

Micronutrient survey manual



Micronutrient survey manual



Micronutrient survey manual

ISBN 978-92-4-001269-1 (electronic version)

ISBN 978-92-4-001270-7 (print version)

© World Health Organization 2020

Some rights reserved. This work is available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo>).

Under the terms of this licence, you may copy, redistribute and adapt the work for non-commercial purposes, provided the work is appropriately cited, as indicated below. In any use of this work, there should be no suggestion that WHO endorses any specific organization, products or services. The use of the WHO logo is not permitted. If you adapt the work, then you must license your work under the same or equivalent Creative Commons licence. If you create a translation of this work, you should add the following disclaimer along with the suggested citation: “This translation was not created by the World Health Organization (WHO). WHO is not responsible for the content or accuracy of this translation. The original English edition shall be the binding and authentic edition”.

Any mediation relating to disputes arising under the licence shall be conducted in accordance with the mediation rules of the World Intellectual Property Organization (<http://www.wipo.int/amc/en/mediation/rules/>).

Suggested citation. Centers for Disease Control and Prevention, World Health Organization, Nutrition International, UNICEF. Micronutrient survey manual. Geneva: World Health Organization; 2020. Licence: [CC BY-NC-SA 3.0 IGO](https://creativecommons.org/licenses/by-nc-sa/3.0/igo).

Cataloguing-in-Publication (CIP) data. CIP data are available at <http://apps.who.int/iris>.

Sales, rights and licensing. To purchase WHO publications, see <http://apps.who.int/bookorders>. To submit requests for commercial use and queries on rights and licensing, see <http://www.who.int/about/licensing>.

Third-party materials. If you wish to reuse material from this work that is attributed to a third party, such as tables, figures or images, it is your responsibility to determine whether permission is needed for that reuse and to obtain permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

General disclaimers. The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by WHO in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by WHO to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall WHO be liable for damages arising from its use.

The mark “CDC” is owned by the US Dept of Health and Human Services and is used with permission. Use of this logo is not an endorsement by HHS or CDC of any particular product, service, or enterprise.

Photo credits: WHO /Andy Craggs and WHO /Oliver O'Hanlon

Contents

Acknowledgements.....	vii
Introduction.....	1
The manual	1
Micronutrient survey manual modules at a glance.....	3
Module 1. Planning and designing a micronutrient survey	7
Oversight committees for planning and implementation: Steering committee and Technical committee ...	8
Developing overall objectives of the survey	9
Defining the stratification and scope of the survey	10
Using anthropometry	13
Factors in micronutrient survey design and protocol development.....	14
Obtaining ethical approval	17
Module 2. Indicators of programme coverage, specimen selection, management and analysis	19
Assessing indicators of programme coverage.....	20
Coverage of vitamin and mineral supplementation.....	21
Coverage of point-of-use fortification.....	21
Coverage and quality of fortified or fortifiable foods	22
Collecting specimens for assessing biomarkers	24
Collecting blood specimens.....	24
Collecting urine specimens.....	26
Safety and other issues.....	27
Location for collecting samples and data	27
Selecting laboratories to test specimens	28
Module 3. Biomarker selection and specimen handling.....	29
Factors to consider when selecting biological indicators and specimens.....	30
Micronutrient and related health indicators.....	30
Cutoff values for populations groups	30
Inflammation	31
Vitamin A	33
Haemoglobin	40
Iron	43
Iron deficiency anaemia	47
Iodine.....	47
Vitamin B12	49

Folate	50
Vitamin D	54
Zinc	56
Overview of specimen collection containers, storage and transport conditions	58
References	60
Module 4. Survey design	68
Types of sampling design.....	69
National and subnational estimates, principles and purpose of stratification	70
The survey approach: independent or combined with another	72
Method of collecting data: paper-based or electronic.....	73
Module 5. Sample size	77
General sampling considerations	78
Considerations for household-based surveys	80
Calculation of sample size for a single cross-sectional cluster survey	83
Step 1: Calculate the sample size using the SRS method	84
Step 2: Account for the design effect in calculating sample sizes for cluster surveys	84
Step 3: Account for response rates	85
Calculation of sample sizes for baseline and follow-up cluster surveys	88
Subgroup comparisons and their effect on sample size	90
Module 6. Selecting clusters.....	93
Determining the appropriate number of clusters and the number of units per cluster.....	94
Methods for selecting clusters	95
Examples of cluster selection using probability proportional to size (PPS) and systematic sampling (SS)...	97
Module 7. Selecting households and participants.....	100
General principles of mapping and listing.....	101
Definitions	101
How to segment primary sampling units (PSUs)	102
How to select households in a cluster	107
Identifying and selecting eligible individuals in the household.....	108
Module 8. Survey supervision and personnel	110
Survey oversight: Steering committee, technical expertise and subcommittees	111
Personnel needs, organizational structure, and main responsibilities	112
Field team numbers, composition and roles.....	117

Survey field team recruitment	120
Module 9. Survey equipment and supplies.....	121
Anthropometry.....	122
Collecting, storing, transporting and analysing biological specimens and food samples	123
Communication and data collection	124
Electronic data collection	124
Paper-based data collection	124
Food sample replacement.....	124
Labelling requirements to consider when purchasing or generating them	125
Supply lists and ordering	125
Storing, tracking, inventory, and transport of supplies.....	126
Module 10. Budget and timeline	128
Factors to consider when developing a budget	129
How to develop a survey timeline.....	130
Module 11. Data collection tools, field manual, and database.....	132
Developing and testing the main survey questionnaire.....	133
Cognitive interviewing.....	135
Translation and back-translation.....	136
Pretesting the survey questionnaire	137
Other data collection tools	139
Informed consent and assent.....	141
Age determination technique and tools	142
Field manual	143
Module 12. Training and pilot testing.....	145
Developing the training agenda	146
Planning the training: training venue, trainees and trainers	146
Training venue	146
Trainees	147
Trainers.....	148
Training sessions.....	148
Testing and evaluating trainees	154
Training for supervisors and team leaders.....	155
Pilot testing.....	156
Refresher training.....	158
Module 13. Field logistics.....	159

Managing supplies and specimens in the field.....	160
Distribution of items to field teams	160
Daily list of supplies and equipment	160
Field team supervision and monitoring.....	161
Coordination and communication in the field	164
Arranging for travel and accommodation	166
Data management in the field.....	166
Cold chain management and quality control	167
Shipping specimens	167
Module 14. Data entry and cleaning.....	169
Ensuring the quality of data	170
Processes for data entry, examples of data entry software and management of the database	170
Constructing the data entry system	170
Choosing software	172
Developing a data dictionary.....	172
Testing the data entry system	173
Data entry requirements	173
Cleaning data to finalize the database for analysis	174
Creating individual-level and household-level data sets.....	176
Managing the database.....	176
Module 15. Data processing and analysis	177
Data processing	178
Analyses for surveys designed with stratification and clustering	178
Weighting for stratification	178
Important considerations related to clustering	180
Calculating percentages for stratified cluster data	180
Calculating sample weights for non-response	181
Statistical analyses for micronutrient surveys.....	182
Outcome results tables.....	183
Additional information for interpreting nutrition indicators	183
Standard analysis and checks for anthropometry data.....	185
Module 16. Survey reports and dissemination	187
Types of reports and documents to produce	188
Preliminary reports.....	188
Final report	189
Summary report	190
Additional reports and manuscripts.....	190
Disseminating and using survey results	190
Including survey results in global databases	192

Acknowledgements

The Micronutrient Survey Manual (2020) content and website are an update of the 2007 publication *Indicators and methods for cross-sectional surveys of vitamin and mineral status of populations*¹ and its associated online Survey toolkit. This document is part of an updated [interactive website](#) developed to meet the demand of countries interested in assessing the micronutrient status of their populations. Appreciation is extended to the numerous individuals who led this revision. Specifically, we would like to thank Ms Katie Tripp, Dr Jacky Knowles and Dr Anne Williams for drafting and coordinating all content or finalizing all revisions. The following individuals contributed to selected modules and content or provided critical review: Dr O Yaw Addo, Dr Krista Crider, Dr Elisa Dominguez, Dr Deborah Galuska, Dr Annette Imohe, Dr Maria Elena Jefferds, Ms Julia Krasevec, Dr Roland Kupka, Ms Carine Mapango, Dr Zuguo Mei, Dr Juan Pablo Peña-Rosas, Dr Christine Pfeiffer, Dr Lisa Rogers, Mr Laird Ruth, Dr Mary Serdula, Dr Rosemary Schleicher and Dr Ralph (Donnie) Whitehead. The multi-year effort was carried out under the careful watch of core advisory committee members: Dr Maria Elena Jefferds (CDC), Dr Anne Williams (McKing Consulting Corporation as a contractor for CDC), Dr Luz Maria De Regil and Dr Sara Wuehler (Nutrition International), Dr Roland Kupka (UNICEF) and Dr Lisa Rogers (WHO).

预览已结束，完整报告链接和二维码如下：

https://www.yunbaogao.cn/report/index/report?reportId=5_24324

