabitating	445	26.2	21.2	31.8	200	12.4	8.4	18.1
Body height								
< 145 cm	20	-	-	-	6	-		
145-149 cm	155	29.2	19.9	40.8	57	16.7	8.5	30.2
150-159 cm	1204	20.3	17.2	23.7	499	9.5	7.0	12.7
> 159 cm	827	21.0	17.4	25.1	352	10.0	6.9	14.2
MUAC status								
Normal	2150	21.1	18.8	23.6	892	10.4	8.3	12.8
Low	60	30.9	17.2	49.0	26	13.8	4.1	37.1

a Haemoglobin < 110 g/l.
b Haemoglobin < 110 g/l and serum ferritin < 15 µg/l.
(-) Based on fewer than 25 unweighted cases.

Prevalence of iron deficiency, as measured by adjusted serum ferritin, was 29.6% and 8.7% as measured by soluble transferrin receptor (sTfR). Prevalence of low body iron stores in pregnant women was 13.5% (Table PW.7). Prevalence of iron deficiency as measured by serum ferritin was lowest in the first trimester (10.9%) and highest in the third trimester (47.5%) and Kazak pregnant women had higher prevalence of iron deficiency (60.1%) as measured by serum ferritin compared to Khalkh women (29.4%) and other ethnic minorities (24.5%). Prevalence of iron deficiency as measured by serum ferritin was also highest in Western (35.1%) and lowest in Eastern region (21.5%) for all pregnant women. The prevalence of low body iron stores mirrored the findings of iron deficiency with the highest prevalence among women in their third trimester (22.6%) and in Kazak women (40.7%).

Table PW.7: Iron deficiency										
Percent distribution of iron deficiency as measured by serum ferritin, soluble transferrin receptor and low body iron stores in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Unweighted Number	Iron deficiency by serum ferritin [a]			Iron deficiency by sTfR [b]			Low body iron stores [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Total	918	29.6	26.4	33.0	8.7	6.9	11.0	13.5	11.2	16.2
Trimester of pregnancy										
First	93	10.9	5.7	19.9	6.6	2.9	14.4	8.3	3.9	16.5
Second	418	16.2	12.6	20.5	3.4	1.9	6.0	5.8	3.7	8.9
Third	407	47.5	42.2	52.9	14.6	11.2	18.9	22.6	18.4	27.5
Age										
< 20 years	42	24.9	13.2	42.0	9.5	3.1	25.7	17.1	7.6	34.2
20-29 years	520	32.6	28.3	37.2	10.2	7.6	13.4	15.0	11.9	18.7
30-39 years	336	24.9	20.0	30.5	6.2	3.9	9.8	10.0	6.9	14.3
40-49 years	20	-	-	-	-	-	-	-	-	-
Ethnicity										
Khalkh	699	29.4	25.8	33.3	8.2	6.2	10.7	12.4	9.9	15.4
Kazak	48	60.1	45.3	73.3	29.1	17.0	45.1	40.7	26.9	56.1
Other	171	24.5	17.7	32.7	7.9	4.2	14.3	14.4	9.1	22.0
Economic region										
Western	188	35.1	28.6	42.2	9.6	6.1	14.7	16.5	11.8	22.5
Khangai	177	27.7	21.6	34.7	11.9	7.9	17.5	13.6	9.3	19.4
Central	192	27.1	21.3	33.8	7.3	4.4	11.9	9.9	6.4	15.0
Eastern	186	21.5	16.2	28.0	7	4.1	11.7	10.8	7.0	16.1
Ulaanbaatar	175	33.1	26.6	40.5	8	4.8	13.1	16.6	11.8	22.8
Area										
Urban	453	30.5	26.0	35.3	9.2	6.7	12.6	14.8	11.5	18.7
Rural	465	28.4	24.0	33.3	8.1	5.7	11.3	11.9	9.0	15.6
Education										
No education	10	-	-	-	-	-	-	-	-	-
Primary	34	25.9	13.6	43.5	7.1	2.4	19.4	7.1	2.4	19.4
Secondary	396	32.6	27.7	38.0	9.2	6.5	12.9	15.9	12.3	20.3
Higher	478	26.6	22.4	31.2	8.5	6.1	11.8	12.1	9.1	15.8
Employment status										
Not employed	350	35.8	30.4	41.6	12.2	8.9	16.6	16.9	12.9	21.7
Employed	568	25.6	21.7	29.8	6.5	4.6	9.1	11.4	8.8	14.7
Location										
Capital city	175	33.1	26.6	40.5	8	4.8	13.1	16.6	11.8	22.8
Aimag center	278	27.3	21.8	33.5	10.7	7.2	15.6	12.6	8.9	17.6

Table PW.7: Iron deficiency									
Percent distribution of iron deficiency as measured by serum ferritin, soluble transferrin receptor and low body iron stores in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017									
Characteristics	Unweighted Number	Iron deficiency by serum ferritin [a]			Iron deficiency by sTfR [b]			Low body iron stores [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Soum center	368	28.1	23.2	33.6	6.8	4.5	10.3	11.8	8.6	16.0
Bagh/rural	97	29.5	20.6	40.2	12.6	7.0	21.8	12.3	6.7	21.4
Marital status										
Married	645	29.4	25.6	33.5	9.3	7.0	12.1	14.6	11.7	18.0
Not married	73	27.5	17.5	40.6	8.2	3.4	18.5	21.3	12.3	34.2
Cohabitating	200	30.6	24.3	37.8	7.6	4.5	12.5	8.6	5.3	13.6
Body height										
< 145 cm	6	-	-	-	-	-	-	-	-	-
145-149 cm	57	35.7	23.3	50.4	11.9	5.3	24.8	22.5	12.5	37.0
150-159 cm	499	29.1	24.9	33.8	8.9	6.5	12.0	11.4	8.7	14.9
> 159 cm	352	28.5	23.6	34.0	7.9	5.2	11.7	14.2	10.6	18.8
MUAC status										
Normal	892	29.6	26.4	33.1	9	7.1	11.3	13.5	11.2	16.2
Low	26	28.8	13.2	51.8	0	-	-	13.8	4.1	37.1

a Serum ferritin < 15 µg/l.
b sTfR > 8.3 mg/l.
c Body iron stores < 0 mg/kg.
(-) Based on fewer than 25 unweighted cases.

The majority of pregnant women (88.2%) had sufficient vitamin A status with 11.3% and 0.5% of pregnant women having insufficient and deficient vitamin A levels, respectively (Table PW.8). There was a higher prevalence of vitamin A insufficiency among women in their first trimester (25.5%) compared to their second (8.0%) and third (11.4%) trimesters, among those who had a low MUAC measurement (19.4%) compared to normal (11.1%), and among women in the Kazak ethnic minority population (17.4%) compared to women in the Khalkh population (11.1%) and those of other ethnic minorities (11.0%).

Table PW.8: Vitamin A status									
Percent distribution of vitamin A status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017									
Characteristics	Unweighted Number	Vitamin A deficiency [a]			Vitamin A insufficiency [b]			Vitamin A sufficiency [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Total	**918**	**0.5**	**0.2**	**1.3**	**11.3**	**9.2**	**13.8**	**88.2**	**85.7**	**90.3**
Trimester of pregnancy										
First	93	0.0	0.0	0.0	25.5	16.9	36.5	74.5	63.5	83.1
Second	418	0.5	0.1	2.1	8.0	5.6	11.2	91.6	88.3	94.0
Third	407	0.7	0.2	2.3	11.4	8.3	15.4	87.9	83.9	91.1
Age										
< 20 years	42	0.0	0.0	0.0	12.7	5.2	27.7	87.3	72.3	94.8
20-29 years	520	0.9	0.3	2.3	12.1	9.3	15.5	87.1	83.6	89.9
30-39 years	336	0.0	0.0	0.0	10.0	6.9	14.3	90.0	85.7	93.1
40-49 years	20	-	-	-	-	-	-	-	-	-
Ethnicity										
Khalkh	699	0.5	0.2	1.6	11.1	8.8	14.0	88.4	85.5	90.7
Kazak	48	1.9	0.3	12.6	17.4	9.2	30.6	80.7	67.2	89.4
Other	171	0.4	0.1	2.7	11.0	6.8	17.3	88.6	82.3	92.9

Table PW.8: Vitamin A status

Percent distribution of vitamin A status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Vitamin A deficiency [a]			Vitamin A insufficiency [b]			Vitamin A sufficiency [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Economic region										
Western	188	1.1	0.3	4.2	15.4	10.9	21.3	83.5	77.5	88.2
Khangai	177	0.0	0.0	0.0	7.3	4.3	12.2	92.7	87.8	95.7
Central	192	0.5	0.1	3.6	12.0	8.1	17.4	87.5	82.0	91.5
Eastern	186	1.1	0.3	4.2	14.0	9.7	19.7	84.9	79.1	89.4
Ulaanbaatar	175	0.6	0.1	3.9	11.4	7.5	17.1	88.0	82.3	92.0
Area										
Urban	453	0.4	0.1	1.9	10.6	7.9	14.2	89.0	85.4	91.8
Rural	465	0.7	0.2	2.2	12.2	9.2	15.8	87.1	83.4	90.1
Education										
No education	10	-	-	-	-	-	-	-	-	-
Primary	34	0.0	0.0	0.0	10.1	3.3	26.9	89.9	73.1	96.7
Secondary	396	1.1	0.4	3.1	11.9	8.8	15.8	87.0	82.9	90.3
Higher	478	0.1	0.0	0.5	10.8	8.0	14.3	89.2	85.7	91.9
Employment status										
Not employed	350	0.8	0.2	2.4	11.5	8.3	15.7	87.7	83.5	91.0
Employed	568	0.3	0.1	1.8	11.2	8.6	14.4	88.5	85.2	91.1
Location										
Capital city	175	0.6	0.1	3.9	11.4	7.5	17.1	88.0	82.3	92.0
Aimag center	278	0.1	0.0	1.0	9.7	6.5	14.3	90.2	85.6	93.4
Soum center	368	0.9	0.3	2.8	13.2	9.8	17.6	85.9	81.4	89.4
Bagh/rural	97	0.0	0.0	0.0	8.4	4.0	16.6	91.6	83.4	96.0
Marital status										
Married	645	0.1	0.0	0.6	11.7	9.2	14.8	88.1	85.1	90.7
Not married	73	0.5	0.1	3.2	9.8	4.4	20.4	89.7	79.3	95.2
Cohabitating	200	1.5	0.4	4.8	10.7	7.0	16.1	87.8	82.2	91.8
Body height										
< 145 cm	6	-	-	-	-	-	-	-	-	-
145-149 cm	57	1.0	0.1	6.5	13.3	5.9	27.4	85.8	71.8	93.4
150-159 cm	499	0.5	0.1	2.0	11.6	8.8	15.1	87.9	84.4	90.7
> 159 cm	352	0.5	0.1	2.4	10.9	7.8	15.0	88.5	84.4	91.7
MUAC status										
Normal	892	0.4	0.1	1.1	11.1	9.0	13.6	88.6	86.1	90.7
Low	26	5.5	0.8	30.1	19.4	7.5	41.9	75.1	52.3	89.3

a Serum retinol < 0.70 μmol/l.
b Serum retinol ⩾ 0.70 - 1.05 μmol/l.
c Serum retinol > 1.05 μmol/l.
(-) Based on fewer than 25 unweighted cases.

The prevalence of vitamin D deficiency in pregnant women was high with 75.4% of all pregnant women deficient in vitamin D and an additional 20.2% of pregnant women having insufficient levels (Table PW.9). Only 4.4% of all pregnant women had sufficient vitamin D status. The prevalence of vitamin D deficiency was above 70% in all regions, locations, urban and rural areas, ethnicities, education levels, employment statuses, marital statuses, height statuses and for women in all trimesters of their pregnancy.

Table PW.9: Vitamin D status									
Percent distribution of vitamin D status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017									
Characteristics	Unweighted Number	Vitamin D deficiency [a]			Vitamin D insufficiency [b]			Vitamin D sufficiency [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Total	924	75.4	72.2	78.4	20.2	17.4	23.3	4.4	3.1	6.2
Trimester of pregnancy										
First	92	71.9	60.3	81.1	24.1	15.6	35.4	4.0	1.2	12.7
Second	423	77.5	72.6	81.6	18.7	14.9	23.2	3.9	2.2	6.7
Third	409	74.2	69.2	78.7	20.8	16.7	25.6	5.0	3.0	8.0
Age										
< 20 years	41	70.5	53.0	83.5	24.9	13.1	42.3	4.6	0.9	20.8
20-29 years	524	74.8	70.4	78.7	21.0	17.3	25.1	4.3	2.7	6.8
30-39 years	339	76.5	71.0	81.3	18.7	14.5	23.9	4.7	2.7	8.2
40-49 years	20	-	-	-	-	-	-	-	-	-
Ethnicity										
Khalkh	705	74.6	70.9	78.0	20.9	17.8	24.4	4.5	3.1	6.6
Kazak	48	85.3	72.7	92.6	12.8	6.1	25.0	1.9	0.3	12.6
Other	171	78.1	69.8	84.6	17.7	11.9	25.4	4.2	1.6	10.5
Economic region										
Western	187	78.6	72.1	83.9	19.3	14.2	25.5	2.1	0.8	5.6
Khangai	178	78.1	71.4	83.6	18.5	13.5	24.9	3.4	1.5	7.3
Central	194	74.7	68.2	80.4	21.6	16.4	28.0	3.6	1.7	7.4
Eastern	186	80.6	74.3	85.7	15.6	11.1	21.5	3.8	1.8	7.7
Ulaanbaatar	179	72.1	65.0	78.2	21.2	15.8	27.8	6.7	3.8	11.4
Area										
Urban	458	76.0	71.4	80.1	18.6	15.0	22.9	5.4	3.5	8.3
Rural	466	74.7	70.0	78.9	22.3	18.3	26.9	3.0	1.7	5.3
Education										
No education	10	-	-	-	-	-	-	-	-	-
Primary	34	80.1	62.2	90.8	19.9	9.2	37.8	0.0	0.0	0.0
Secondary	397	73.1	67.9	77.8	21.1	17.0	26.0	5.7	3.6	9.0
Higher	483	76.7	72.2	80.7	19.7	16.0	24.0	3.6	2.1	6.1
Employment status										
Not employed	352	75.1	69.7	79.9	19.1	14.9	24.1	5.7	3.5	9.3
Employed	572	75.6	71.4	79.4	20.9	17.3	24.9	3.5	2.1	5.7
Location										
Capital city	179	72.1	65.0	78.2	21.2	15.8	27.8	6.7	3.8	11.4
Aimag center	279	80.7	74.9	85.5	15.4	11.2	20.9	3.8	1.9	7.6
Soum center	369	74.0	68.5	78.8	23.0	18.4	28.3	3.0	1.6	5.7
Bagh/rural	97	77.4	67.1	85.1	19.7	12.5	29.6	3.0	0.9	9.7
Marital status										
Married	652	75.3	71.3	78.8	20.6	17.3	24.4	4.1	2.6	6.3
Not married	72	71.9	58.3	82.4	18.7	10.3	31.5	9.4	3.8	21.6
Cohabitating	200	76.9	70.1	82.6	19.5	14.2	26.0	3.6	1.6	7.7

Table PW.9: Vitamin D status

Percent distribution of vitamin D status in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Vitamin D deficiency [a]			Vitamin D insufficiency [b]			Vitamin D sufficiency [c]		
		%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI
Body height										
< 145 cm	6	-	-	-	-	-	-	-	-	-
145-149 cm	57	76.9	61.8	87.2	19.1	9.7	34.0	4.1	1.0	15.7
150-159 cm	497	74.5	69.9	78.6	20.7	17.0	25.1	4.8	3.0	7.5
> 159 cm	360	77.1	71.9	81.5	18.9	14.9	23.8	4.0	2.3	7.1
MUAC status										
Normal	898	76.1	72.8	79.1	19.5	16.7	22.5	4.5	3.1	6.3
Low	26	54.1	32.6	74.1	44.7	24.8	66.4	1.3	0.2	8.8

a Serum 25(OH)D < 20 ng/ml.
b Serum 25(OH)D 20 to < 30 ng/ml.
c Serum 25(OH)D 30 to ≤100 ng/ml.
(-) Based on fewer than 25 unweighted cases.

Inflammation occurs when the immune system mounts a response to protect the body from disease-causing pathogens. In the NNS V, 27.1% of pregnant women had inflammation (Table PW.10). There were no significant differences in the prevalence of inflammation by area, region, or trimester of pregnancy.

Table PW.10: Inflammation

Percent distribution of inflammation in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Any inflammation[a]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	
Total	**27.1**	**24.0**	**30.5**	**918**
Trimester of pregnancy				
First	28.3	19.1	39.7	93
Second	28.5	23.9	33.5	418
Third	25.5	21.1	30.6	407
Age				
< 20 years	40.5	25.4	57.6	42
20-29 years	25.6	21.7	30.0	520
30-39 years	27.5	22.4	33.2	336
40-49 years	-	-	-	20
Ethnicity				
Khalkh	26.5	23.0	30.2	699
Kazak	15.5	7.8	28.3	48
Other	33.0	25.2	42.0	171
Economic region				
Western	26.1	20.3	32.8	188
Khangai	26.6	20.6	33.5	177
Central	27.6	21.7	34.4	192
Eastern	24.7	19.1	31.4	186
Ulaanbaatar	28.0	21.8	35.1	175

Table PW.10: Inflammation				
Percent distribution of inflammation in pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Any inflammation[a]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	
Area				
Urban	27.1	22.9	31.8	453
Rural	27.2	22.8	32.0	465
Education				
No education	-	-	-	10
Primary	23.1	11.4	41.2	34
Secondary	29.6	24.8	34.9	396
Higher	25.7	21.6	30.4	478
Employment status				
Not employed	28.6	23.7	34.2	350
Employed	26.2	22.3	30.4	568
Location				
Capital city	28.0	21.8	35.1	175
Aimag center	26.1	20.7	32.3	278
Soum center	27.4	22.5	32.9	368
Bagh/rural	26.2	17.8	36.7	97
Marital status				
Married	27.8	24.0	31.9	645
Not married	26.8	16.8	39.8	73
Cohabitating	25.6	19.7	32.6	200
Body height				
< 145 cm	-	-	-	6
145-149 cm	31.2	19.4	46.0	57
150-159 cm	25.7	21.6	30.3	499
> 159 cm	28.2	23.3	33.7	352
MUAC status				
Normal	27.1	23.9	30.5	892
Low	28.8	12.8	52.8	26

a C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l.
(-) Based on fewer than 25 unweighted cases.

Adequate iodine status is essential during pregnancy for fetal growth and cognitive development. Urinary iodine concentration is used as a marker of iodine status as the majority of iodine absorbed by the body is excreted in the urine. Table PW.11 presents the median urinary iodine concentration (MUIC) of pregnant women sampled in the NNS V. The median concentration of 120.5 µg/l indicates inadequate iodine status in pregnant women, as the desired range for adequate iodine nutrition in pregnancy 150-249 µg/l. MUIC was highest in the first trimester (132.9 µg/l) and lowest in the third trimester (110.6 µg/l). Pregnant women in all regions had inadequate iodine status with lowest median concentration in Western region (82.1 µg/l) and highest in Central region (142.4 µg/l). Among pregnant women who used only iodized salt in their household, MUIC was 128 µg/l while MUIC was 92.2 µg/l among pregnant women who used only non-iodized salt.

Table PW.11: Median urinary iodine concentration		
Median urinary iodine concentration (MUIC) of pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	Unweighted Number	MUIC (μg/l)
Total	920	120.5
Trimester of pregnancy		
First	91	132.9
Second	427	129.5
Third	402	110.6
Age		
< 20 years	42	132.8
20-29 years	519	116.7
30-39 years	338	123.2
40-49 years	21	-
Ethnicity		
Khalkh	704	122.9
Kazak	47	99.0
Other	169	118.3
Economic region		
Western	187	82.1
Khangai	179	102.5
Central	195	142.4
Eastern	185	122.9
Ulaanbaatar	174	132.0
Area		
Urban	459	125.0
Rural	461	114.1
Education		
No education	10	-
Primary	34	107.3
Secondary	392	127.6
Higher	484	118.7
Employment status		
Not employed	351	122.6
Employed	569	120.0
Location		
Capital city	174	132.0
Aimag center	285	113.3
Soum center	363	118.1
Bagh/rural	98	102.5
Marital status		
Married	649	121.7
Not married	74	116.7
Cohabitating	197	120.4
Iodized salt consumption		
Use only iodized salt	659	128.0
Use both iodized and ordinary salt	166	114.4
Use only ordinary salt	41	92.2

a Median urinary iodine concentration (MUIC) of 150–249 μg/l indicates adequate iodine
    nutrition for pregnant women.
(-) Based on fewer than 25 unweighted cases.

Only about half of pregnant women were aware of iodine deficiency (47.5%), however 85.4% reported hearing about iodized salt (Table PW.16). Awareness of iodized salt was high in all areas and regions and awareness of iodine deficiency and iodized salt was higher among employed pregnant women (52.1% and 89.3%) compared to pregnant women who were not employed (39.2% and 78.6%). About three-quarters of pregnant women (74.1%) reported using only iodized salt for cooking in the household, 20.6% reported using a combination of ordinary and iodized salt and 4.8% used ordinary salt that was not iodized. Usage of only iodized salt was higher in urban areas (76.5%) compared to rural areas (70.7%) and lowest in Western region (59.4%) compared to the other regions (67.0% to 87.9%). In Western region, 10.3% of pregnant women reported that they used only non-iodized salt in their household.

Table PW.12: Awareness of iodine deficiency and iodized salt and use of iodized salt							
Percent distribution of awareness of iodine deficiency and iodized salt and usage of iodized salt among pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Unweighted Number	Heard of iodine deficiency (%)	Heard of iodized salt (%)	Reported type of salt consumed				Unweighted Number
				Only iodized salt (%)	Both iodized and non-iodized salt (%)	Non-iodized salt (%)	Don't know (%)	
Total	2220	47.5	85.4	74.1	20.6	4.8	0.5	1894
Age								
< 20 years	88	16.7	64.4	67.0	19.3	11.2	2.5	58
20-29 years	1265	43.1	82.2	74.6	19.3	5.5	0.6	1038
30-39 years	812	57.7	92.6	73.8	22.6	3.4	0.2	747
40-49 years	55	53.5	94.9	75.5	22.7	1.8	0.0	51
Economic region								
Western	458	52.4	84.5	59.4	30.2	10.3	0.0	387
Khangai	430	47.2	84.4	67.0	26.1	6.3	0.5	364
Central	448	46.9	84.8	72.6	21.8	4.2	1.3	380
Eastern	434	46.5	85.7	87.9	9.4	2.4	0.3	372
Ulaanbaatar	450	46.7	86.9	82.1	15.1	2.8	0.0	391
Area								
Urban	1136	47.7	86.4	76.5	18.7	4.4	0.4	987
Rural	1084	47.2	84.1	70.7	23.4	5.2	0.7	907
Location								
Capital city	450	46.7	86.9	82.1	15.1	2.8	0.0	391
Aimag center	686	48.9	85.7	69.3	23.3	6.5	0.9	596
Soum center	853	47.7	83.3	69.5	24.6	5.2	0.7	712
Bagh/rural	231	45.6	86.8	74.3	19.6	5.4	0.6	195
Education								
No education	-	-	-	-	-	-	-	-
Primary	73	21.6	76.7	55.7	34.4	9.9	0.0	53
Secondary	935	32.6	77.6	75.5	18.1	5.2	1.1	733
Higher	1190	61.0	92.4	74.1	21.8	4.0	0.1	1096
Employment status								
Not employed	778	39.2	78.6	73.4	19.5	6.3	0.9	610
Employed	1442	52.1	89.3	74.5	21.2	4.0	0.3	1284
Child's father lives in household								
Yes	2063	47.8	85.6	74.8	20.1	4.6	0.5	1764
No	157	43.2	83.6	64.8	27.4	7.0	0.8	130

Table PW.12: Awareness of iodine deficiency and iodized salt and use of iodized salt								
Percent distribution of awareness of iodine deficiency and iodized salt and usage of iodized salt among pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017								
Characteristics	Unweighted Number	Heard of iodine deficiency (%)	Heard of iodized salt (%)	Reported type of salt consumed				
				Only iodized salt (%)	Both iodized and non-iodized salt (%)	Non-iodized salt (%)	Don't know (%)	Unweighted Number
Marital status								
Married	1572	51.5	88.5	74.5	21.3	4.0	0.2	1378
Not married	200	34.9	78.1	72.4	20.0	6.9	0.7	159
Cohabiting	448	41.0	79.6	73.5	18.8	6.4	1.3	357

(-) Based on fewer than 25 unweighted cases.

DIETARY QUALITY

Minimum dietary diversity (MDD) is used to assess the micronutrient adequacy of a person's diet, indicating consumption of at least 5 out of 10 food groups the previous day. A person who consumes food items from at least 5 food groups is likely to consume at least 1 animal-source food and items from 2 or more of the fruit/vegetable food groups. Over 3 out of 4 pregnant women achieved MDD (76.6%), with a higher prevalence in urban (80.6%) compared to rural (64.9%) areas (Table PW.12). The prevalence of MDD was highest in Ulaanbaatar (82.4%) with lower prevalence (70.1% and below) in Western, Khangai, Central and Eastern regions.

Table PW.13: Minimum Dietary Diversity				
Percent distribution of minimum dietary diversity among pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Minimum Dietary Diversity [a]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	
Total	76.6	74.2	78.9	2220
Age				
< 20 years	75.6	62.6	85.1	88
20-29 years	77.3	74.1	80.2	1265
30-39 years	75.4	71.0	79.2	812
40-49 years	82.4	64.5	92.4	55
Economic region				
Western	68.8	64.4	72.9	458
Khangai	66.3	61.7	70.6	430
Central	70.1	65.7	74.2	448
Eastern	65.9	61.3	70.2	434
Ulaanbaatar	82.4	78.6	85.7	450
Area				
Urban	80.6	77.5	83.4	1136
Rural	64.9	61.5	68.3	1084
Location				
Capital city	82.4	78.6	85.7	450
Aimag center	73.7	69.5	77.5	686
Soum center	65.3	61.3	69.1	853
Bagh/rural	63.9	56.7	70.5	231

Table PW.13: Minimum Dietary Diversity				
Percent distribution of minimum dietary diversity among pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Minimum Dietary Diversity [a]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	
Ethnicity				
Khalkh	77.2	74.6	79.6	1740
Kazak	65.4	49.3	78.7	117
Other	74.4	66.9	80.8	363
Education				
No education	-	-	-	22
Primary	51.5	36.6	66.1	73
Secondary	69.6	65.5	73.4	935
Higher	83.5	80.5	86.1	1190
Employment status				
Not employed	74.5	70.2	78.4	778
Employed	77.9	74.9	80.6	1442
Marital status				
Married	76.5	73.5	79.3	1572
Not married	79.8	71.9	86.0	200
Cohabitating	75.8	70.6	80.4	448
Trimester of pregnancy				
First	73.0	65.4	79.5	281
Second	78.9	75.4	82.1	991
Third	75.6	71.7	79.1	947

a   The proportion of women who consumed food items from at least 5 out of the following 10 food groups the previous day: Grains, white roots, tubers, plantains; pulses (beans, peas, lentils); nuts and seeds; dairy; meat, poultry, fish; eggs; dark green leafy vegetables; other vitamin A-rich fruits and vegetables; other vegetables; other fruits.

(-) Based on fewer than 25 unweighted cases.

MICRONUTRIENT SUPPLEMENTATION

Most women (86.2%) reported taking a vitamin or mineral supplement during pregnancy with 74.6% consuming any iron supplement or multiple micronutrient containing iron and 57.9% consuming any type of multiple micronutrient supplement (Table PW.13). Though pregnant women took a variety of supplements, the majority (43.3%) consumed the Elevit brand of prenatal multi-vitamins. Only 11.3% of pregnant women received the government provided multi-micronutrient supplements at antenatal care visits though distribution of multi-micronutrient supplements during ANC is part of the routine national health programme in Mongolia.

Table PW.14: Consumption of vitamin and mineral supplements		
Percent distribution of micronutrient supplement consumption by pregnant women, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Any supplement	86.2	1882
Any iron supplement	74.6	1638
Any multiple micronutrient supplement	57.9	1181
Multi-micronutrient tablet from ANC	11.3	172
Iron and folic acid	38.4	792
Folic acid	33.2	722

Table PW.14: Consumption of vitamin and mineral supplements		
Percent distribution of micronutrient supplement consumption by pregnant women, Mongolia National Nutrition Survey, 2017		
Iron	33.9	836
Vitamin D	7.3	135
Pregnavit	0.7	11
Vitamin C	4.3	109
Vitamin E	0.8	10
Prenatal	11.8	233
Elevit	43.3	915
Calcium	7.2	101
Magnesium/B6	28.7	604
Omega 3, 6, 9	2.2	33
Zinc	0.1	2
Vitamin B complex	1.0	26
Other type of supplement	8.8	173

Of the 38.4% of pregnant women who took a specific iron and folic acid supplement (IFA), over two-thirds (67.0%) started taking the supplement during the first trimester. Of the 11.3% of pregnant women who took a government provided multi-micronutrient supplement, 56% began supplementation during their first trimester (Table PW.14). In contrast, of the 7.3% of pregnant women who took a specific vitamin D supplement, only 31.5% started taking in the first trimester with the majority of pregnant women starting supplementation in the second trimester (60.9%). Nearly all pregnant women purchased IFA (89.9%) and vitamin D (90.0%) from pharmacies however the majority of pregnant women who received the government provided multi-micronutrient supplement did so from the health center (67.0%).

Table PW.15: Timing and source of vitamin and mineral supplements						
Percent distribution of trimester of first use and source of iron and folic acid, vitamin D, and multi-vitamin supplements among pregnant women, Mongolia National Nutrition Survey, 2017						
Characteristics	Iron and folic acid supplement		Vitamin D supplement		Multi-micronutrient supplement	
	%	Unweighted Number	%	Unweighted Number	%	Unweighted Number
Total	38.4	2220	7.3	2220	11.3	2220
Trimester in which started to use supplement						
First	67.0	514	31.5	49	56.0	99
Second	29.5	242	60.9	76	41.0	68
Third	3.5	32	-	-	-	-
Main source of supplement						
Health center	8.2	58	8.6	13	67.0	118
Health worker home visit	0.1	4	-	-	2.8	4
Private hospital	1.2	6	0.7	3	0.0	1
Pharmacy	89.9	719	90.0	117	29.4	45
Other	0.6	5	0.7	2	0.8	4

(-) Based on fewer than 25 unweighted cases.

The WHO recommends pregnant women receive iron and folic acid supplementation or multi-micronutrient supplementation with iron and folic acid for at least 180 days during their pregnancy. As shown in Table PW.15, mean consumption of iron and folic acid supplementation and multi-micronutrient supplementation was below the 60 supplements expected in the first trimester, 120 supplements recommended in the second trimester and 180 supplements recommended in the third trimester. Women in their third trimester consumed a mean of 69.3 iron and folic acid supplements or 79.3 multi-micronutrient supplements.

Table PW.16: Quantity of vitamin and mineral supplements consumed						
Average number of iron and folic acid, vitamin D, and multi-vitamin supplements consumed by pregnant women by trimester of pregnancy, Mongolia National Nutrition Survey, 2017						
Characteristics	Iron and folic acid supplement		Vitamin D supplement		Multi-micronutrient supplement	
	Mean number of tablets	Unweighted Number	Mean number of tablets	Unweighted Number	Mean number of tablets	Unweighted Number
Total	57.2	2220	31.9	2220	60.1	2220
Trimester of pregnancy						
First trimester	29.9	53	-	4	-	10
Second trimester	48.4	335	22.9	44	40.7	62
Third trimester	69.3	394	37.7	81	79.3	90

(-) Based on fewer than 25 unweighted cases.

ANTENATAL CARE ATTENDANCE

Almost all pregnant women (97.3%) attended at least one antenatal care (ANC) visit and attendance was high across all ages and in all areas and regions (Table PW.17). The majority (86.7%) of women had their first ANC visit during the first trimester, however ANC attendance during the first trimester was lower in situations where the child's father was not living in the household (72.8%) (Table PW.18). Pregnant women received a mean of 1.8 ANC visits in their first trimester, 3.2 ANC visits by their second trimester and 5.4 ANC visits by their third trimester for a total mean number of 4.0 ANC visits in pregnancy (Table PW.19).

Table PW.17: Antenatal care attendance		
Percent distribution of antenatal care attendance by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Total	97.3	2220
Age		
< 20 years	100.0	88
20-29 years	97.0	1265
30-39 years	97.6	812
40-49 years	93.8	55
Economic region		
Western	96.5	458
Khangai	98.8	430
Central	98.0	448
Eastern	98.4	434
Ulaanbaatar	96.7	450
Area		
Urban	97.0	1136
Rural	98.0	1084
Location		
Capital city	96.7	450
Aimag center	98.3	686
Soum center	98.0	853
Bagh/rural	98.1	231

Table PW.17: Antenatal care attendance		
Percent distribution of antenatal care attendance by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	%	Unweighted Number
Education		
No education	-	22
Primary	92.7	73
Secondary	97.5	935
Higher	97.2	1190
Employment status		
Not employed	97.9	778
Employed	96.9	1442
Father lives in household		
Yes	97.4	2063
No	94.7	157
Marital status		
Married	97.4	1572
Not married	97.3	200
Cohabitating	97.0	448
Ethnicity		
Khalkh	97.3	1740
Kazak	96.0	117
Other	97.6	363

(-) Based on fewer than 25 unweighted cases.

Table PW.18: Timing of first antenatal care visit				
Percent distribution of timing of first antenatal care visit by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Unweighted Number	First trimester	Second trimester	Third trimester
		%	%	%
Total	**2168**	**86.7**	**12.8**	**0.5**
Age				
< 20 years	88	71.1	28.9	0.0
20-29 years	1234	87.1	12.5	0.4
30-39 years	792	88.0	11.3	0.7
40-49 years	54	85.8	14.2	0.0
Economic region				
Western	442	85.4	13.9	0.7
Khangai	425	87.1	12.2	0.7
Central	439	87.2	12.3	0.5
Eastern	427	83.6	16.2	0.2
Ulaanbaatar	435	86.7	12.9	0.5
Area				
Urban	1109	86.9	12.5	0.6
Rural	1059	86.1	13.6	0.4

Table PW.18: Timing of first antenatal care visit

Percent distribution of timing of first antenatal care visit by selected characteristics, Mongolia National Nutrition Survey, 2017

Location				
Capital city	435	86.7	12.9	0.5
Aimag center	674	87.9	11.2	0.9
Soum center	832	86.0	13.8	0.3
Bagh/rural	227	86.4	13.0	0.6
Education				
None	22	-	-	-
Primary	70	72.9	27.1	0.0
Secondary	919	83.7	15.9	0.5
Higher	1157	89.5	9.9	0.6
Employment status				
Not employed	764	84.1	15.4	0.5
Employed	1404	88.3	11.2	0.5
Father lives in household				
Yes	2016	87.6	12.0	0.4
No	152	72.8	24.6	2.6
Marital status				
Married	1533	88.0	11.5	0.5
Not married	195	81.4	18.0	0.5
Cohabitating	440	85.2	14.2	0.6

(-) Based on fewer than 25 unweighted cases.

Table PW.19: Number of antenatal care visits

Average number of antenatal care visits attended by women during each trimester by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	First trimester	Second trimester	Third trimester	Total
		Mean number of visits	Mean number of visits	Mean number of visits	Mean number of visits
Total	**2168**	**1.8**	**3.2**	**5.4**	**4.0**
Age					
< 20 years	88	2.4	2.4	5.0	3.6
20-29 years	1234	1.8	3.1	5.5	3.9
30-39 years	792	1.9	3.5	5.4	4.2
40-49 years	54	1.2	3.7	5.5	4.2
Economic region					
Western	442	1.8	3.1	5.2	3.9
Khangai	425	1.8	2.8	5.3	3.9
Central	439	2.0	3.1	5.6	4.0
Eastern	427	1.7	2.9	4.9	3.6
Ulaanbaatar	435	1.7	3.4	5.5	4.0
Area					
Urban	1109	1.7	3.3	5.4	4.0
Rural	1059	2.1	3.1	5.5	4.0

Table PW.19: Number of antenatal care visits					
Average number of antenatal care visits attended by women during each trimester by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Unweighted Number	First trimester	Second trimester	Third trimester	Total
		Mean number of visits	Mean number of visits	Mean number of visits	Mean number of visits
Location					
Capital city	435	1.7	3.4	5.5	4.0
Aimag center	674	1.6	2.8	5.3	3.8
Soum center	832	2.2	3.2	5.6	4.1
Bagh/rural	227	1.6	2.7	5.1	3.9

The main providers of ANC to pregnant women were family/*soum* doctors (54.9%) and gynecologists (39.4%) with very few pregnant women receiving care from midwives (0.5%) or auxiliary midwives (4.7%) (Table PW.20). There was regional variation in providers of antenatal care, with care provided by gynecologists more prevalent in Ulaanbaatar (47.8%) and Central (39.6%) regions, care provided by family/*soum* doctors more prevalent in Eastern region (82.4%), and care provided by auxiliary midwives more prevalent in Khangai (22.1%) and Western (15.9%) regions.

Table PW.20: Provider of antenatal care					
Percent distribution of antenatal care providers by selected characteristics, Mongolia National Nutrition Survey, 2017					
Characteristics	Unweighted Number	Gynecologist	Family/Soum doctor	Midwife	Auxiliary midwife
		%	%	%	%
Total	2168	39.4	54.9	0.5	4.7
Age					
< 20 years	88	37.7	50.8	0.9	7.6
20-29 years	1234	36.4	57.9	0.5	4.7
30-39 years	792	44.0	51.2	0.4	3.9
40-49 years	54	49.0	41.7	0.0	9.4
Economic region					
Western	442	21.9	60.9	0.4	15.9
Khangai	425	17.2	58.8	1.9	22.1
Central	439	39.6	58.5	0.7	1.1
Eastern	427	16.4	82.4	0.2	0.9
Ulaanbaatar	435	47.8	51.3	0.0	0.0
Area					
Urban	1109	42.5	56.6	0.1	0.1
Rural	1059	30.4	49.9	1.6	18.0
Location					
Capital city	435	47.8	51.3	0.0	0.0
Aimag center	674	22.8	76.5	0.3	0.3
Soum center	832	38.3	50.3	1.0	10.3
Bagh/rural	227	6.8	48.8	3.5	40.9

Among the few pregnant women (2.7%) who had not attended ANC, the majority stated that they had not attended due to being too busy and not having enough time (50.8%) (Table PW.21). Almost all pregnant women (96.3%) had an ANC guide or MCH handbook with coverage 92% or above for all regions, areas and age categories of pregnant women (Table PW.22).

Table PW.21: Reasons for not attending antenatal care

Percent distribution of reasons for not attending antenatal care by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Not informed	No money	Very far	Busy/no time	Other reason
		%	%	%	%	%
Total	52	15.9	9.6	0.6	50.8	21.8
Area						
Urban	27	17.7	11.8	0.0	53.6	16.9
Rural	25	7.9	0.0	3.1	38.5	43.2

Table PW.22: Possession of ANC guide or MCH handbook

Percent of pregnant women who had ANC guide or MCH handbook by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	%
Total	2220	96.3
Age		
< 20 years	88	93.6
20-29 years	1265	96.9
30-39 years	812	96.0
40-49 years	55	92.0
Economic region		
Western	458	95.2
Khangai	430	96.7
Central	448	98.2
Eastern	434	96.8
Ulaanbaatar	450	95.8
Area		
Urban	1136	95.9
Rural	1084	97.7
Location		
Capital city	450	95.8
Aimag center	686	96.3
Soum center	853	97.5
Bagh/rural	231	98.1

RECEIPT OF COUNSELING MESSAGES AT ANC

As shown in Table PW.23, there was wide variation in the counseling messages pregnant women received during ANC visits. Most women received messages about the importance of attending ANC visits (72.0%) and consuming IFA supplements (77.5%). 39.9% of women received counseling about taking multi-micronutrient supplements during pregnancy, a routine national health programme in Mongolia.

Table PW.23: Receipt of antenatal care counseling messages

Percent distribution of antenatal care counseling messages received by pregnant women, Mongolia National Nutrition Survey, 2017

Type of messages	Unweighted Number	%
Importance of prenatal checkup	1569	72.0
Complications during delivery	1183	50.7
Causes and effects of anaemia	1207	50.1
Iron and folic acid supplementation	1682	77.5
Multi-micronutrient supplementation	897	39.9
Increased food intake	1254	55.2
Weight monitoring	1194	51.3
Increased intake of iron-rich foods	1260	55.0
Personal hygiene	1383	59.7
Importance of breastfeeding	1337	61.5
Early initiation of breastfeeding	1291	59.1
Exclusive breastfeeding	1373	63.8
Complementary feeding	1161	53.2

KNOWLEDGE ABOUT BREASTFEEDING AND COMPLEMENTARY FEEDING

Almost all pregnant women (99.7%) expressed a positive intention to breastfeed their baby, 22 months being the average length of time pregnant women planned to breastfeed (Table PW.24). The percentage of women intending to breastfeed their baby was 98.6% or higher across all characteristics measured. Pregnant women planned a longer duration of breastfeeding in rural areas (25.2 months) compared to urban areas (20.9 months) and pregnant women with primary only education (28.6 months) planned a longer duration of breastfeeding than pregnant women with secondary (23.2 months) and higher (20.8 months) education levels. Planned duration of breastfeeding was similar between employed (22.1 months) and unemployed (21.8 months) women.

Table PW.24: Intentions for breastfeeding

Percent of pregnant women planning to breastfeed and the planned length of time for breastfeeding by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Unweighted Number	Plans to breastfeed baby	Planned length of time to breastfeed baby
		%	Mean (months)
Total	2220	99.7	22.0
Age			
< 20 years	88	100.0	19.6
20-29 years	1265	99.6	21.7
30-39 years	812	99.8	22.8
40-49 years	55	100.0	22.3
Economic region			
Western	458	99.6	23.9
Khangai	430	100.0	24.6
Central	448	99.3	24.0
Eastern	434	99.8	22.6
Ulaanbaatar	450	99.8	20.6
Area			
Urban	1136	99.8	20.9
Rural	1084	99.6	25.2

Table PW.24: Intentions for breastfeeding			
Percent of pregnant women planning to breastfeed and the planned length of time for breastfeeding by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Unweighted Number	Plans to breastfeed baby	Planned length of time to breastfeed baby
		%	Mean (months)
Location			
Capital city	450	99.8	20.6
Aimag center	686	99.7	22.4
Soum center	853	99.5	25.0
Bagh/rural	231	100.0	25.8
Education			
No education	21	-	-
Primary	73	100.0	28.6
Secondary	935	99.8	23.2
Higher	1190	99.7	20.8
Employment status			
Not employed	778	99.4	21.8
Employed	1442	99.9	22.1
Child's father lives in household			
Yes	2063	99.7	22.1
No	157	99.4	20.7
Marital status			
Married	1572	99.8	22.3
Not married	200	98.6	19.3
Cohabitating	448	99.8	22.2
Trimester of pregnancy			
First	281	99.7	22.0
Second	991	99.5	21.9
Third	947	100.0	22.1

(-) Based on fewer than 25 unweighted cases.

As shown in Table PW.25, with mean responses of 6.3 months and 6.0 months, respectively, pregnant women demonstrated accurate knowledge about the appropriate duration of exclusive breastfeeding and the appropriate age of introduction of complementary foods into a child's diet. Knowledge about breastfeeding and complementary feeding was high in all age groups, areas, and regions and among women in each trimester of pregnancy.

Table PW.25: Knowledge on breastfeeding and complementary feeding			
Average length of time for exclusive breastfeeding and age of introduction of complementary foods reported by pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Unweighted Number	Length of time for exclusive breastfeeding	Age child should be given complementary foods
		Mean (months)	Mean (months)
Total	**2128**	**6.3**	**6.0**
Age			
< 20 years	70	6.2	6.0
20-29 years	1203	6.3	6.0
30-39 years	801	6.2	5.9
40-49 years	54	7.1	5.7

Table PW.25: Knowledge on breastfeeding and complementary feeding			
Average length of time for exclusive breastfeeding and age of introduction of complementary foods reported by pregnant women by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Unweighted Number	Length of time for exclusive breastfeeding	Age child should be given complementary foods
		Mean (months)	Mean (months)
Economic region			
Western	431	6.0	6.1
Khangai	415	6.0	5.9
Central	425	5.9	6.0
Eastern	420	6.1	5.9
Ulaanbaatar	437	6.5	6.0
Area			
Urban	1087	6.3	6.0
Rural	1041	6.0	6.0
Location			
Capital city	437	6.5	7.0
Aimag center	650	5.9	5.9
Soum center	817	6.0	6.0
Bagh/rural	224	6.0	5.9
Education			
No education	19	-	-
Primary	68	6.1	5.9
Secondary	880	6.5	6.0
Higher	1160	6.1	5.9
Employment status			
Not employed	715	6.3	6.0
Employed	1413	6.3	5.9
Child's father lives in household			
Yes	1989	6.3	6.0
No	139	6.1	6.0
Marital status			
Married	1543	6.2	5.9
Not married	179	6.1	6.0
Cohabitating	406	6.4	6.1
Trimester of pregnancy			
First	269	6.4	6.1
Second	938	6.3	6.0
Third	920	6.2	5.9

(-) Based on fewer than 25 unweighted cases.

DISCUSSION

Nutritional status

Only 2.6% of pregnant women were detected as having severe acute malnutrition or underweight, which is similar to the results of 2010 National nutrition survey (2.1%). There was no visible association between the prevalence of severe acute malnutrition in pregnant women and their wealth quintiles, location, age, level of education, and employment status that is statistically significant.

Since the short stature of women is the consequence of childhood stunting, and short women are at risk of birth complications, the heights of pregnant women were measured to determine prevalence of short stature in this survey. Prevalence of short and borderline short stature among pregnant women was 0.3% and 5.8% respectively.

Micronutrient status:

One in five or 21.4% of pregnant women in Mongolia are anaemic. The prevalence of anaemia in Mongolia is at the "moderate" level, as measured by WHO recommended assessment criteria for prevalence of anemia. Figure PW.1 shows moderate decrease in the prevalence of anemia among pregnant women compared to 2010 (26.5%).
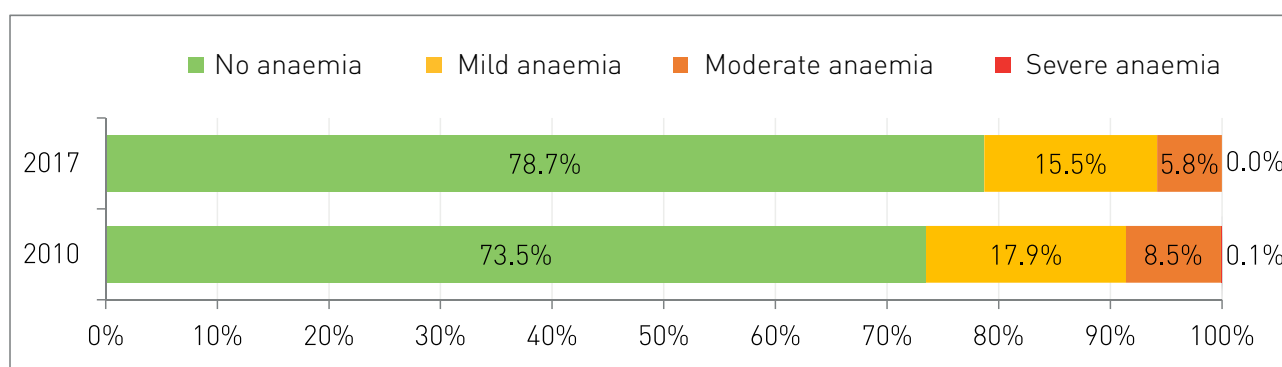
Figure PW.1: Percent distribution of anemia among pregnant women,
by anemia degree and chronology

In the 5th National nutrition survey, the percent distribution of micronutrient status, in particular, iron and vitamins A, D statuses among pregnant women was determined by selected characteristics (demographic and socio-economic). However, comparative analysis of micronutrients statuses of pregnant women, except iodine status, was not possible as these were not analyzed during the previous survey. Figure PW.2 and PW.3 provides prevalence of the awareness of iodine supply, deficiency and consumption of iodized salt among pregnant women, compared with that of 2010. This is an internationally accepted principle that any subset of population is considered to have appropriate awareness of a subject, if at least 90% of them have ever heard of it. The percentage of pregnant women who have awareness on micronutrient deficiencies, as identified in the 5th National nutrition survey, was found lying below this benchmark, even dropping from the previous NNS level, raising concern. This situation is the direct consequence of the termination of awareness raising activities, following the closure of the National program on combating iodine deficiency disorder in 2010, as one may conclude (Figure PW.2 and PW.3).
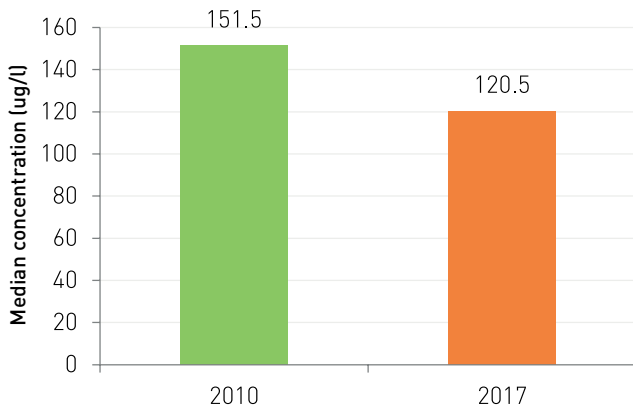
Figure PW.2: Median urinary iodine concentration of pregnant women (μg/l)
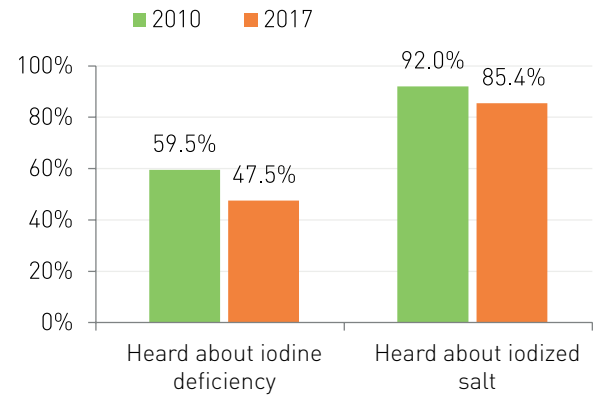
Figure PW.3: Percentage of pregnant women with awareness on iodine deficiency and iodized salt consumption

Micronutrients supplementation

Slight reduction in the prevalence of iron deficiency among pregnant women, as compared to the 4th National nutrition survey in 2010, may be explained with increased percentage of women consuming any supplements containing iron, in the mean time. The percentage of pregnant of women who received MMS during antenatal care visit had no change, if compared to 2010 (Figure PW.4).
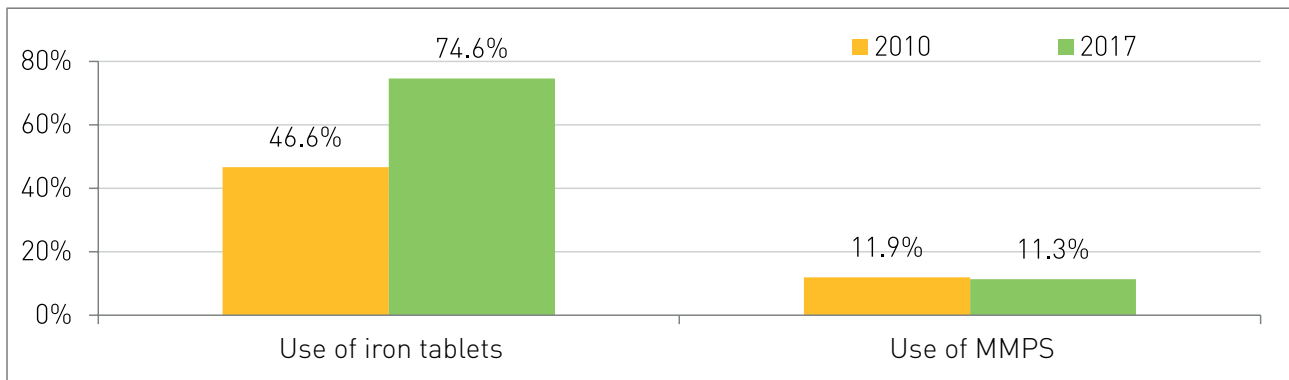
Figure PW.4: Percent distribution of iron and multiple micronutrient supplements consumption among pregnant women, by survey years

Though it was decreed by the Health minister to provide MMS in the framework of the national health program to pregnant women during ANC visit, the enforcement of an order is not satisfactory, as revealed by results of numerous surveys. In this survey, of the majority of pregnant women (86.2%) who reported to have consumed any vitamin and mineral supplements, about 90% purchased them from pharmacies. Despite the substantial awareness of the importance of vitamin and mineral supplements intake among the target group, the actual intake of supplements by pregnant women that is far from being sufficient, making an effective prevention of iron, vitamin D and other micronutrients deficiencies more complicated.

CONCLUSION

1. Prevalence of severe acute malnutrition or underweight in women is insignificant (2.1%), with relatively higher prevalence of underweight among unemployed women, in particular.

2. One in every 5 pregnant women (21.4%) is anemic. High prevalence of anemia in pregnancy is observed, with percent distribution of anemia among pregnant women in their second and third trimester rising to 20.0% and 28.5% respectively.

3. Prevalence of iron deficiency is common among pregnant women. About 1/3 of pregnant women (29.6%) has iron deficiency, and about half of pregnant women who is anemic or 10.5% of all pregnant women have iron deficiency anemia.

4. Vitamin D intake among pregnant women (7.3%) is very low, with 75.4% having vitamin D deficiency and vitamin D insufficiency - by 20.2%.

5. Despite visible growth in vitamin and mineral supplements intake by pregnant women, compared to 2010, the infrequency of intake and failure to consume recommended number of supplements as instructed in the relevant guides persist.

6. Median urinary iodine concentration of pregnant women is 120.2 µg/l, considerably lower than WHO recommended reference range, indicating pregnant women are at risk of iodine deficiency. Percentage of women with awareness on iodine deficiency and iodized salt consumption dropped from level in 2010.

7. 76.6% of pregnant women had 'minimum dietary diversity'. Percent distribution of minimum dietary diversity is lower among pregnant women in rural area.

8. 97.3% of pregnant women attended ANC visit and received ANC counseling. 86.7% of pregnant women attended their first ANC visit in their first trimester, and had an average of 4 ANC visits during their pregnancy.

MEN 15-49 YEARS OF AGE

SAMPLE CHARACTERISTICS

Table M.1 provides background characteristics for sampled men 15-49 years of age in the NNS V. 82.1% of men were between 20-39 years of age, 77.7% were married and 93.3% of men had secondary or higher level education. Eastern and Khangai regions had the largest percentage of men in the poorest wealth quintile (Table M.2). Eastern and Western regions had a lower percentage of Khalkhs and a higher percentage of men from Kazak and other ethnic minority groups compared to the other regions.

Table M.1: Men 15-49 characteristics (National level)			
Percent of men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017			
Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Total	100.0	1382	1384
Economic region			
Western	12.3	171	350
Khangai	18.6	257	258
Central	14.6	202	243
Eastern	6.7	92	266
Ulaanbaatar	47.7	659	267
Area			
Urban	65.3	903	645
Rural	34.7	479	739
Location			
Capital city	47.7	659	267
Aimag center	17.6	244	378
Soum center	24.6	341	544
Bagh/rural	10.0	138	195
Age			
15-19 years	3.6	50	33
20-29 years	37.0	512	507
30-39 years	45.1	623	641
40-49 years	14.3	197	203
Marital status			
Not married	7.0	96	67
Married	77.7	1072	1157
Cohabitating	15.3	211	159
Ethnicity			
Khalkh	83.6	1155	1040
Kazak	3.6	50	85
Durvud	2.2	31	48
Buriad	1.1	16	17
Bayad	1.7	24	31
Dariganga	1.3	18	48
Other	6.5	90	115

Table M.1: Men 15-49 characteristics (National level)

Percent of men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Weighted Percent	Weighted Number	Unweighted Number
Education			
No education	1.4	19	24
Primary	5.3	73	103
Secondary	54.7	756	779
Higher	38.6	533	478
Employment status			
Not employed	15.0	207	205
Employed	85.0	1174	1179
Wealth index quintile			
Poorest	19.8	274	361
Second	18.5	256	266
Third	20.3	279	301
Fourth	21.2	293	277
Wealthiest	20.2	279	179

Table M.2: Men 15-49 characteristics (Regional level)

Percent of men 15-49 years by selected characteristics in each region, Mongolia National Nutrition Survey, 2017

Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Total	**100.0**	**65.0**	**35.0**	**12.0**	**19.0**	**15.0**	**7.0**	**48.0**	**1382**	**1384**
Area										
Urban	65.3	100.0	0.0	42.3	33.0	30.7	26.3	100.0	903	645
Rural	34.7	0.0	100.0	57.7	67.0	69.3	73.7	0.0	479	739
Location										
Capital city	47.7	73.0	0.0	0.0	0.0	0.0	0.0	100.0	659	267
Aimag center	17.6	27.0	0.0	42.3	33.0	30.7	26.3	0.0	244	378
Soum center	24.6	0.0	71.1	52.0	29.7	64.7	48.1	0.0	341	544
Bagh/rural	10.0	0.0	28.9	5.7	37.3	4.5	25.6	0.0	138	195
Age										
15-19 years	3.6	4.7	1.5	0.6	4.3	0.8	1.5	5.2	50	33
20-29 years	37.0	37.9	35.6	36.3	32.2	44.1	33.8	37.5	512	507
30-39 years	45.1	43.5	47.9	49.4	46.4	40.4	49.6	44.2	623	641
40-49 years	14.3	13.9	15.0	13.7	17.1	14.7	15.0	13.1	197	203
Marital status										
Not married	7.0	9.3	2.5	1.7	6.2	1.6	4.9	10.5	96	67
Married	77.7	72.1	88.4	95.7	83.7	80.6	85.3	68.8	1072	1157
Cohabitating	15.3	18.6	9.1	2.6	10.1	17.7	9.8	20.7	211	159
Ethnicity										
Khalkh	83.6	86.1	78.7	41.7	92.4	93.8	71.1	89.5	1155	1040
Kazak	3.6	2.1	6.4	22.6	0.6	0.0	0.0	1.5	50	85
Durvud	2.2	2.1	2.4	11.4	0.0	1.6	0.4	1.1	31	48
Buriad	1.1	1.3	0.9	0.0	0.4	0.4	4.1	1.5	16	17
Bayad	1.7	2.4	0.5	7.1	0.0	0.8	0.0	1.5	24	31

Table M.2: Men 15-49 characteristics (Regional level)										
Percent of men 15-49 years by selected characteristics in each region, Mongolia National Nutrition Survey, 2017										
Characteristics	Weighted Percent	Area		Region					Weighted Number	Unweighted Number
		Urban	Rural	Western	Khangai	Central	Eastern	Ulaanbaatar		
Dariganga	1.3	0.7	2.4	0.0	0.0	0.8	17.3	0.0	18	48
Other	6.5	5.3	8.8	17.1	6.6	2.5	7.1	4.9	90	115
Education										
No education	1.4	1.1	2.0	1.4	2.3	0.0	3.8	1.1	19	24
Primary	5.3	2.2	11.1	10.0	12.0	6.6	7.1	0.7	73	103
Secondary	54.7	51.5	60.8	47.1	67.8	56.7	63.2	49.8	756	779
Higher	38.6	45.2	26.2	41.4	17.9	36.7	25.9	48.3	533	478
Employment status										
Not employed	15.0	16.7	11.8	19.4	12.8	13.6	10.9	15.7	207	205
Employed	85.0	83.3	88.2	80.6	87.2	86.4	89.1	84.3	1174	1179
Wealth index quintile										
Poorest	19.8	7.1	43.7	24.3	48.2	14.8	36.8	6.7	274	361
Second	18.5	20.3	15.2	26.9	14.6	17.3	15.8	18.7	256	266
Third	20.3	19.2	22.1	22.6	22.1	21.0	24.8	18.0	279	301
Fourth	21.2	23.6	16.6	16.9	10.9	32.8	18.0	23.2	293	277
Wealthiest	20.2	29.7	2.4	9.4	4.3	14.0	4.5	33.3	279	179

NUTRITION STATUS

Prevalence of overweight was high in men (48.8%) with 14.6% of men obese (Table M.3). The prevalence of overweight was higher among men 30-39 (59.2%) and 40-49 (63.9%) years of age, married men (53.1%), men with higher education (54.3%) and men from higher wealth index quintiles. The prevalence of obesity was higher in the two wealthiest quintiles (17.2% and 23.1%) compared to the three poorer wealth index quintiles (10.0% to 11.3%). There was no significant regional variation in the prevalence of overweight or obesity among men.

Table M.3: Nutrition status										
Percent distribution of weight status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Underweight [a]			Overweight [b]			Obese [c]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Total	1.9	1.1	3.2	48.8	45.4	52.0	14.6	12.4	17.1	1377
Age										
15-19 years	3.7	1.0	12.5	17.7	6.8	38.6	0.0	0.0	0.0	33
20-29 years	2.6	1.2	5.4	33.2	28.5	38.4	7.3	5.2	10.2	505
30-39 years	1.1	0.4	3.2	59.2	54.3	63.8	20.4	16.6	24.8	639
40-49 years	1.9	0.5	7.3	63.9	55.5	71.5	18.6	12.9	26.1	200
Economic region										
Western	0.9	0.3	2.6	53.3	48.0	58.5	12.7	9.6	16.6	347
Khangai	0.8	0.2	3.1	43.8	37.9	50.0	15.7	11.7	20.6	256
Central	1.6	0.6	4.3	50.9	44.7	57.2	13.6	9.8	18.5	243
Eastern	1.9	0.8	4.5	46.6	40.6	52.6	16.7	12.6	21.7	264
Ulaanbaatar	2.6	1.3	5.4	49.1	43.1	55.1	14.6	10.9	19.4	267

Table M.3: Nutrition status

Percent distribution of weight status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Underweight [a]			Overweight [b]			Obese [c]			Unweighted Number
	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	%	Lower 95% CI	Upper 95% CI	
Area										
Urban	2.5	1.4	4.5	48.0	43.4	52.6	14.1	11.1	17.6	643
Rural	0.7	0.3	0.5	50.2	46.3	54.1	15.5	12.8	1.2	734
Location										
Capital city	2.6	1.3	5.4	49.1	43.1	55.1	14.6	10.9	19.4	267
Aimag center	2.1	1.1	4.3	45.0	39.7	50.4	12.6	9.4	16.7	376
Soum center	0.9	0.3	2.5	53.9	49.4	58.3	16.0	13.0	19.6	542
Bagh/rural	0.3	0.0	1.8	40.9	33.6	48.6	14.1	9.5	20.4	192
Ethnicity										
Khalkh	2.1	1.2	3.6	49.0	45.4	52.9	14.4	12.0	17.2	1038
Kazak	0.0	0.0	0.0	44.7	31.8	58.2	21.9	11.5	37.6	84
Other	0.9	0.3	2.4	48.0	39.2	55.3	13.2	8.6	19.8	255
Education										
No education	-	-	-	-	-	-	-	-	-	24
Primary	0.5	0.1	3.4	38.8	28.6	49.9	15.9	9.6	25.1	101
Secondary	1.7	0.9	3.5	45.6	41.2	49.9	12.1	9.6	15.2	775
Higher	2.3	1.0	5.1	54.3	48.7	59.9	17.6	13.6	22.4	477
Employment status										
Not employed	3.1	1.2	7.6	41.7	33.6	50.5	10.4	6.1	17.3	202
Employed	1.7	0.9	3.1	50.0	46.4	53.5	15.3	12.9	18.0	1175
Marital status										
Married	1.2	2.5	18.7	53.1	49.4	56.7	16.8	14.2	19.8	1152
Not married	7.1	0.6	2.5	22.7	12.9	37.0	0.0	-	-	67
Cohabitating	2.7	0.8	8.8	38.0	29.5	47.2	9.8	5.6	16.6	159
Wealth index quintile										
Poorest	1.4	0.4	5.4	37.7	32.1	43.5	10.7	7.8	14.5	356
Second	1.2	0.2	5.9	42.7	35.4	50.3	11.3	7.5	16.6	266
Third	2.6	1.0	6.9	46.4	39.4	53.6	10.0	6.8	14.4	300
Fourth	2.3	0.8	6.5	58.4	51.1	65.4	17.2	12.3	23.5	276
Wealthiest	1.8	0.6	5.3	57.2	48.6	65.3	23.1	16.6	31.1	179

a BMI < 18.5 kg/m^2.

b BMI ⩾ 25.0 kg/m^2.

c BMI ⩾ 30.0 kg/m^2.

(-) Based on fewer than 25 unweighted cases.

MICRONUTRIENT STATUS

A subset of men aged 15-49 years were randomly selected for analysis of micronutrient status with indicators of anaemia, iron, vitamin A, and vitamin D status, and the presence of inflammation measured at the National level. Table M.4 presents summary results for these indicators.

Table M.4: Micronutrient status				
Percentage distribution of anaemia, iron, vitamin A, vitamin D, and inflammation status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Anaemia				**482**
Anaemia [a]	3.0	1.5	5.7	11
Iron status				
Iron deficiency [b]	1.1	0.4	2.7	5
Iron sufficiency	98.9	97.3	99.6	375
Iron overload [c]	-	-	-	0
Iron deficiency by soluble transferrin receptor [d]	3.9	2.2	6.9	15
Low body iron stores [e]	0.3	0.1	1.1	2
Iron deficiency anaemia [f]	0.1	0.0	1.0	1
Vitamin A status [g]				**380**
Vitamin A deficiency	0.6	0.1	4.1	1
Moderate vitamin A deficiency	2.6	1.3	4.9	13
Vitamin A sufficiency	96.8	94.0	98.4	366
Vitamin D status [h]				**377**
Vitamin D deficiency	40.4	34.6	46.6	160
Vitamin D insufficiency	41.9	36.0	48.1	155
Vitamin D sufficiency	17.6	13.3	23.0	62
Inflammation				**380**
Any inflammation [i]	11.2	7.8	15.8	39

a Haemoglobin < 130 g/l.

b Serum ferritin < 15 µg/l.

c Serum ferritin > 300 µg/l.[1]

d sTfR > 8.3 mg/l.

e Body iron stores < 0 mg/kg.

f Haemoglobin < 130 g/l and ferritin < 15 µg/l.

g Serum retinol < 0.70 µmol/l (deficiency); ≥ 0.7–1.05 µmol/l (insufficiency); > 1.05 µmol/l (sufficiency).
h Serum 25(OH)D < 20 ng/ml (deficiency); 20 to < 30 ng/ml (insufficiency); 30 to ≤100 ng/ml (sufficiency).

i C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l.

Among men 15-49 years of age, the prevalence of anaemia, as measured by haemoglobin, was 3.0% and the prevalence of iron deficiency anaemia, as measured by haemoglobin and serum ferritin, was 0.1% (Table M.5).

Table M.5: Anaemia and iron deficiency anaemia				
Percent distribution of anaemia and iron deficiency anaemia among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Anaemia (Hb level) [a]		Iron deficiency anaemia (Hb and ferritin) [b]	
	Unweighted Number	%	Unweighted Number	%
Total	452	3.0	377	0.1
Age				
15-19 years	13	-	13	-
20-29 years	169	3.6	134	0.0
30-39 years	206	3.3	174	0.3
40-49 years	64	0.9	56	0.0
Ethnicity				
Khalkh	344	2.2	281	0.2
Kazak	23	-	23	-
Other	85	7.7	73	0.0
Economic region				
Western	81	2.5	79	1.3
Khangai	78	5.1	71	0.0
Central	121	0.0	78	0.0
Eastern	77	2.6	72	0.0
Ulaanbaatar	95	3.2	77	0.0
Area				
Urban	224	3.0	181	0.2
Rural	228	2.9	196	0.0
Education				
No education	7	-	6	-
Primary	22	-	21	-
Secondary	265	1.8	216	0.2
Higher	158	4.1	134	0.0
Employment status				
Not employed	67	5.6	55	0.0
Employed	385	2.5	322	0.2
Location				
Capital city	95	3.2	77	0.0
Aimag center	129	2.6	104	0.7
Soum center	175	2.2	146	0.0
Bagh/rural	53	4.8	50	0.0
Marital status				
Not married	22	-	19	-
Married	377	3.4	316	0.2
Cohabitating	53	1.9	42	0.0
Wealth index quintile				
Poorest	93	5.9	85	0.0
Second	90	4.2	79	0.0
Third	101	2.5	84	0.0
Fourth	104	0.0	78	0.0
Wealthiest	64	3.2	51	0.7

a   Haemoglobin < 130 g/l.

b   Haemoglobin < 130 g/l and ferritin < 15 µg/l.

(-) Based on fewer than 25 unweighted cases.

Few men were iron deficient as measured by serum ferritin (1.1%) or soluble transferrin receptor (3.9%) and less than 1% of men (0.3%) had low body iron stores (Table M.6). There was no case of iron overload (serum ferritin > 300 µg/l) among men sampled in the survey, with the mean serum ferritin concentration of 141 µg/l indicating good iron status with little risk of iron overload.

Table M.6: Iron deficiency and low body iron stores				
Percent distribution of iron deficiency and low body iron stores among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Unweighted Number	Iron deficiency by ferritin level [a]	Iron deficiency by sTfR level [b]	Low body iron stores [c]
		%	%	%
Total	380	1.1	3.9	0.3
Age				
15-19 years	13	-	-	-
20-29 years	136	1.7	4.7	0.4
30-39 years	175	0.3	2.6	0.3
40-49 years	56	0.0	7.4	0.0
Ethnicity				
Khalkh	284	0.8	3.4	0.2
Kazak	23	-	-	-
Other	73	2.0	6.4	0.0
Economic region				
Western	80	2.5	3.8	2.5
Khangai	71	2.8	7.0	0.0
Central	78	1.3	3.8	0.0
Eastern	74	0.0	2.7	0.0
Ulaanbaatar	77	0.0	2.6	0.0
Area				
Urban	181	0.9	3.6	0.2
Rural	199	1.3	4.3	0.4
Education				
No education	6	-	-	-
Primary	21	-	-	-
Secondary	217	1.4	4.9	0.2
Higher	136	0.8	2.2	0.4
Employment status				
Not employed	56	4.3	1.1	0.0
Employed	324	0.5	4.3	0.3
Location				
Capital city	77	0.0	2.6	0.0
Aimag center	104	3.2	6.2	0.7
Soum center	148	1.3	3.6	0.0
Bagh/rural	51	1.4	6.1	1.4
Marital status				
Not married	19	-	-	-
Married	319	0.6	3.3	0.4
Cohabitating	42	2.2	8.8	0.0

Table M.6: Iron deficiency and low body iron stores				
Percent distribution of iron deficiency and low body iron stores among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	Unweighted Number	Iron deficiency by ferritin level [a]	Iron deficiency by sTfR level [b]	Low body iron stores [c]
		%	%	%
Wealth index quintile				
Poorest	86	1.7	5.1	0.0
Second	80	0.0	7.2	0.0
Third	85	0.7	4.0	0.7
Fourth	78	1.4	1.9	0.0
Wealthiest	51	1.5	1.3	0.7

a Serum ferritin < 15 µg/l.

b sTfR > 8.3 mg/l.

c Body iron stores < 0 mg/kg.

(-) Based on fewer than 25 unweighted cases.

Almost all men had sufficient vitamin A status (96.8%), with 0.6% at deficient levels and 2.6% of men having vitamin A insufficiency (Table M.7).

Table M.7: Vitamin A status						
Percent distribution of vitamin A status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Vitamin A deficiency [a]		Vitamin A insufficiency [b]		Vitamin A sufficiency [c]	
	Unweighted Number	%	Unweighted Number	%	Unweighted Number	%
Total	**1**	**0.6**	**13**	**2.6**	**366**	**96.8**
Age						
15-19 years	0	-	0	-	13	-
20-29 years	1	-	7	-	128	93.3
30-39 years	0	-	2	-	173	99.4
40-49 years	0	-	4	-	52	96.6
Ethnicity						
Khalkh	1	-	9	-	274	96.7
Kazak	0	-	1	-	22	-
Other	0	-	3	-	70	97.7
Economic region						
Western	0	-	3	-	77	96.3
Khangai	0	-	2	-	69	97.2
Central	0	-	3	-	75	96.2
Eastern	0	-	4	-	70	94.6
Ulaanbaatar	1	-	1	-	75	97.4
Area						
Urban	1	-	7	-	173	96.4
Rural	0	-	6	-	193	97.6
Education						
No education	0	-	1	-	5	-

Table M.7: Vitamin A status

Percent distribution of vitamin A status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Vitamin A deficiency [a]		Vitamin A insufficiency [b]		Vitamin A sufficiency [c]	
	Unweighted Number	%	Unweighted Number	%	Unweighted Number	%
Primary	0	-	0	-	21	-
Secondary	0	-	8	-	209	96.6
Higher	1	-	4	-	131	97.0
Employment status						
Not employed	0	-	1	-	55	98.9
Employed	1	-	12	-	311	96.5
Location						
Capital city	1	-	1	-	75	97.4
Aimag center	0	-	6	-	98	94.1
Soum center	0	-	4	-	144	97.6
Bagh/rural	0	-	2	-	49	97.6
Marital status						
Not married	0	-	1	-	18	-
Married	1	-	10	-	308	97.0
Cohabitating	0	-	2	-	40	95.6
Wealth index quintile						
Poorest	0	-	3	-	83	95.2
Second	0	-	2	-	78	97.9
Third	0	-	3	-	82	98.0
Fourth	1	-	4	-	73	94.1
Wealthiest	0	-	1	-	50	99.3

a Serum retinol < 0.70 µmol/l.

b Serum retinol ≥ 0.7–1.05 µmol/l.

c Serum retinol > 1.05 µmol/l.

(-) Based on fewer than 25 unweighted cases.

The prevalence of vitamin D inadequacy was 82.3% with 40.4% of men having vitamin D deficiency and 41.9% having vitamin D insufficiency with no significant difference in the prevalence of vitamin D insufficiency and deficiency by region, wealth index quintile or area. Only 17.6% of men had sufficient vitamin D levels (Table M.8).

Table M.8: Vitamin D status

Percent distribution of vitamin D status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	TOTAL Unweighted Number	Vitamin D deficiency				Vitamin D insufficiency				Vitamin D sufficiency			
		Unweighted Number	%	95% CI		Unweighted Number	%	95% CI		Unweighted Number	%	95% CI	
				Lower	Upper			Lower	Upper			Lower	Upper
Total	**377**	**160**	**40.4**	**34.6**	**46.6**	**155**	**41.9**	**36.0**	**48.1**	**62**	**17.6**	**13.3**	**23.0**
Age													
15-19 years	13	8	-	-	-	4	-	-	-	1	-	-	-
20-29 years	135	51	37.0	27.8	47.2	56	41.5	31.8	51.9	28	21.5	14.2	31.4
30-39 years	174	74	41.6	33.0	50.7	73	42.5	33.8	51.7	27	15.9	10.2	23.9
40-49 years	55	27	40.8	26.5	56.8	22	-	-	-	6	-	-	-

Table M.8: Vitamin D status

Percent distribution of vitamin D status among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	TOTAL Unweighted Number	Vitamin D deficiency				Vitamin D insufficiency				Vitamin D sufficiency			
		Unweighted Number	%	95% CI		Unweighted Number	%	95% CI		Unweighted Number	%	95% CI	
				Lower	Upper			Lower	Upper			Lower	Upper
Ethnicity													
Khalkh	281	128	41.1	34.5	48.1	108	40.9	34.1	48.0	45	18.0	13.1	24.3
Kazak	23	6	-	-	-	11	-	-	-	6	-	-	-
Other	73	26	40.5	27.0	55.5	36	44.7	30.9	59.3	11	-	-	-
Economic region													
Western	80	31	38.8	28.7	49.8	36	45.0	34.5	56.0	13	-	-	-
Khangai	70	32	45.7	34.5	57.4	28	40.0	29.2	51.8	10	-	-	-
Central	78	42	53.8	42.8	64.6	26	33.3	23.8	44.5	10	-	-	-
Eastern	72	28	38.9	28.4	50.6	31	43.1	32.2	54.7	13	-	-	-
Ulaanbaatar	77	27	35.1	25.3	46.3	34	44.2	33.5	55.4	16	-	-	-
Area													
Urban	178	66	35.9	28.2	44.4	83	45.4	37.1	54.0	29	18.7	12.8	26.5
Rural	199	94	48.9	41.4	56.4	72	35.4	28.6	43.0	33	15.7	11.0	21.9
Education													
No education	6	3	-	-	-	1	-	-	-	2	-	-	-
Primary	21	10	-	-	-	5	-	-	-	6	-	-	-
Secondary	213	87	41.4	33.6	49.5	90	41.5	33.7	49.6	36	17.2	11.8	24.4
Higher	137	60	38.9	29.6	49.2	59	45.4	35.4	55.8	18	-	-	-
Employment status													
Not employed	57	25	43.6	29.3	59.0	23	-	-	-	9	-	-	-
Employed	320	135	39.9	33.6	46.5	132	42.4	35.9	49.1	53	17.8	13.1	23.7
Location													
Capital city	77	27	35.1	25.3	46.3	34	44.2	33.5	55.4	16	-	-	-
Aimag center	101	39	38.0	28.4	48.7	49	48.6	38.2	59.1	13	-	-	-
Soum center	149	75	51.0	42.4	59.5	53	34.8	27.1	43.4	21	-	-	-
Bagh/rural	50	19	-	-	-	19	-	-	-	12	-	-	-
Marital status													
Married	317	134	41.9	35.4	48.6	132	41.7	35.2	48.5	51	16.4	11.9	22.2
Not married	19	13	-	-	-	4	-	-	-	2	-	-	-
Cohabitating	41	13	-	-	-	19	-	-	-	9	-	-	-
Wealth Index quintile													
Poorest	86	38	44.6	33.2	56.6	31	33.8	23.8	45.6	17	-	-	-
Second	77	24	29.4	18.6	43.2	41	52.2	38.6	65.4	12	-	-	-
Third	84	35	42.2	30.3	55.2	33	41.0	28.8	54.3	16	-	-	-
Fourth	79	36	36.0	24.6	49.1	30	45.1	32.1	58.8	13	-	-	-
Wealthiest	51	27	51.5	35.9	66.8	20	-	-	-	4	-	-	-

a Serum 25(OH)D < 20 nmol/l.
b Serum 25(OH)D 20 to < 30 nmol/l.
c Serum 25(OH)D ≥ 30 nmol/l.
(-) Based on fewer than 25 unweighted cases.

Inflammation occurs when the immune system mounts a response to protect the body from disease-causing pathogens. The prevalence of inflammation in men 15-49 years of age was 11.2% (Table M.9).

Table M.9: Inflammation status ᵃ				
Percent distribution of inflammation among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Total	11.2	7.8	15.8	380
Age				
15-19 years	-	-	-	13
20-29 years	13.4	7.6	22.5	136
30-39 years	10.1	5.7	17.4	175
40-49 years	6.5	2.2	17.4	56
Ethnicity				
Khalkh	12.9	8.8	18.5	284
Kazak	-	-	-	23
Other	4.4	1.4	12.4	73
Economic region				
Western	3.8	1.2	11.0	80
Khangai	9.9	4.8	19.3	71
Central	12.8	7.0	22.2	78
Eastern	12.2	6.4	21.8	74
Ulaanbaatar	13.0	7.1	22.5	77
Area				
Urban	11.7	7.1	18.5	181
Rural	10.2	6.4	15.9	199
Education				
No education	-	-	-	6
Primary	-	-	-	21
Secondary	12.3	7.6	19.2	217
Higher	9.3	4.9	17.0	136
Employment status				
Not employed	19.5	9.4	36.3	56
Employed	9.8	6.4	14.6	324
Location				
Capital city	13.0	7.1	22.5	77
Aimag center	8.5	4.2	16.3	104
Soum center	7.7	4.3	13.4	148
Bagh/rural	16.3	7.7	31.0	51
Marital status				
Not married	-	-	-	19
Married	10.3	6.9	15.2	319
Cohabitating	13.7	4.9	32.8	42
Wealth index quintile				
Poorest	17.2	8.9	30.6	86
Second	10.8	4.9	22.1	80
Third	7.1	2.6	17.8	85
Fourth	9.7	4.1	21.4	78
Wealthiest	11.8	4.8	26.5	51

a C-reactive protein > 5 mg/l or α1-acid-glycoprotein >1 g/l.

(-) Based on fewer than 25 unweighted cases.

DIETARY QUALITY

Minimum dietary diversity (MDD) is an indicator of whether men consumed at least 5 out of 10 food groups the previous day or night and is used to assess the micronutrient adequacy of the diet. Men who consume food items from at least 5 food groups are likely to consume at least 1 animal-source food and items from 2 or more of the fruit/vegetable food groups. About 60% of men had MDD, with a higher percentage in urban (64.8%) compared to rural (47.9%) areas (Table M.10). Men in Ulaanbaatar had higher prevalence of MDD (68.5%) compared to the other regions (40.2% to 52.0%), with the lowest MDD in Eastern region (40.2%). The prevalence of MDD increased according to wealth status, with the lowest prevalence in the poorest households (38.5%) and highest prevalence in the wealthiest households (79.7%).

Table M.10: Minimum dietary diversity [a]				
Percent distribution of minimum dietary diversity among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Total	58.9	55.7	62.1	1384
Age				
15-19 years	53.0	33.9	71.3	33
20-29 years	59.8	54.4	64.9	507
30-39 years	58.2	53.4	62.8	641
40-49 years	60.4	52.3	68.1	203
Economic region				
Western	52.0	46.8	57.2	350
Khangai	51.7	45.6	57.7	258
Central	51.1	44.8	57.4	243
Eastern	40.2	34.5	46.2	266
Ulaanbaatar	68.5	62.7	73.8	267
Area				
Urban	64.8	60.3	69.0	645
Rural	47.9	44.0	51.8	739
Location				
Capital city	68.5	62.7	73.8	267
Aimag center	54.6	49.2	59.9	378
Soum center	52.4	47.9	56.8	544
Bagh/rural	36.8	29.7	44.5	195
Ethnicity				
Khalkh	60.0	56.4	63.5	1040
Kazak	56.9	43.6	69.2	85
Other	52.3	44.3	60.2	259
Education				
No education	-	-	-	24
Primary	32.9	23.5	44.0	103
Secondary	53.6	49.2	57.9	779
Higher	71.2	66.1	75.9	478
Employment status				
Not employed	49.0	40.4	57.5	205
Employed	60.7	57.2	64.0	1179

Table M.10: Minimum dietary diversity [a]				
Percent distribution of minimum dietary diversity among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017				
Characteristics	%	Lower 95% CI	Upper 95% CI	Unweighted Number
Marital status				
Not married	56.4	42.2	69.6	67
Married	58.7	55.1	62.1	1157
Cohabitating	61.9	52.8	70.3	159
Wealth index quintile				
Poorest	38.5	32.7	44.6	361
Second	47.1	39.6	54.8	266
Third	62.5	55.6	68.9	301
Fourth	65.1	57.9	71.6	277
Wealthiest	79.7	72.1	85.7	179

a Proportion of men who consumed food items from at least 5 out of the following 10 food groups the previous day: Grains, white roots, tubers, plantains; pulses (beans, peas, lentils); nuts and seeds; dairy; meat, poultry, fish; eggs; dark green leafy vegetables; other vitamin A-rich fruits and vegetables; other vegetables; other fruits.

(-) Based on fewer than 25 unweighted cases.

MEDIA SOURCES FOR HEALTH INFORMATION

Men were asked about their media sources for health-related information. As shown in Table M.11, 97.1% of men received health information from watching television at least once per week, followed by reading the newspaper (42.1%), and listening to the radio (23.3%). Watching television was common in urban and rural areas and in all regions, ethnic groups, and household wealth quintiles. 57.3% of men reported receiving health information from the internet at least once per week.

Table M.11: Media sources for health information							
Percentage distribution of media information sources among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Newspaper at least once per week	Radio at least once per week	TV at least once per week	All three media at least once per week	At least 1 media at least once per week	No newspaper, radio, TV	Internet at least once per week	Unweighted Number
Total	42.1	23.3	97.1	12.3	98.0	2.0	57.3	1384
Economic region								
Western	39.1	12.0	96.3	6.3	97.4	2.6	56.9	350
Khangai	31.8	17.9	98.3	7.4	98.3	1.7	37.3	258
Central	42.7	16.1	98.8	8.7	98.8	1.2	48.6	243
Eastern	38.7	16.2	94.7	7.5	95.1	4.9	38.7	266
Ulaanbaatar	47.2	31.5	96.6	17.6	98.1	1.9	70.4	267
Area								
Urban	44.7	27.1	96.7	14.9	98.0	2.0	65.8	645
Rural	37.3	16.0	97.8	7.4	97.8	2.2	41.1	739
Location								
Capital city	47.2	31.5	96.6	17.6	98.1	1.9	70.4	267
Aimag center	37.8	15.2	96.8	7.7	97.8	2.2	53.4	378
Soum center	37.0	14.3	98.4	6.2	98.4	1.6	49.0	544
Bagh/rural	38.1	20.3	96.3	10.3	96.3	3.7	21.8	195

Table M.11: Media sources for health information							
Percentage distribution of media information sources among men 15-49 years by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Newspaper at least once per week	Radio at least once per week	TV at least once per week	All three media at least once per week	At least 1 media at least once per week	No newspaper, radio, TV	Internet at least once per week	Unweighted Number
Age								
15-19 years	62.3	15.6	95.0	14.9	100.0	0.0	70.3	33
20-29 years	44.3	21.1	97.7	11.0	98.5	1.5	67.2	507
30-39 years	37.7	25.4	96.2	13.0	97.1	2.9	54.6	641
40-49 years	45.4	23.9	98.8	12.9	98.9	1.2	36.8	203
Marital status								
Not married	59.1	22.4	94.5	11.7	99.6	0.4	53.1	67
Married	41.4	22.9	97.4	12.0	97.7	2.3	57.3	1157
Cohabitating	38.5	26.0	96.8	14.4	98.4	1.6	59.5	159
Ethnicity								
Khalkh	42.3	23.1	97.3	11.6	98.2	1.8	57.8	1039
Kazak	37.4	28.5	95.1	13.8	95.1	4.9	54.0	85
Other	42.1	22.6	96.4	16.5	97.3	2.7	54.4	260
Education								
No education	-	-	-	-	-	-	-	24
Primary	18.8	17.1	95.0	6.2	95.0	5.0	18.5	103
Secondary	38.9	23.6	96.1	12.1	97.4	2.6	44.3	779
Higher	50.6	24.1	98.8	13.8	99.3	0.7	82.9	478
Employment status								
Not employed	39.7	13.6	99.0	7.6	99.2	0.8	55.9	205
Employed	42.6	25.0	96.7	13.1	97.7	2.3	57.5	1179
Wealth index quintile								
Poorest	34.5	19.9	95.4	9.2	95.6	4.4	29.0	361
Second	38.8	25.8	97.0	14.2	98.3	1.7	47.7	266
Third	41.9	22.3	97.9	9.6	98.8	1.2	52.0	301
Fourth	47.0	23.1	96.9	15.5	98.8	1.2	68.0	277
Wealthiest	47.7	25.3	98.1	13.1	98.2	1.8	87.8	179

(-) Based on fewer than 25 unweighted cases.

DISCUSSION

The prevalence of overweight and obesity among men 15-49 years of age increased from 27.6% in 2011 to 48.8% in 2016. In particular, overweight and obesity occurred at high prevalence in 30-39 age group (59.2%), including a subsequent group of 40-49 year old men (63.9%), as shown in Figure M.1.
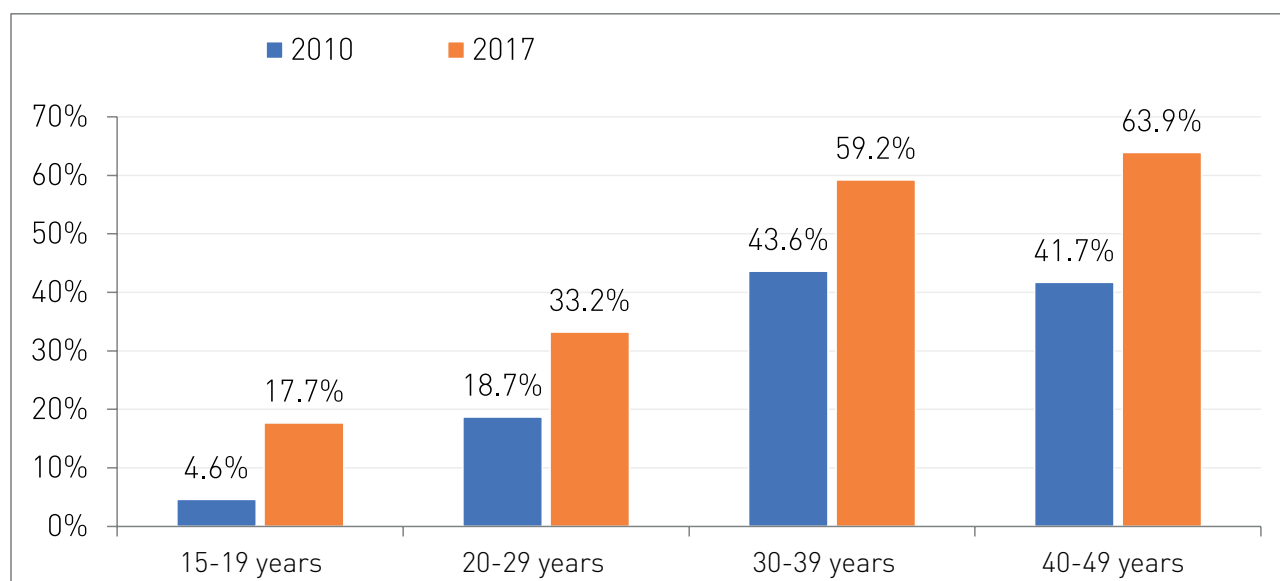

Figure M.1: Percent distribution of overweight and obesity in male population, by age groups and survey years

As shown in Figure M.1, prevalence of overweight and obesity in men increased by 13-20 percentage points across all age groups compared to previous survey.

At regional level, the highest prevalence of overweight and obesity among men, earlier recorded in Ulaanbaatar during the 4th National nutrition survey, was now shifted to Western region, where 53.3% of men were overweight and/or obese in 2016 (Figure M.2).

Percent increase in the prevalence of overweight and obesity in men 15-49 years of age was commonly high across all regions, with most abrupt change by 32.5 percentage points observed in Western region, and the lowest in Ulaanbaatar by 15.6 percentage points, compared to results of previous survey.
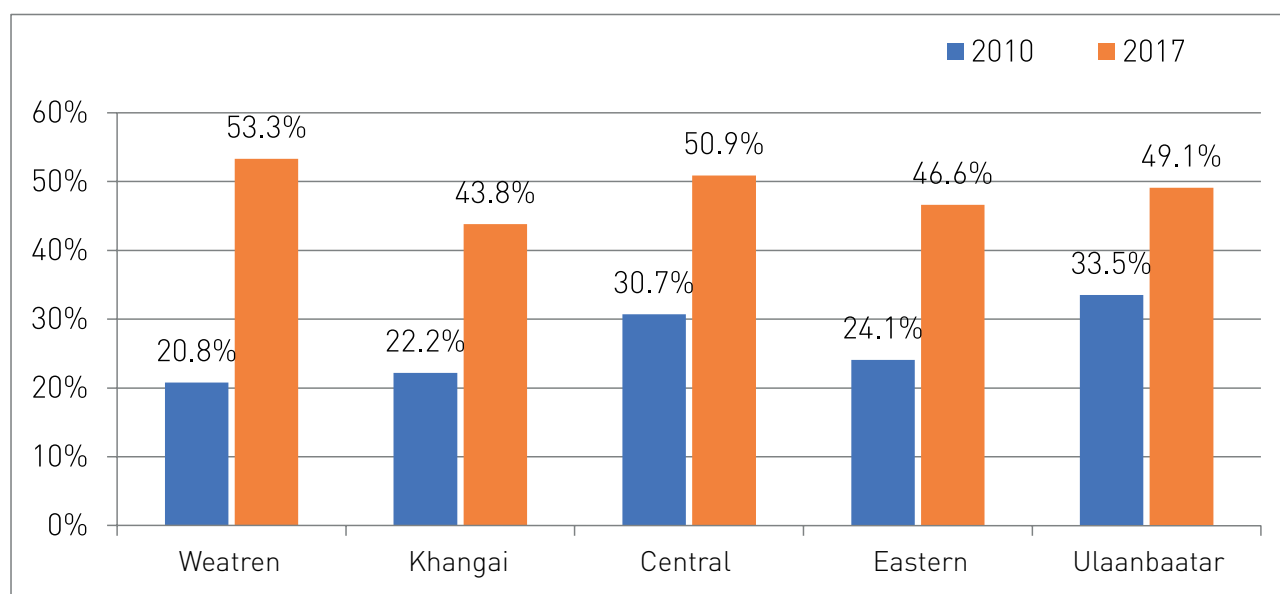

Figure M.2: Percent distribution of overweight and obesity among men by regions and survey years

Prevalence of overweight and obesity among urban men (29.8%) was 5 percentage points higher than that of rural men (24.3%) in previous survey, but that difference narrowed down to 2.2% in 2016 (48.0% and 50.2%), nevertheless, it can be seen as increased prevalence of overweight and obesity among rural men.

As an indicator for nutrition status evaluation, prevalence of underweight in men from previous and present surveys was compared. Underweight fell from 7.8% in 2011 to 1.9% in 2016 among men 15-49 years of age.

Prevalence of underweight was commonly low across all age groups in the present survey, as opposed to previous survey, when such prevalence was highest (28.8%) among men 15-19 years of age (current rate was 3.7%, as of 2017).

The NNS V was the first survey that assessed the micronutrient status of men 15-49 years of age, therefore, impossible to compare men's micronutrient status with other survey findings. In general, micronutrient status of Mongolian men aged 15-49 years is sufficient, except in Vitamin D. In particular, iron and vitamin A deficiency among men is scarcely apparent, and insufficiency of these micronutrients is very low. In addition, no case of iron overload was revealed among Mongolia men. In 2001, the nutrition assessment survey in Dzud affected Mongolia estimated a prevalence of anaemia among men, and revealed 2.3% of them had anaemia. According to the NNS V findings, prevalence of anemia was close to the previous NNS results, 3% of men were anaemic.

CONCLUSION

1. Prevalence of overweight and obesity among men 15-49 year of age is 48.8%. At regional level, the highest prevalence is found in Western region at 53.3%.

2. Prevalence of anemia among men was 3%. Mean serum ferritin concentration was 141 μg/l, indicating iron overload is less likely.

3. Prevalence of vitamin D inadequacy among men is 82.3%, with vitamin D deficiency standing at 41.9%.

4. Prevalence of vitamin A deficiency is 0.6%, with another 2.6% of men having insufficient amount of vitamin A.

5. Survey results showed about 60% of men had minimally adequate dietary diversity, with percent distribution ranging from 47.9% among rural men to 40.2% in Eastern region.

6. 97.1% of sampled men receive health related information from watching TV at least once a week, with another 57.3% from internet, 42.1% from reading newspapers, and 23.3% who get such information from listening to radio at least once a week.

SCHOOL CHILDREN 6-11 YEARS OF AGE

SAMPLE CHARACTERISTICS

Table SC.1 provides background characteristics for school children 6-11 years of age sampled in the NNS V. Approximately equal percentages of male and female children were sampled with a larger percentage of children sampled in urban (73.2%) compared to rural (26.8%) areas.

Table SC.1: School children 6-11 years of age characteristics									
Percent of school children 6-11 years of age by selected characteristics, Mongolia National Nutrition Survey, 2017									
Characteristics	Total			Boys			Girls		
	%	Weighted Number	Unweighted Number	%	Weighted Number	Unweighted Number	%	Weighted Number	Unweighted Number
Total	100.0	1755	1755	49.9	876	897	50.1	879	876
Economic region									
Western	17.9	314	352	49.4	155	174	50.6	159	178
Khangai	11.6	203	355	51.0	103	181	49.0	99	174
Central	12.3	217	344	51.2	111	176	48.8	106	168
Eastern	1.2	22	351	49.3	11	173	50.7	11	178
Ulaanbaatar	57.0	1000	353	49.6	496	175	50.4	504	178
Area									
Urban	73.2	1285	839	49.8	640	421	50.2	236	418
Rural	26.8	470	916	50.2	236	458	49.8	234	458
Child age									
6	18.0	316	308	45.7	145	149	54.3	172	159
7	16.1	282	291	51.1	144	149	48.9	138	142
8	17.9	314	317	53.2	167	171	46.8	147	146
9	17.4	305	304	48.1	147	140	51.9	158	164
10	18.6	326	325	50.6	165	167	49.4	161	158
11	12.1	213	210	51.0	109	103	49.0	104	107

NUTRITION STATUS

Table SC.2 presents the prevalence of stunting, thinness, overweight and obesity in children 6-11 years of age. The prevalence of stunting (HAZ < -2 SD), that is children short for their age, was 7.3% with a higher prevalence in girls (9.0%) compared to boys (5.7%) and children 10 and 11 years old (10.9%, 9.7%) compared to younger age groups (5.4%, 7.4%, 5.1%, 6.2%). Stunting prevalence was similar in urban areas (7.2%) and rural areas (7.8%) and was higher in Eastern (12.5%) and Western (11.7%) regions compared to the other regions (4.2%, 5.5%, 6.9%). The prevalence of thinness (BMI < -2 SD), that is children thin for their height, was 2.8%. Thinness was higher in boys (3.7%) compared to girls (1.9%), in children 9-11 years old (3.4%, 4.4%, 4.5%) compared to children 6-8 years old (1.8%, 1.2%, 1.8%), in urban areas (3.5%) compared to rural areas (0.8%), and higher in Ulaanbaatar (4.3%) compared to other regions (0.6% to 1.1%).

The prevalence of overweight (BMI > +1 SD) was 22.2% and prevalence of obesity (BMI > +2 SD) was 6.4% (Table SC.2). Overweight prevalence was higher in boys (26.6%) compared to girls (17.8%) and in urban (23.9%) compared to rural (17.6%) areas with the highest prevalence in Ulaanbaatar (25.6%) compared to other regions (14.9% to 21.1%). Children 6 years old (26.1%) and 7 years old (25.6%) had a higher prevalence of overweight than older children (18.0% to 21.9%).

Table SC.2: Stunting, thinness, and overweight

Percent distribution of stunting, thinness, and overweight in children 6–11 years by selected characteristics, Mongolia National Nutrition Survey, 2017

Characteristics	Stunting [a]							Thinness [b]							Overweight and Obese [c,d]						
	Moderate (< -2 SD)			Severe (< -3 SD)			Unweighted Number	Moderate (< -2 SD)			Severe (< -3 SD)			Unweighted Number	Moderate (> +1 SD)			Severe (> +2 SD)			Unweighted Number
	%	95% CI		%	95% CI			%	95% CI		%	95% CI			%	95% CI		%	95% CI		
Total	**7.3**	**5.8**	**9.2**	**1.0**	**0.5**	**2.0**	**1749**	**2.8**	**1.8**	**4.3**	**0.3**	**0.1**	**1.3**	**1750**	**22.2**	**19.5**	**25.1**	**6.4**	**4.8**	**8.4**	**1750**
Child gender																					
Boys	5.7	4.0	8.0	0.8	0.3	2.1	876	3.7	2.1	6.3	0.7	0.2	2.6	877	26.6	22.6	31.0	9.0	6.5	12.4	877
Girls	9.0	6.6	12.1	1.1	0.4	3.0	873	1.9	0.9	4.0	0.0	0.0	0.0	873	17.8	14.5	21.6	3.8	2.3	6.1	873
Economic region																					
Western	11.7	8.7	15.5	1.4	0.6	3.4	352	0.9	0.3	2.6	0.0	0.0	0.0	352	17.9	14.2	22.3	3.1	1.7	5.6	352
Khangai	4.2	2.6	6.9	0.0	0.0	0.0	355	0.8	0.3	2.6	0.0	0.0	0.0	355	14.9	11.6	19.1	2.3	1.1	4.5	355
Central	5.5	3.6	8.5	0.3	0.0	2.0	343	0.6	0.1	2.3	0.0	0.0	0.0	344	19.8	15.9	24.3	4.9	3.1	7.8	344
Eastern	12.5	9.5	16.4	3.4	2.0	5.9	351	1.1	0.4	3.0	0.0	0.0	0.0	351	21.1	17.1	25.7	4.0	2.4	6.6	351
Ulaanbaatar	6.9	4.7	10.1	1.1	0.4	3.0	348	4.3	2.6	7.0	0.6	0.1	2.3	348	25.6	21.3	30.4	8.6	6.1	12.1	348
Area																					
Urban	7.2	5.3	9.7	1.1	0.5	2.5	833	3.5	2.2	5.6	0.4	0.1	1.8	834	23.9	20.4	27.7	7.4	5.4	10.1	834
Rural	7.8	5.9	10.1	0.7	0.3	1.8	916	0.8	0.3	1.9	0.0	0.0	0.0	916	17.6	15.0	20.7	3.7	2.5	5.3	916
Child age																					
6	5.4	2.9	10.0	0.6	0.2	2.2	307	1.8	0.4	6.9	0.0	0.0	0.0	308	26.1	19.8	33.6	6.7	3.5	12.4	308
7	7.4	4.1	12.9	0.0	0.0	0.0	290	1.2	0.2	6.2	0.0	0.0	0.0	290	25.6	19.0	33.6	10.2	5.9	17.0	290
8	5.1	2.8	9.1	0.1	0.0	0.2	317	1.8	0.5	6.9	0.0	0.0	0.0	317	21.9	16.0	29.2	8.7	4.9	15.0	317
9	6.2	3.5	11.0	0.7	0.2	2.3	302	3.4	1.3	8.6	1.9	0.5	7.2	302	20.1	14.4	27.2	6.3	3.2	11.9	302
10	10.9	6.8	17.1	2.9	1.0	7.9	324	4.4	2.0	9.4	0.0	0.0	0.0	324	18.0	12.8	24.8	2.6	1.0	6.8	324
11	9.7	5.6	16.1	1.8	0.4	7.9	209	4.5	1.6	11.9	0.0	0.0	0.0	209	21.5	14.6	30.6	3.3	1.3	8.1	209

a Stunting: Height-for-age < −2 SD of the median of the WHO Growth Reference Standards for 5–19 years.

b Thinness: BMI-for-age < −2 SD of the median of the WHO Growth Reference Standards for 5–19 years.

c Overweight: BMI for age > +1 SD of the median of the WHO Growth Reference Standards for 5–19 years.

d Obese: BMI for age > +2 SD of the median of the WHO Growth Reference Standards for 5–19 years.

IODINE STATUS

School-age children are frequently used globally as a reference for the iodine status of a population. Iodine status is diagnosed through both clinical signs of deficiency and through the measurement of urinary iodine concentration. The most visible clinical sign of iodine deficiency is goitre which is an enlarged thyroid gland that appears as a swollen neck. In less advanced stages, goitre is palpable, but not visible.

In the NNS V, the prevalence of goitre in children 6-11 years of age was 7.8%, with almost all cases classified as palpable goitre as opposed to more severe visible goitre (Table SC.3). The prevalence of goitre cases among boys (7.6%) was lower compared to girls (8.0%). There was a higher prevalence of goitre in urban areas (8.2%) compared to rural areas (6.7%). As the number of cases of visible goitre was less than 25 at the time of the survey, prevalence for visible goitre is not reported.

Table SC.3: Goitre							
Percent distribution of any goitre, palpable goitre, and visible goitre among children 6-11 years by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	Unweighted Number	Any goitre		Palpable goitre (grade 1) [a]		Visible goitre (grade 2) [b]	
		%	Unweighted Number	%	Unweighted Number	%	Unweighted Number
Total	1740	7.8	125	7.7	123	-	2
Child gender							
Boys	871	7.6	63	7.6	63	-	0
Girls	869	8.0	62	7.9	60	-	2
Economic region							
Western	352	-	18	-	17	-	1
Khangai	355	9.6	34	9.6	34	-	0
Central	344	-	14	-	14	-	0
Eastern	337	8.0	27	7.7	26	-	1
Ulaanbaatar	352	9.1	32	9.1	32	-	0
Area							
Urban	835	8.2	62	8.2	62	-	0
Rural	905	6.7	63	6.5	61	-	2
Child age							
6	307	-	23	-	22	-	1
7	289	-	18	-	17	-	1
8	314	8.1	25	8.1	25	-	0
9	302	-	21	-	21	-	0
10	322	-	23	-	23	-	0
11	206	-	15	-	15	-	0

a Swelling of the thyroid gland detectable only on palpation or palpable and visible with neck extended.

b Swelling of the thyroid gland visible with neck in normal position.

(-) Based on fewer than 25 unweighted cases.

Urinary iodine concentration is used as a marker of iodine status as the majority of iodine absorbed by the body is excreted in the urine. Table SC.4 presents the median urinary iodine concentration (MUIC) of children 6-11 years of age. The median concentration of 144.6 µg/l is within the normal range of 100–199 µg/l which indicates adequate iodine nutrition in school-age children. MUIC did not differ significantly between boys and girls, however MUIC was higher in urban areas (151.0 µg/l) compared to rural areas (124.2 µg/l). MUIC was adequate in all regions with the exception of Western region where MUIC was 91.2 µg/l, indicating insufficient iodine status in school-age children.

Table SC.4: Median urinary iodine concentration		
Median urinary iodine concentration of children 6-11 years by selected characteristics, Mongolia National Nutrition Survey, 2017		
Characteristics	Unweighted Number	Median urinary iodine concentration (µg/l) [a]
Total	1733	144.6
Child gender		
Boys	868	148.6
Girls	865	141.9
Economic region		
Western	351	91.2
Khangai	350	137.6
Central	341	163.1
Eastern	349	168.4
Ulaanbaatar	353	159.3
Area		
Urban	823	151.0
Rural	910	124.2
Location		
Capital City	342	159.3
Aimag Center	481	130.9
Soum Center	689	119.5
Bagh/Rural	221	133.5

a Median urinary iodine of 100-199 µg/l indicates adequate iodine nutrition.

While iodine status of school-age children was adequate, there was low awareness among children of both iodine deficiency disorders (IDD) (6.7%) and awareness of how to prevent from IDD (2.3%) (Table SC.5). A larger percentage of children in Central region had heard about IDD (11.6%) and IDD prevention methods (5.8%) but knowledge was far below a desired level.

Table SC.5: Awareness of Iodine Deficiency Disorders and prevention						
Percent of children 6-11 years who were aware of Iodine Deficiency Disorders (IDD) and IDD prevention methods by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Heard about IDD			Aware of IDD prevention methods		
	Yes	No	Unweighted Number	Yes	No	Unweighted Number
	%	%		%	%	
Total	6.7	93.3	1755	2.3	97.7	1755
Child gender						
Boys	6.5	93.5	879	2.0	98.0	879
Girls	6.9	93.1	876	2.6	97.4	876
Region						
Western	1.7	98.3	352	0.3	99.7	352
Khangai	6.2	93.8	355	2.0	98.0	355
Central	11.6	88.4	344	5.8	94.2	344
Eastern	3.1	96.9	351	0.6	99.4	351
Ulaanbaatar	7.4	92.6	353	2.3	97.7	353
Area						
Urban	6.9	93.1	839	2.3	97.7	839
Rural	6.1	93.9	916	2.2	97.8	916

Table SC.5: Awareness of Iodine Deficiency Disorders and prevention						
Percent of children 6-11 years who were aware of Iodine Deficiency Disorders (IDD) and IDD prevention methods by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Heard about IDD			Aware of IDD prevention methods		
	Yes	No	Unweighted Number	Yes	No	Unweighted Number
	%	%		%	%	
Child age						
6	5.8	94.2	308	1.1	98.9	308
7	4.7	95.3	291	0.5	99.5	291
8	4.3	95.7	305	1.1	98.9	317
9	9.8	90.2	304	4.8	95.2	304
10	9.4	90.6	325	3.5	96.5	325
11	5.8	94.2	210	2.8	97.2	210

While most children were not aware of the use of iodized salt for the prevention of iodine deficiency disorders, 36.1% of children 6-11 years of age had heard about iodized salt (Table SC.6). Awareness was higher in children 9-11 years of age (41.3% to 70.3%) compared to children 6-8 years of age (12.5% to 29.9%) and among children in rural (41.0%) compared to urban (34.3%) areas and was highest in Central region (44.5%). However, only 9.9% of children 6-11 years of age were aware of the importance of iodized salt.

Table SC.6: Awareness of iodized salt						
Percent of children 6-11 years who had heard about iodized salt and were aware of its importance by selected characteristics, Mongolia National Nutrition Survey, 2017						
Characteristics	Heard about Iodized salt			Aware of importance of Iodized salt		
	Yes	No	Unweighted Number	Yes	No	Unweighted Number
	%	%		%	%	
Total	36.1	63.9	1755	9.9	90.1	1755
Child gender						
Boys	36.0	64.0	879	10.8	89.2	879
Girls	36.1	63.9	876	9.1	90.9	876
Economic region						
Western	33.6	66.4	352	10.5	89.5	352
Khangai	35.2	64.8	355	7.6	92.4	355
Central	44.5	55.5	344	21.2	78.8	344
Eastern	39.3	60.7	351	16.8	83.2	351
Ulaanbaatar	35.1	64.9	353	7.6	92.4	353
Area						
Urban	34.3	65.7	839	8.3	91.7	839
Rural	41.0	59.0	916	14.4	85.6	916
Child age						
6	12.5	87.5	308	1.8	98.2	308
7	14.9	85.1	291	3.1	96.9	291
8	29.9	70.1	317	6.3	93.7	317
9	41.3	58.7	304	10.6	89.4	304
10	56.0	44.0	325	16.9	83.1	325
11	70.3	29.7	210	25.0	75.0	210

CONSUMPTION OF JUNK FOODS

Consumption of junk (high-calorie, low-nutrient) foods in the past week was nearly universal (99.0%) among children 6-11 years of age (Table SC.7). Over half of children (51.4%) consumed junk foods at least once per week and 45.7% consumed junk foods a few times a week. Junk foods were consumed more frequently in urban (49.4%) compared to rural (35.7%) areas and was highest in Ulaanbaatar (53.3%) compared to the other regions (33.0% to 45.3%).

Table SC.7: Frequency of consumption of any junk foods in the previous week											
Percent of children 6-11 years who consumed any junk foods by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Total Unweighted Number	Did not eat		At least once per week		Once per week		A few times per week		≥ Once per day	
		%	n	%	n	%	n	%	n	%	n
Total	1755	0.8	13	99.2	1755	51.4	996	45.7	723	2.1	23
Child gender											
Boys	879	0.3	3	99.7	879	51.0	497	46.2	364	2.6	15
Girls	876	1.3	10	98.7	876	51.9	499	45.3	359	1.6	8
Economic region											
Western	352	1.4	5	98.5	352	64.1	226	33.0	116	1.4	5
Khangai	355	1.1	4	98.9	355	61.7	219	36.6	130	0.6	2
Central	344	0.6	2	99.4	344	60.5	208	37.8	130	1.2	4
Eastern	351	0.0	0	100.0	351	54.1	190	45.3	159	0.6	2
Ulaanbaatar	353	0.6	2	99.4	353	43.3	153	53.3	188	2.8	10
Area											
Urban	839	0.4	2	99.6	839	47.5	438	49.4	380	2.7	19
Rural	916	1.7	11	98.3	916	62.1	558	35.7	343	0.5	4
Child age											
6	308	3.0	7	97.0	308	43.9	154	50.2	142	3.0	5
7	291	0.8	3	99.2	291	53.1	185	44.7	100	1.4	3
8	317	0.0	0	100.0	317	59.7	190	39.8	125	0.6	2
9	304	0.2	1	99.8	304	51.9	180	44.5	117	3.5	6
10	325	0.4	2	99.6	325	50.7	168	45.7	148	3.3	7
11	210	0.0	0	100.0	210	49.0	119	51.0	91	0.0	0

n = Unweighted number

Consumption of sugar-sweetened beverages was high with 80.9% of children consuming these at least once in the past week, 20.3% consuming them a few times per week and 4.1% of children consuming a sugar-sweetened beverage at least once per day (Table SC.8). Higher consumption of sugar-sweetened beverages was reported in urban (82.6%) compared to rural (76.3%) areas with the highest consumption in Ulaanbaatar (85.8%) compared to other regions (69.6% to 79.5%).

Table SC.8: Frequency of consumption of sugar-sweetened beverages in the previous week											
Percent of children 6-11 years who consumed sugar-sweetened beverages by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Total Unweighted Number	Did not drink		At least once per week		Once per week		A few times per week		≥ Once per day	
		%	n	%	n	%	n	%	n	%	n
Total	1755	19.1	387	80.9	1755	56.5	1056	20.3	276	4.1	36
Child gender											
Boys	879	19.0	188	81.0	879	54.4	522	21.8	148	4.8	21
Girls	876	19.3	199	80.8	876	58.5	534	18.9	128	3.4	15
Economic region											
Western	352	30.4	107	69.6	352	52.6	185	15.9	56	1.1	4
Khangai	355	24.2	86	75.8	355	61.4	218	13.3	47	1.1	4
Central	344	20.9	72	79.1	344	63.1	217	14.5	50	1.5	5
Eastern	351	20.5	72	79.5	351	68.9	242	10.3	36	0.3	1
Ulaanbaatar	353	14.2	50	85.8	353	55.0	194	24.6	87	6.2	22
Area											
Urban	839	17.4	183	82.6	839	54.3	452	22.9	173	5.4	31
Rural	916	23.7	204	76.3	916	62.4	604	13.4	103	0.5	5
Child age											
6	308	18.0	66	82.0	308	51.8	169	26.2	66	4.0	7
7	291	20.2	73	79.8	291	58.8	178	16.5	34	4.5	6
8	317	13.4	52	86.6	317	66.3	223	16.4	37	3.9	5
9	304	19.2	70	80.7	304	51.9	176	22.3	48	6.5	10
10	325	21.2	69	78.8	325	51.5	185	23.9	64	3.4	7
11	210	24.5	57	75.4	210	59.8	125	14.3	27	1.3	1

n = Unweighted number

Overall consumption of fried foods was lower than consumption of junk foods or sugar-sweetened beverages with 22.7% of children not consuming any fried foods in the past week and only 8.5% of children consuming fried foods a few times per week (Table SC.9).

Table SC.9: Frequency of consumption of fried foods in the previous week											
Percent of children 6-11 years who consumed fried foods by selected characteristics, Mongolia National Nutrition Survey, 2017											
Characteristics	Total Unweighted Number	Did not eat		At least once per week		Once per week		A few times per week		≥ Once per day	
		%	n	%	n	%	n	%	n	%	n
Total	1755	22.7	397	77.3	1755	68.1	1227	8.5	123	0.7	8
Child gender											
Boys	879	19.3	178	80.7	879	71.1	626	8.2	68	1.4	7
Girls	876	26.1	219	73.9	876	65.1	601	8.7	55	0.1	1
Economic region											
Western	352	40.3	142	59.7	352	54.6	192	4.0	14	1.1	4
Khangai	355	20.0	71	80.0	355	74.1	263	5.9	21	0.0	0
Central	344	23.3	80	76.8	344	69.5	239	7.0	24	0.3	1
Eastern	351	11.7	41	88.3	351	80.9	284	7.4	26	0.0	0
Ulaanbaatar	353	17.8	63	82.1	353	70.5	249	10.8	38	0.8	3

Table SC.9: Frequency of consumption of fried foods in the previous week										
Percent of children 6-11 years who consumed fried foods by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Total Unweighted Number	Did not eat		At least once per week		Once per week		A few times per week		≥ Once per day	
		%	n	%	n	%	n	%	n	%	n
Area											
Urban	839	19.6	167	80.3	839	69.4	586	10.0	79	0.9	7
Rural	916	31.1	230	68.9	916	64.5	641	4.2	44	0.2	1
Child age											
6	308	20.1	65	79.9	308	68.5	208	10.2	33	1.2	2
7	291	22.8	65	77.2	291	68.0	209	9.2	17	0.0	0
8	317	25.7	78	74.3	317	69.4	223	4.6	15	0.3	1
9	304	22.7	72	77.3	304	69.8	214	7.2	17	0.3	1
10	325	19.9	61	80.1	325	68.3	236	9.6	24	2.2	4
11	210	26.4	56	73.6	210	62.9	137	10.7	17	0.0	0

n = Unweighted number

Consumption of sweet foods was high with nearly all children having consumed sweet foods in the past week, 45.9% of children 6-11 years having consumed sweet foods a few times per week and 6.1% of children consuming sweet foods at least once per day (Table SC.10). In contrast to other junk foods, there was significant difference in consumption of sweet foods between urban and rural areas.

Table SC.10: Frequency of consumption of sweet foods in the previous week										
Percent of children 6-11 years who consumed sweet foods by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	Total Unweighted Number	Did not eat		At least once per week		Once per week		A few times per week		≥ Once per day	
		%	n	%	n	%	n	%	n	%	n
Total	1755	2.2	41	97.8	1755	45.8	849	45.9	788	6.1	77
Child gender											
Boys	879	1.9	17	98.1	879	48.0	442	43.7	378	6.4	42
Girls	876	2.4	24	97.6	876	43.5	407	48.2	410	5.9	35
Economic region											
Western	352	3.7	13	96.4	352	44.8	158	45.0	158	6.6	23
Khangai	355	2.0	7	98.0	355	57.5	204	38.0	135	2.5	9
Central	344	3.8	13	96.3	344	48.3	166	44.2	152	3.8	13
Eastern	351	0.9	3	99.1	351	48.1	169	49.3	173	1.7	6
Ulaanbaatar	353	1.4	5	98.7	353	43.1	152	48.2	170	7.4	26
Area											
Urban	839	1.5	13	98.5	839	45.5	408	46.2	372	6.8	46
Rural	916	4.0	28	96.0	916	46.3	441	45.2	416	4.5	31
Child age											
6	308	5.4	15	94.6	308	42.8	138	43.9	137	7.9	18
7	291	3.6	12	96.4	291	44.7	150	44.0	116	7.7	13
8	317	1.3	3	98.7	317	55.5	171	38.8	133	4.4	10
9	304	0.8	4	99.3	304	49.2	163	44.7	127	5.4	10
10	325	0.9	5	99.1	325	43.7	143	48.2	158	7.2	19
11	210	0.7	2	99.3	210	35.4	84	60.3	117	3.6	7

n = Unweighted number

PHYSICAL EDUCATION

Overall, 93.4% of children 6-11 years of age reported that a physical education (PE) class occurred regularly at their school, with higher prevalence in rural (98.5%) compared to urban (91.6%) areas and lowest prevalence in Ulaanbaatar (89.2%) compared to the other regions (98.6% to 99.7%) (Table SC.11). PE class attendance was 98.7% and 98.5% among boys and girls, respectively. 79.4% of children attended PE classes the recommended 2 times per week.

Table SC.11: Physical Education class attendance										
Percent of children 6-11 years who attended Physical Education (PE) class at school by selected characteristics, Mongolia National Nutrition Survey, 2017										
Characteristics	**PE class in school**			**Attends PE class**			**Frequency of attendance (per week)**			
	Yes	No	Unweighted Number	Yes	No	Unweighted Number	1 time	2 times	> 2 times	Unweighted Number
	%	%		%	%		%	%	%	
Total	93.4	6.6	1755	98.6	1.4	1704	19.7	79.4	0.8	1684
Child gender										
Boys	93.8	6.2	879	98.7	1.3	854	20.0	78.9	1.1	846
Girls	93.1	6.9	876	98.5	1.5	850	19.5	79.9	0.5	838
Economic region										
Western	98.6	1.4	352	98.0	2.0	347	22.9	76.2	0.9	340
Khangai	99.7	0.3	355	99.2	0.8	354	32.0	67.1	0.9	351
Central	98.8	1.2	344	99.7	0.3	340	17.1	82.6	0.3	339
Eastern	99.1	0.9	351	98.9	1.1	348	21.2	78.2	0.6	344
Ulaanbaatar	89.2	10.8	353	98.4	1.6	315	16.5	82.6	1.0	310
Area										
Urban	91.6	8.4	839	98.2	1.8	800	17.9	81.3	0.8	784
Rural	98.5	1.5	916	99.5	0.5	904	24.4	74.6	1.0	900
Child age										
6	66.5	33.5	308	95.3	4.7	264	33.3	65.8	0.9	255
7	97.7	2.3	291	98.7	1.3	287	24.0	76.0	0.0	284
8	99.1	0.9	317	99.8	0.2	316	16.6	83.1	0.3	315
9	100.0	0.0	304	100.0	0.0	302	14.3	85.2	0.5	301
10	100.0	0.0	325	98.7	1.3	325	14.7	84.4	0.9	322
11	100.0	0.0	210	97.8	2.2	210	21.6	75.3	3.2	207

As shown in Table SC.12, 90.4% of children reported their PE class was appropriate length (50 minutes) and 43.8% of children reported participating in a physical examination and sport games. Prevalence of appropriate PE class length was lower in Ulaanbaatar (86.8%) and Central (89.4%) regions compared to the other regions (96.2% to 98.3%) and prevalence was lower in urban (88.7%) compared to rural (94.9%) areas.

Table SC.12: Adequacy of Physical Education classes							
Percent of children 6-11 years reporting appropriate length of school Physical Education (PE) classes and types of PE activities they participated in by selected characteristics, Mongolia National Nutrition Survey, 2017							
Characteristics	PE class appropriate length [a]			Types of activities in PE class			
	Yes	No	Unweighted Number	Physical examination	Sport game	Both activities	Unweighted Number
	%	%		%	%	%	
Total	90.4	9.6	1684	49.8	6.6	43.8	1677
Child gender							
Boys	89.4	10.6	846	45.7	6.6	47.6	845
Girls	91.5	8.5	838	53.8	6.4	39.8	832
Economic region							
Western	96.2	3.8	340	39.1	9.5	51.4	340
Khangai	98.3	1.7	351	67.5	5.2	27.3	350
Central	89.4	10.6	339	39.6	12.5	47.9	338
Eastern	97.1	2.9	344	46.4	7.9	45.7	343
Ulaanbaatar	86.8	13.2	310	52.0	4.2	43.8	306
Area							
Urban	88.7	11.3	784	53.2	4.7	42.1	779
Rural	94.9	5.1	900	41.2	11.0	47.8	898
Child age							
6	78.0	22.0	255	67.1	7.5	25.4	253
7	85.4	14.6	284	67.3	3.3	29.4	283
8	93.0	7.0	315	56.0	6.5	37.5	314
9	92.3	7.7	301	42.6	5.4	52.0	301
10	95.6	4.4	322	40.0	7.8	52.2	320
11	94.6	5.4	207	26.4	9.4	64.2	206

a Appropriate length of a PE class is 50 minutes per class.

DISCUSSION

Anthropometric measurements of school children aged 6-11 years were performed in the 5th National nutrition survey. Measurements of heights and weights were taken to determine prevalence of protein and iodine deficiencies, overweight and obesity. Comparative analysis of results from 4th and present nutrition surveys indicated that prevalence of stunting reduced, while prevalence of overweight and obesity increased among school aged children (Figure SC.1).
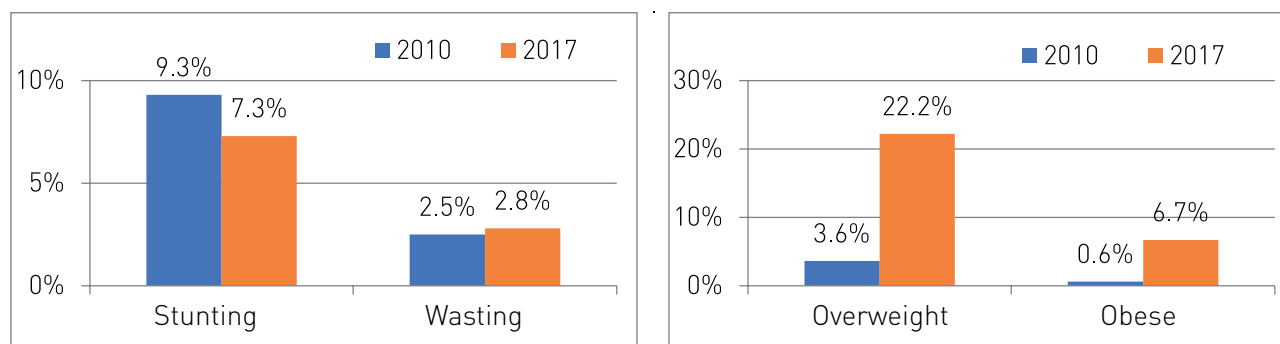

Figure SC.1: Percent distribution and chronology of protein and energy malnutrition among school children aged 6-11 years

National surveys on iodine deficiency disorders (IDD) prevalence in Mongolia were conducted in 1992–1995, 1999, 2004, 2007, and 2010. To eliminate IDD, the country implemented a national program on combating iodine deficiency from 1996 to 2010 in three phases, which resulted in a significant reduction in the prevalence of iodine deficiency, though it still persists. The country can declare itself 'free of iodine deficiency disorders'[2] when goiter prevalence and percent distribution of iodized salt consumption among households are <5%, and ≥95% respectively, with urinary iodine concentrations in the target population reaching an appropriate level1. Under the current nutrition survey, 7.8% of sampled school children were found having goiter. Compared to periods of 1994-2010, when goiter prevalence was on the gradual decline, the latest nutrition survey showed no decline in the percentage of school age children with goiter since 2010 (Figure SC.2).
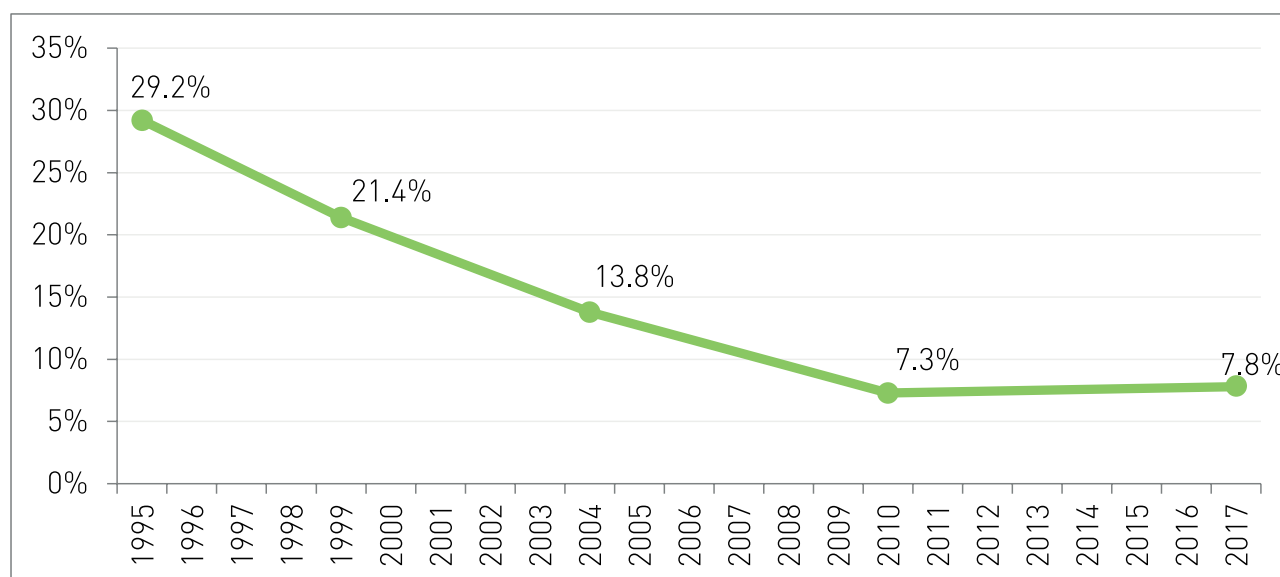

Figure SC.2: Prevalence and chronology of goitre among school children aged 6-11 years

Along with goiter prevalence, the urinary iodine concentration was also determined to assess prevalence of IDD. The median urinary concentration of <100 μg/l for school children indicates low iodine intake or iodine deficiency. The median urinary iodine concentration of 144.6 μg/l for school age children during the 5th National nutrition survey, though it was slightly lower than that of the 4th NNS, was still within desirable limits (Figure SC. 3). Regional variations can be seen in median urinary iodine concentrations of

school children, with the lowest in Western region (91.2 µg/l), which was even lower than reference ranges. This indicates people in Western region are still vulnerable to risks of iodine deficiency, stressing on the need for increasing iodized salt consumption among Western population.
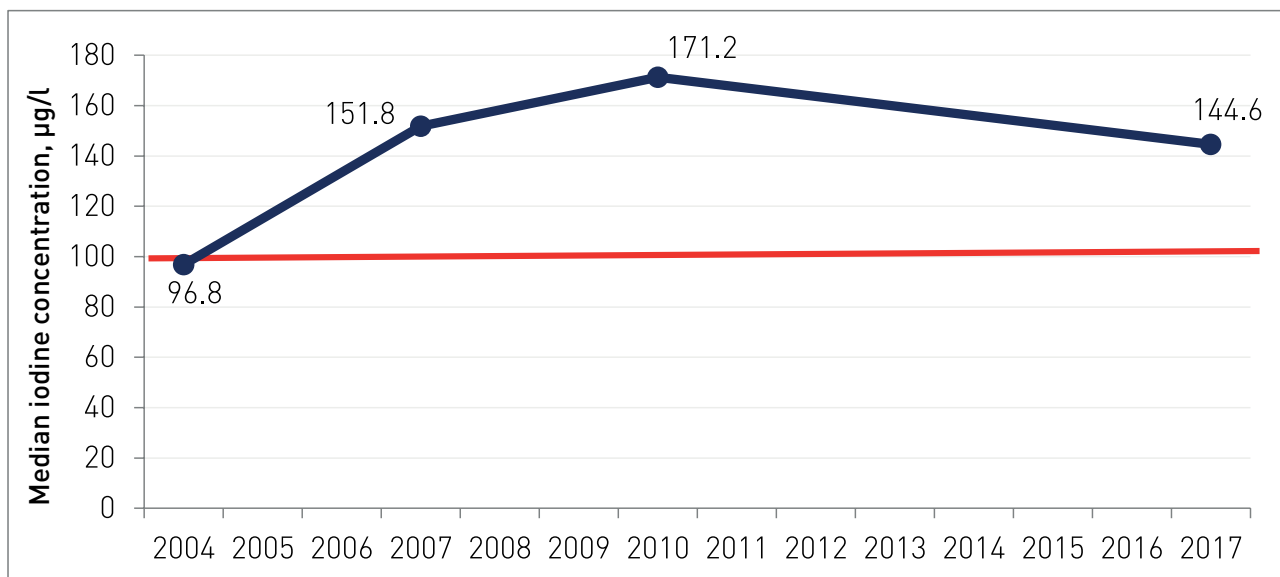

Figure SC.3: Median urinary iodine concentration (µg/l) of school children aged 6-11, by chronology

The same standard questionnaire, as in the previous 4th National nutrition survey, was used in present survey to evaluate awareness of school children aged 6-11 years on iodine deficiency and iodized salts consumption. The method suggests children have basic awareness of iodine deficiency and iodized salt consumption once they have heard of it. Percent distribution of awareness on iodine deficiency and iodized salt consumption among 6-11 year olds was 6.7% and 36.1%, respectively. If we compare these with results from 2007 and 2010 surveys, we can see sharp downward trends (Figure SC.4).
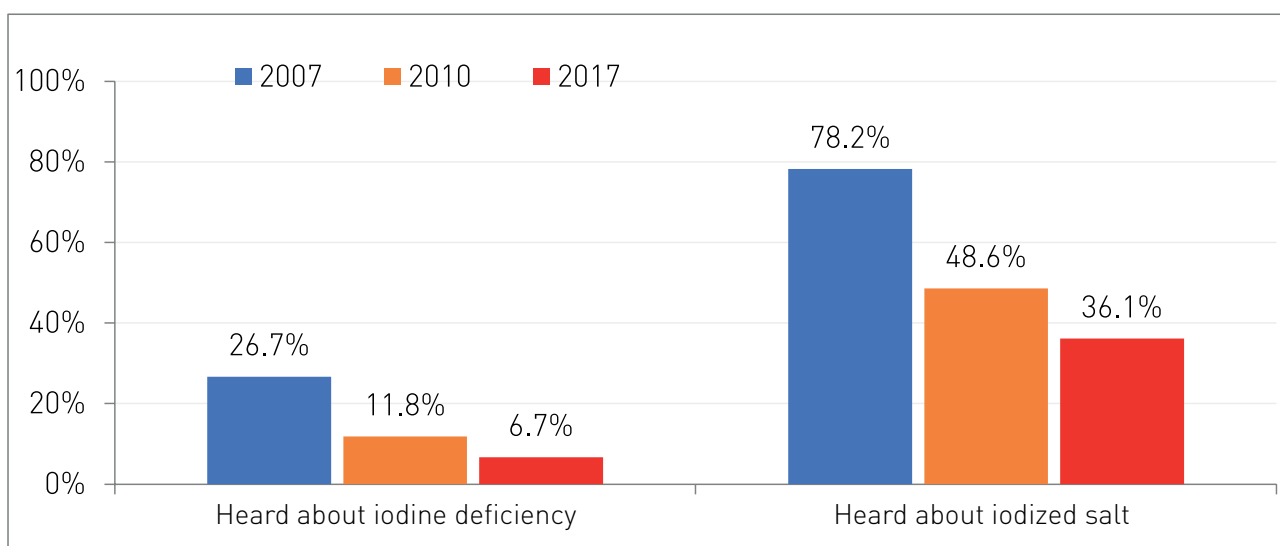

Figure SC.4. Percent distribution of awareness of iodine deficiency and iodized salt
among school children aged 6-11, by chronology

The assessment results of the nutritional status of school children aged 6-11 years, in the 5th National nutrition survey, stress on the need to exert efforts in the continuation of overweight, obesity and iodine deficiency prevention strategies, targeted to children. Other challenges include, strengthening monitoring and enforcement of regulations on protecting children from harmful effects of food and drink marketing, establishment of buffer zone for sales and services of unhealthy foods and drinks around schools, and law on salt iodization and prevention of iodine deficiency. To be able to declare Mongolia as free of IDD, we need to implement immediate interventions targeted to increase supply and consumption of iodized salts among households, particularly in Western and Khangai regions.

CONCLUSION

1. Percentage of stunted and wasted children, aged 6-11 years, in Mongolia are 7.3% and 2.8%, respectively. The prevalence of overweight and obesity in school children aged 6-11years sharply increased from 2010 NNS IV level and reached 22.2% and 6.4%, respectively.

2. Percentage of school children aged 6-11 years with awareness on iodine deficiency and iodized salt consumption stood at 6.7% and 36.1%, respectively, which are 1.8 and 1.3 times lower than compared to NNS IV level in 2010.

3. Prevalence of goiter in school children aged 6-11 years was 7.8%, almost unchanged compared with the NNS IV findings.

4. Median urinary iodine concentration in school children was 144.6 µg/l, within WHO recommended reference ranges, that was decreased from NNS IV level in 2010.

5. Consumption of unhealthy foods and drinks is common to 6-11 year olds group, with almost all children (99.2%) consuming any type of unhealthy foods and drinks at least once per week, in particular, 8 out of 10 children were found consuming sugary drinks and/or deep fried food.

6. 93.4% of schools have physical training program, embedded in their curriculum, with 98.6% of school children enrolled in said program. Barely half of children enrolled in physical trainings is positively active either by doing physical exercises and/or participating interactive sports games.

___ GENERAL CONCLUSIONS AND RECOMMENDATIONS

Though Mongolia has achieved significant economic growth in recent years, has a highly educated population, and has made substantial progress towards improving the health and nutrition of its population, particularly through achieving the MDG targets of reductions in child and maternal mortality, child underweight and stunting the results of the NNS V indicate widespread nutrition challenges remain in the country. The burgeoning dual burden of under- and over-nutrition, manifested by a high prevalence of micronutrient deficiencies and a rapidly increasing prevalence of overweight and obesity, adversely impacts individual and family wellbeing at the community level, poses exorbitant economic costs on health systems, and has unfavorable consequences for the country's long-term development.

MICRONUTRIENT DEFICIENCIES ARE COMMON IN ALL POPULATION GROUPS AND A PRIORITY PUBLIC HEALTH CONCERN IN MONGOLIA

The NNS V revealed that micronutrient deficiencies are prevalent in all population groups and are most concerning for infants, young children, and pregnant women. The highest prevalence of micronutrient deficiencies was in children under 5 years of age with 27% classified as anaemic, 21% as iron-deficient, 70% as insufficient in vitamin A and 90% as insufficient in vitamin D. High prevalence of micronutrient deficiency and insufficiency are public health problems in Mongolia that require multiple reinforcing strategies to address them.

Awareness of mothers and caregivers on the importance of feeding young children a variety of nutritious foods is needed to improve the quality of young children's diets. While iron-rich and vitamin A-rich foods are available and are consumed by other household members, they are not fed to young children or are fed in insufficient quantities to meet their nutrition requirements. The NNS V confirmed poor infant and young child feeding practices in Mongolia with children in the critical period of 6-23 months of age consuming few dietary sources of iron and vitamin A and with less than 50% receiving a diet with minimum dietary diversity. For these young children, minimum meal frequency was above 90% which means that children are being fed regularly, but their diet quality is poor with only 44% of children receiving a minimum acceptable diet of both adequate feeding frequency and dietary diversity.

The highest prevalence of anaemia, iron deficiency and vitamin A deficiency was found in the youngest children 0-23 months of age which stresses the importance of appropriate breastfeeding practices to provide adequate nutrition to infants before the introduction of complementary foods. Exclusive breastfeeding and early initiation of breastfeeding practices are unacceptably low in Mongolia; 20% of newborns are not breastfed within 1 hour of birth and more than 40% of infants under 6 months of age are not exclusively breastfed and therefore not receiving optimum nutrition and immunity benefits from breast milk. Strengthening IYCF counseling in all regions and wealth quintiles to support women to practice optimal breastfeeding, along with counseling and awareness of timely and adequate complementary feeding for children under 2 years of age, should be a top priority for Mongolia and is a key strategy to reduce micronutrient deficiencies in children.

Counseling and awareness-building activities are essential to improve infant and young child feeding practices to increase children's daily intake of essential micronutrients. However, as dietary intake practices are slow to change and natural sources of micronutrients are not universally available or affordable to all households, continued high-dose and low-dose supplementation of essential micronutrients for young children is recommended. While vitamin A-rich foods are readily available in Mongolia, the prevalence of vitamin A deficiency in children 6-59 months of age is over the 5% threshold set by the WHO for the continuation of vitamin A supplementation programmes. Per the WHO recommendation, twice-yearly high-dose vitamin A supplementation, in addition to increasing consumption of vitamin A-rich foods, should continue to be provided to all children 6-59 months of age. In contrast to vitamin A, natural sources of vitamin D are not readily available in the Mongolian diet. Also, vitamin D is not available through fortified foods or from sunlight exposure as conditions are insufficient for production of vitamin D during most of the year in Mongolia. Therefore, until the provision of vitamin D through sources such as Multiple Micronutrient Powders (MMPs) can be fully scaled-up to reach all children, vitamin D supplementation will continue to be necessary for infants and young children.

Improvements in infant and young child feeding practices, combined with the provision of vitamin A and vitamin D supplementation, are necessary to provide essential nutrients to infants and young children for growth and development. To complement these interventions, it is strongly recommended that the provision of Multiple Micronutrient Powders (MMPs) be promoted at scale nationally for all children 6-23 months of age. MMPs provide iron, vitamin A, zinc, vitamin D, iodine, and other essential nutrients children need in optimal amounts to meet their requirements for proper growth and development and are an effective way to increase micronutrient, especially iron, intake in children who are just beginning to eat family foods. These powders have the advantage of improving the micronutrient content of a child's diet without changing their usual dietary habits. However, effective rollout of MMPs at scale requires education of health providers and intensive communication and awareness-raising at the community level to ensure high compliance and to alleviate concerns mothers may have about side effects.

Pregnant women are a highly vulnerable population for micronutrient deficiencies in Mongolia. The NNS V revealed that 21% of pregnant women are anaemic, 30% are iron deficient, nearly all, or 96% have deficient or insufficient vitamin D status and 12% have deficient or insufficient vitamin A status. Additionally, pregnant women in all regions and areas of Mongolia have inadequate iodine status, placing their infants at risk of poor cognitive development. While the government-provided multiple micronutrient supplement provides all of the essential micronutrients for pregnant women, the most common privately-purchased prenatal supplements, such as Elevit, lack iodine and vitamin D which are essential during pregnancy.

Due to the high demand for prenatal vitamin supplements, which most women purchase privately from pharmacies, and nearly universal ANC attendance, Mongolia is uniquely well-positioned to reduce iron, iodine, vitamin D and other micronutrient deficiencies in pregnant women through prenatal supplementation programmes. However, challenges surrounding poor compliance with supplementation throughout pregnancy and lack of availability of free supplements provided through ANC prevent optimal benefit from prenatal micronutrient supplementation. The provision of multiple micronutrient supplements during ANC visits through the national government programme should be a priority intervention in Mongolia as it offers pregnant women affordable and equitable access to prenatal supplementation, along with the important benefit of regular counseling to improve compliance and manage side effects. In addition to provision of multiple micronutrient supplementation through ANC, it is recommended that Mongolia establish national guidelines, which apply to both privately and publicly available prenatal supplements, for a standard multiple micronutrient formulation that includes iron, folic acid, vitamin D, and iodine. This standard multiple micronutrient formulation should be promoted through all providers of ANC, including private doctors and gynecologists, along with awareness of the importance of adequate iodine status during pregnancy.

A complementary strategy to address iron and folic acid deficiency in women before they become pregnant is through the fortification of wheat flour with iron and folic acid. In Mongolia, the fortification of wheat flour with iron and folic acid has been introduced on a limited scale to prevent neural tube defects and help build women's iron stores prior to pregnancy. For optimum impact, however, mandatory fortification with iron and folic acid of all wheat flour produced and imported into the country is recommended. As raw flour is not utilized in most households on a daily basis, mandatory use of iron and folic acid fortified flour by commercial food producers, such as bakeries, has the potential to reach the majority of the population to achieve a reduction in neural tube defects and improve the iron and folic acid status of women of reproductive age with minimum risk of iron overload in men.

Vitamin D insufficiency is universally high in all populations in Mongolia with prevalence of 90% in children, 95% in pregnant women, and 82% among men. As vitamin D insufficiency affects individuals at all socio-economic levels in all regions of the country and there is limited potential to increase vitamin D status through diet and sun exposure, fortification has the greatest potential to improve the vitamin D status of the Mongolian population. While milk is a potential food vehicle for vitamin D fortification, it is not a preferred food vehicle due to lack of centralized production and processing in the country. Wheat flour is likely the most feasible and effective vehicle for vitamin D fortification as it is highly consumed by all population groups in all areas of the country via commercial baked goods. Effective fortification requires government-imposed mandatory fortification for all domestic and imported wheat flour with mandatory fortification applicable to wheat flour sold for home use and for commercial use. Stringent monitoring is required to ensure compliance with production and fortification standards. Though fortification is essential for increasing the overall intake of vitamin D in the general population, the provision of vitamin

D supplementation will continue to be necessary for infants and young children and pregnant women through MMPs and prenatal micronutrient supplements, respectively, in order to meet their higher vitamin D requirements.

Due to the low availability of foods containing iodine, universal salt iodization should continue to be the main strategy for preventing iodine deficiency in Mongolia. Currently, 20% of the population does not consume adequately iodized salt and, therefore, is not protected from iodine deficiency. As iodized salt coverage is lower in Khangai and Western regions, where cheaper non-iodized salt is widely available, efforts should focus on these areas along with strict national regulations for monitoring the iodine content of all domestically-produced and imported salt. In order to ensure that health status of the Mongolian population is not adversely affected, the promotion of iodized salt needs to be balanced with ongoing programmes to reduce salt intake in the Mongolian population.

PREVALENCE OF OVERWEIGHT AND OBESITY HAS DRAMATICALLY INCREASED SINCE 2010 WITH NEARLY HALF OF ADULTS AND A QUARTER OF SCHOOL-AGED CHILDREN OVERWEIGHT

The prevalence of overweight and obesity among adults, and increasingly among children, in all regions of Mongolia has reached epidemic proportions and is likely the greatest public health challenge facing the country. The prevention of overweight and obesity requires a lifecycle approach focusing on good prenatal, infant, child, adolescent, and adult nutrition. Of greatest concern in Mongolia is that increasingly, children are becoming not only overweight, but are also transitioning to obesity at a young age. Addressing overweight in children through dietary modification and increased physical activity is critical to preventing excess weight gain and its associated chronic diseases in adulthood. If current trends are not reversed, the overweight and obesity epidemic will have enormous implications in terms of health care costs and lost productivity.

The WHO's recommendations on "Ending Childhood Obesity" provide a template for which obesity prevention programmes should be developed in Mongolia. Some key recommendations include a focus on the school as schools provide an excellent platform for educating children on healthy eating and physical fitness, for reducing consumption of unhealthy foods and snacks by limiting availability of "junk" foods in schools, and for providing physical education classes. Community-based approaches, such as the introduction of mandatory restrictions on marketing and advertising of high-sugar and high-fat foods is recommended to reduce children's exposure and desire for these foods. Government policies limiting access to specific foods through sugar taxes and fat taxes should also be evaluated as a strategy to reduce consumption of unhealthy foods. Reducing overweight and obesity in children requires the involvement of parents and a family approach to healthy eating, physical fitness, and maintaining a normal body weight to benefit all members of the household, with public awareness and institutional support necessary to change dietary and physical activity habits.

POVERTY REDUCTION STRATEGIES ARE AN INTEGRAL COMPONENT TO REDUCE MALNUTRITION IN MONGOLIA

Despite the high prevalence of overweight and obesity in Mongolia, the NNS V revealed that food insecurity is a major problem in the country, with two-thirds of households experiencing some level of food insecurity and 1 in 5 households having severe food insecurity. As the NNS V measure of food security pertains to the household, it is unclear which households are disproportionately affected by food insecurity in Mongolia. Further understanding is needed to target programmes to ensure adequate foods are available and accessible to the most vulnerable individuals.

The NNS V revealed marked regional disparities in nutrition indicators and food security status, with generally poorer conditions in Khangai and Western regions and the Ger districts in Ulaanbaatar. Targeted food security and nutrition-focused social protection measures, such as the food stamp programme which was shown to be successful in reducing vulnerability of poor households to food shortages, should be reformed and strengthened to ensure the most vulnerable households with children under 5 are prioritized for assistance. Such safety net schemes can help protect vulnerable populations from seasonal food shortages and natural disasters that are common in Mongolia.

Dietary approaches are key to address malnutrition in the country, however chronic inflammation contributes to half of the anaemia in pregnant women and children in Mongolia. To address chronic inflammation, improved access to safe water and sanitation facilities is required to reduce repeated infections and is recommended as an essential part of Mongolia's comprehensive nutrition strategy, particularly in rural areas and Ger districts that lack access to basic infrastructure services. In rural areas, 20% of the population lacks access to safe drinking water and one-third of the overall population lacks access to improved sanitation, both indicators strongly associated with child malnutrition. Water, sanitation and hygiene programmes are a critical nutrition-sensitive component for reducing the burden of malnutrition in Mongolia.

SUMMARY

This NNS V findings presents a "report card" on Mongolia's nutrition situation, highlighting the specific population groups and geographic areas greater attention is required. The pastoral system in Mongolia is associated with unique food consumption patterns, with high intake of proteins from meat and milk products, but little dietary diversity leaving the population increasingly susceptible to micronutrient deficiencies and excess weight gain. Tackling Mongolia's nutrition challenges requires intersectoral programmes and policies aimed at improving nutrition status through: increasing household food security, promoting year-round consumption of nutritionly-adequate diets, provision of IYCF and family counseling on healthy eating and lifestyles, micronutrient supplementation, and food fortification. For these actions to be effective, they need to occur within the framework of a poverty reduction strategy that promotes sustainable livelihoods, employment opportunities for Mongolia's highly educated population, improved living conditions, and building resilience of rural populations to prepare and recover from natural disasters. Regional and socio-economic disparities in health and welfare should be addressed through targeted social assistance programmes.

ANNEX I

ЭРҮҮЛ МЭНД, СПОРТЫН ЯАМ
**НИЙГМИЙН ЭРҮҮЛ МЭНДИЙН
ХҮРЭЭЛЭНГИЙН ЗАХИРЛЫН
ТУШААЛ**

2016 оны 05 сарын 23 өдөр   Дугаар А/25   Улаанбаатар хот

Техникийн ажлын хэсэг томилох тухай

Монгол Улсын "Хүнсний тухай" хуулийн 9 дүгээр зүйлийн 9.1.1 дэх заалтыг хэрэгжүүлэх зорилгоор ТУШААХ НЬ:

1. Хүн амын хоол тэжээлийн байдалд үнэлгээ өгөх үндэсний тавдугаар судалгааг зохион байгуулах Техникийн ажлын хэсгийн бүрэлдэхүүнийг нэгдүгээр, техникийн ажлын хэсгийн үйл ажиллагааны чиглэлийг хоёрдугаар, судалгааны ажлын календарчилсан төлөвлөгөөг гуравдугаар хавсралтаар тус тус баталсугай.

2. Хоол тэжээлийн үндэсний тавдугаар судалгааны баг бэлдэх, судалгааны ажлыг зохион байгуулах, мэргэжил, арга зүйн удирдлагаар хангах ажиллах, мэдээлэл цуглуулах, мэдээллийг боловсруулах, тайлагнах, үр дүнг танилцуулах, түгээх ажлыг хариуцахыг Хоол судлалын төв (Ж.Батжаргал)-д үүрэг болгосугай.

3. Судалгааны ажилд шаардагдах зардлыг гаргах, зарцуулалтад хяналт тавьж ажиллахыг Санхүү, аж ахуйн албаны дарга (А.Болор-Эрдэнэ)-д үүрэг болгосугай.

4. Энэхүү тушаалын хэрэгжилтэд хяналт тавьж ажиллахыг Нийгмийн эрүүл мэндийн бодлого зохицуулалт, хөгжлийн албаны дарга (Б.Сувд)-д даалгасугай.

ЗАХИРЛЫН
ҮҮРЭГ ГҮЙЦЭТГЭГЧ   Б.ЦОГТБААТАР

Нийгмийн эрүүл мэндийн хүрээлэнгийн
захирлын 2016 оны .. *5.* дугаар сарын *23*-ний
өдрийн *А/25* дугаар тушаалын нэгдүгээр
хавсралт

ХООЛ ТЭЖЭЭЛИЙН ҮНДЭСНИЙ V СУДАЛГААНЫ ТЕХНИКИЙН

АЖЛЫН ХЭСГИЙН БҮРЭЛДЭХҮҮН

Дарга:	Б.Сувд, Нийгмийн эрүүл мэндийн бодлого, зохицуулалт, хөгжлийн албаны дарга
Нарийн бичгийн дарга:	Ж.Батжаргал, Хоол судлалын төвийн дарга
Гишүүд:	Д.Отгонжаргал, Эрдэмтэн нарийн бичгийн дарга
	Ц.Энхжаргал, Нийгмийн эрүүл мэндийн лавлагаа төвийн Шим тэжээлийн лабораторийн эрхлэгч
	Э.Эрдэнэцогт, Хоол судлалын төвийн эрдэм шинжилгээний дэд ажилтан
	Н.Болормаа, Хоол судлалын төвийн эрдэм шинжилгээний дэд ажилтан
	Б.Энхтунгалаг, Хоол судлалын төвийн эрдэм шинжилгээний дэд ажилтан
	Д.Оюундэлгэр, Хоол судлалын төвийн эрдэм шинжилгээний дэд ажилтан
	Б.Цэрэнлхам, Хоол судлалын төвийн эрдэм шинжилгээний дадлагажигч ажилтан
	Д.Гантуяа, Нийгмийн эрүүл мэндийн лавлагаа төвийн Шим тэжээл судлалын лабораторийн биохимич
	Б.Ганболор, Хоол судлалын төвийн эрдэм шинжилгээний дадлагажигч ажилтан

Нийгмийн эрүүл мэндийн хүрээлэнгийн захирлын 2016 оны ..5. дугаар сарын 23 –ний өдрийн А/25 дугаар тушаалын хоёрдугаар хавсралт

ХООЛ ТЭЖЭЭЛИЙН ҮНДЭСНИЙ V СУДАЛГААНЫ ТЕХНИКИЙН АЖЛЫН ХЭСГИЙН ҮЙЛ АЖИЛЛАГААНЫ ЧИГЛЭЛ

Хоол тэжээлийн үндэсний V судалгааг зохион байгуулах "Техникийн ажлын хэсэг" нь доорх чиглэлийн үйл ажиллагааг хийж гүйцэтгэнэ. Үүнд:

1. Судалгааны ажлын хамрах хүрээ, ажлын хэмжээг тогтоож, шаардагдах зардлын тооцоог гаргаж, төсөв, удирдамж боловсруулах, батлуулах,

2. Хоол тэжээлийн үндэсний V судалгааны аргачлал боловсруулж, НЭМХ-ийн Эрдмийн зөвлөлийн хурлаар хэлэлцүүлэх, батлуулах,

3. Судалгааны ажлын ёс зүйн асуудлыг ЭМСЯ-ны дэргэдэх "Анагаах ухааны ёс зүйн хяналтын хороо"-ны хурлаар хэлэлцүүлж, Ёс зүйн зөвшөөрөл авах,

4. Судалгааны ажилд шаардлагатай лабораторийн багаж, хэрэгслэл, эм урвалж, аппарат, өндөр, жин хэмжигч, хүнсний жин зэрэг бүхий л зүйлсийн жагсаалтыг гаргаж, үнийн судалгаа хийж, нийлүүлэгч байгууллагууд захилга өгөх,

5. Судалгааны ажилд шаардлагатай багаж, тоног төхөөрөмж, урвалж, лабораторийн туслах хэрэгслэл, аппарат, өндөр, жин хэмжигч, хүнсний жин зэргийн захиалга, худалдан авалтыг хийх,

6. Судалгааны мэдээлэл цуглуулах багийг бүрдүүлж, мэдээлэл цуглуулах арга зүй эзэмшүүлэх сургалт болон туршилт судалгааг зохион байгуулах,

7. Судалгааны асуумжийг хувилах,

8. Орон нутагт судалгаа хийх бэлтгэл ажлыг хангаж, шаардлагатай материалыг бэлдэх,

9. Судалгааны багийн гишүүд болон жолооч нартай гэрээ байгуулж, ажиллах,

10. Судалгааны ажлыг нийслэл, аймаг орон нутагт зохион байгуулах ажлын удирдамж боловсруулж, батлуулах,

11. Судалгаанд сонгогдсон орон нутаг (дүүрэг, хороо, аймаг, сум)-т урьдчилан мэдэгдэж, судалгааг явуулах бэлтгэл ажлыг хангуулах,

12. Судалгааны мэдээлэл цуглуулах ажлыг батлагдсан арга, аргачлалын дагуу нйислэл, аймаг орон нутагт зохион байгуулах,

13. Судалгааны мэдээлэл цуглуулалтын явцад хяналт тавих,

14. Судалгааны мэдээллийн бааз үүсгэх, цуглуулсан мэдээллийг цахим хэлбэрт шилжүүлэх, шалгах, цэвэрлэх ажлыг гүйцэтгэх,

15. Судалгааны мэдээлэлд статистик боловсруулалт, дүн шинжилгээ хийх,

16. Судалгааны үр дүнгийн хураангуй /Fact sheet/-г боловсруулан орчуулж, хэвлүүлэх,

17. Судалгааны үр дүнг хууль тогтоогчид, бодлого боловсруулагчид, шийдвэр гаргагчдад танилцуулах уулзалтыг зохион байгуулах,

18. Судалгааны ажлын тайлан бичих, орчуулах, хэвлүүлэх, түгээх ажлыг зохион байгуулах,

19. Судалгааны үр дүнг мэргэжлийн байгууллага, холбогдох албан тушаалтан, орон нутгийн эрх баригчдад таниулан сурталчлах ажлыг зохион байгуулах,

20. ЭМСЯ-наас томилсон "Удирдах зөвлөл"-д судалгааны ажлын явцыг тайлагнаж, танилцуулж байх.

ANNEX II

ЭРҮҮЛ МЭНДИЙН ЯАМ

АНАГААХ УХААНЫ ЁС ЗҮЙН ХЯНАЛТЫН ХОРООНЫ ТОГТООЛ

2016 оны 08 дугаар сарын 26 -ний өдөр   № 10   210648 Улаанбаатар хот
Сүхбаатар дүүрэг,
Олимпийн гудамж-2
Засгийн газрын VIII байр,
Эрүүл мэнд, спортын яам
Утас: 261556, Факс:323541
Цахим хаяг:
ganzorig@moh.gov.mn

Анагаах ухааны ёс зүйн хяналтын хорооны 2016 оны 07 дугаар сарын 07-ний өдрийн 04 дүгээр хурлын протоколыг үндэслэн ТОГТООХ нь:

1. "Монголын хүн амын хоол тэжээлийн байдал үндэсний 5 дугаар судалгаа" сэдэвт судалгааг Ж.Батжаргал, Н.Болормаа, Б.Энхтунгалаг (Нийгмийн эрүүл мэндийн хүрээлэн) нар нь 2016-2017 онд багтаан хэрэгжүүлэхийг зөвшөөрсүгэй.

2. Дотоодын лабораторийн өнөөгийн хүчин чадлыг харгалзан, судалгааны арга зүйн дагуу судалгааны сорьцийг Герман Улсын аминдэм, эрдсийн "VITMINLab" лавлагаа лабораторид илгээн шинжлүүлж, шинжлэх ухааны нотолгоо гаргахыг зөвшөөрсүгэй.

3. Судалгааны явцын тайланг жил бүр, төгсгөлийн тайланг судалгаа дууссан хугацаанаас хойш 2 сарын дотор багтаан Анагаах ухааны ёс зүйн хяналтын хороонд ирүүлэхийг төслийн удирдагчид үүрэг болгосугай.

ДАРГА   Г.ЧОЙЖАМЦ

ANNEX III

PRIMARY SAMPLING UNITS SELECTED FROM WESTERN REGION

Province ID	Province name	Soum ID numbers	Soum name	Cluster ID number
1	Bayan - Ulgii	1	Buyant	1
		2	Bulgan	2
		3	Tolbo	3
		4	Altai	4
		5	Ulgii	5.6
		6	Sagsai	7
		7	Tsengel	8
2	Gobi-Altai	8	Darvi	9
		9	Esunbulag	10.11.12.13
		10	Delger	14
3	Zavkhan	11	Uliastai	15
		12	Tosontsengel	16
		13	Songino	17
		14	Otgon	18
4	Uvs	15	Turgen	19
		16	Undurkhangai	20
		17	Ulaangom	21.22.23.24
		18	Zavkhan	25
5	Khovd	19	Myangad	26
		20	Chandmani	27
		21	Jargalant	28.29
		22	Erdenebvren	30

PRIMARY SAMPLING UNITS SELECTED FROM KHANGAI REGION

Province ID	Province name	Soum ID numbers	Soum name	Cluster ID number
6	Arkhangai	23	Tariat	31
		24	Ugiinuur	32
		25	Tuvshruulekh	33
		26	Battsengel	34
		27	Chuluut	35
		28	Tsakhir	36
7	Bayankhongor	29	Jargalant	37
		30	Bayangobi	38
		31	Jinst	39
		32	Bayankhongor	40.41
8	Bulgan	33	Gurvan bulag	42
		34	Bulgan	43
		36	Mogod	44
9	Orkhon	37	Bayan-Undur	45.46.47.48

Province ID	Province name	Soum ID numbers	Soum name	Cluster ID number
10	Uvurkhangai	38	Tugrug	49
		39	Kharkhorin	50
		40	Burd	51
		41	Bat-Ulzii	52
		42	Arvaikheer	53.54
11	Khuvsgul	43	Tsagaan-Uul	55
		44	Tosontsengel	56
		45	Tunel	57
		46	Bayanzurkh	58
		47	Murun	59,60

PRIMARY SAMPLING UNITS SELECTED FROM CENTRAL REGION

Province ID	Province name	Soum ID numbers	Soum name	Cluster ID numbers
12	Gobisumber	48	Shiveegovi	61
13	Darkhan-Uul	49	Shariin gol	62
		50	Darkhan	63.64.65.66.67
14	Dornogobi	51	Sainshand	68
		52	Zamii-Uud	69
15	Dundgobi	53	Saintsagaan	70
		54	Delgertsogt	71
16	Umnugovi	55	Tsogt-Ovoo	72
		56	Dalanzadgad	73
		57	Tsogttsetsii	74
		58	Khanbogd	75
		59	Bulgan	76
17	Selenge	60	Shaamar	77
		61	Saikhan	78
		62	Altanbulag	79
		63	Mandal	80,81
		64	Sant	82
		65	Yeruu	83
		66	Baruunburen	84
		67	Sukhbaatar	85
		68	Zuunburen	86
18	Tuv	69	Bayntsagaan	87
		70	Altanbulag	88
		71	Zaamar	89
		72	Zuunmod	90

PRIMARY SAMPLING UNITS SELECTED FROM EASTERN REGION

Province ID	Province name	Soum ID numbers	Soum name	Cluster ID number
19	Dornod	73	Kherlen	91.92.93.94
		74	Khulunbuir	95
		75	Bayantumen	96
		76	Khalkhgol	97
		77	Matad	98
		78	Sergelen	99
		79	Bayan-uul	100
20	Sukhbaatar	80	Erdenetsagaan	101
		81	Dariganga	102
		82	Baruu-Urt	103, 104,105,106
		83	Khalzan	107
		84	Asgat	108
		85	Uulbayan	109
		86	Tuvshinshiree	110
		87	Tumentsogt	111
21	Khentii	88	Bor-Undur	112.113
		89	Bayan-Adarga	114
		90	Delgerkhaan	115
		91	Umnudelger	116
		92	Bayan-Ovoo	117
		93	Darkhan	118.119
		94	Batnorov	120

PRIMARY SAMPLING UNITS SELECTED FROM ULAANBAATAR

ID number	District name	Khoroo's ID number	Cluster ID number
1	Baganuur	1	121
		5	122
2	Bayangol	1	123
		3	124
		6	125
3	Bayanzurkh	14	126
		19	127
		23	128
		5	129
		7	130
		8	131
		9	132
4	Nalaikh	1	133
		4	134
5	Songinokhairkhan	10	135
		2	136
		29	137
		31	138
		7	139
		9	140

ID number	District name	Khoroo's ID number	Cluster ID number
6	Sukhbaatar	15	141
		16	142
		19	143
		4	144
7	Khan-Uul	13	145
		3	146
8	Chingeltei	10	147
		17	148
		4	149
		8	150

ANNEX IV

Cluster Number	Household Weight	Mother Weight	Child Weight	Child Venipuncture Weight	School Children Weight	Pregnant Women Weight	Pregnant Women Venipuncture Weight	Men Weight	Men Venipuncture Weight
1	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2655	0.4873	0.5226
2	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2660	0.4873	0.5226
3	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2626	0.4873	0.5226
4	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2678	0.4873	0.5226
5	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2655	0.4873	0.5226
6	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2684	0.4873	0.5226
7	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2732	0.4873	0.5226
8	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2732	0.4873	0.5226
9	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2732	0.4873	0.5226
10	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2732	0.4873	0.5226
11	0.6277	0.6278	0.6622	0.6629	0.8970	0.5333	0.2732	0.4873	0.5226
12	0.6277	0.6278	0.6622	0.6629	0.8920	0.5333	0.2732	0.4873	0.5226
13	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2726	0.4873	0.5226
14	0.6277	0.6278	0.6622	0.6629	0.8845	0.5333	0.2726	0.4873	0.5226
15	0.6277	0.6278	0.6622	0.6629	0.8845	0.5333	0.2776	0.4873	0.5226
16	0.6277	0.6278	0.6622	0.6629	0.8845	0.5333	0.2776	0.4873	0.5226
17	0.6277	0.6278	0.6622	0.6629	0.8869	0.5333	0.2776	0.4873	0.5226
18	0.6277	0.6278	0.6622	0.6629	0.8869	0.5333	0.2776	0.4873	0.5226
19	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2776	0.4873	0.5226
20	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2782	0.4873	0.5226
21	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2782	0.4873	0.5226
22	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2782	0.4873	0.5226
23	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2808	0.4873	0.5226
24	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2828	0.4873	0.5226
25	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2847	0.4873	0.5226
26	0.6277	0.6278	0.6622	0.6629	0.8920	0.5333	0.2834	0.4873	0.5226
27	0.6277	0.6278	0.6622	0.6629	0.8920	0.5333	0.2828	0.4873	0.5226
28	0.6277	0.6278	0.6622	0.6629	0.8894	0.5333	0.2828	0.4873	0.5226
29	0.6277	0.6278	0.6622	0.6629	0.8920	0.5333	0.2828	0.4873	0.5226
30	0.6277	0.6278	0.6622	0.6629	0.8920	0.5333	0.2828	0.4873	0.5226
31	0.8986	0.8988	0.8728	0.8651	0.5612	1.1417	0.8159	0.9985	1.1668
32	0.8986	0.8988	0.8747	0.8651	0.5612	1.1417	0.8159	0.9985	1.1668
33	0.8986	0.8988	0.8747	0.8651	0.5627	1.1417	0.8159	0.9985	1.1668
34	0.8986	0.8988	0.8747	0.8651	0.5627	1.1417	0.8159	0.9985	1.1668
35	0.8986	0.8988	0.8747	0.8651	0.5627	1.1417	0.8159	0.9985	1.1668
36	0.8986	0.8988	0.8747	0.8651	0.5659	1.1417	0.8159	0.9985	1.1668

Cluster Number	Household Weight	Mother Weight	Child Weight	Child Venipuncture Weight	School Children Weight	Pregnant Women Weight	Pregnant Women Venipuncture Weight	Men Weight	Men Venipuncture Weight
37	0.8986	0.8988	0.8747	0.8651	0.5692	1.1417	0.8159	0.9985	1.1668
38	0.8986	0.8988	0.8747	0.8651	0.5708	1.1417	0.8159	0.9985	1.1668
39	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
40	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
41	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
42	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
43	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
44	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
45	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
46	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
47	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
48	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
49	0.8986	0.8988	0.8747	0.8651	0.5724	1.1417	0.8159	0.9985	1.1668
50	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
51	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
52	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
53	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
54	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
55	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
56	0.8986	0.8988	0.8747	0.8651	0.5741	1.1417	0.8159	0.9985	1.1668
57	0.8986	0.8988	0.8747	0.8651	0.5774	1.1417	0.8159	0.9985	1.1668
58	0.8986	0.8988	0.8747	0.8651	0.5774	1.1417	0.8159	0.9985	1.1668
59	0.8986	0.8988	0.8747	0.8651	0.5774	1.1417	0.8159	0.9985	1.1668
60	0.8986	0.8988	0.8747	0.8651	0.5774	1.1417	0.8159	0.9985	1.1668
61	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
62	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
63	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
64	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
65	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
66	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
67	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
68	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
69	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
70	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
71	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
72	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
73	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
74	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
75	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914

Cluster Number	Household Weight	Mother Weight	Child Weight	Child Venipuncture Weight	School Children Weight	Pregnant Women Weight	Pregnant Women Venipuncture Weight	Men Weight	Men Venipuncture Weight
76	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
77	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
78	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
79	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
80	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
81	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
82	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
83	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
84	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
85	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
86	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
87	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
88	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
89	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
90	0.7517	0.7518	0.7257	0.7523	0.6295	1.4129	0.8794	0.8345	0.5914
91	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
92	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
93	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
94	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
95	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
96	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
97	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
98	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
99	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
100	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
101	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
102	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
103	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
104	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
105	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
106	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
107	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
108	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
109	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
110	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
111	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
112	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
113	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
114	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011

Cluster Number	Household Weight	Mother Weight	Child Weight	Child Venipuncture Weight	School Children Weight	Pregnant Women Weight	Pregnant Women Venipuncture Weight	Men Weight	Men Venipuncture Weight
115	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
116	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
117	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
118	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
119	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
120	0.3316	0.3317	0.3261	0.3191	0.0623	0.3302	0.0907	0.3474	0.4011
121	2.3903	2.3960	2.3697	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
122	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
123	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
124	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
125	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
126	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
127	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
128	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
129	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
130	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
131	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
132	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
133	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
134	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
135	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
136	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
137	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
138	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
139	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
140	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
141	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
142	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
143	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
144	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
145	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
146	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
147	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
148	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
149	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496
150	2.3903	2.3960	2.4128	2.4621	2.8321	1.6170	2.9103	2.4696	2.2496