



# BEST PRACTICES FOR QUALITY ANTHROPOMETRIC DATA COLLECTION

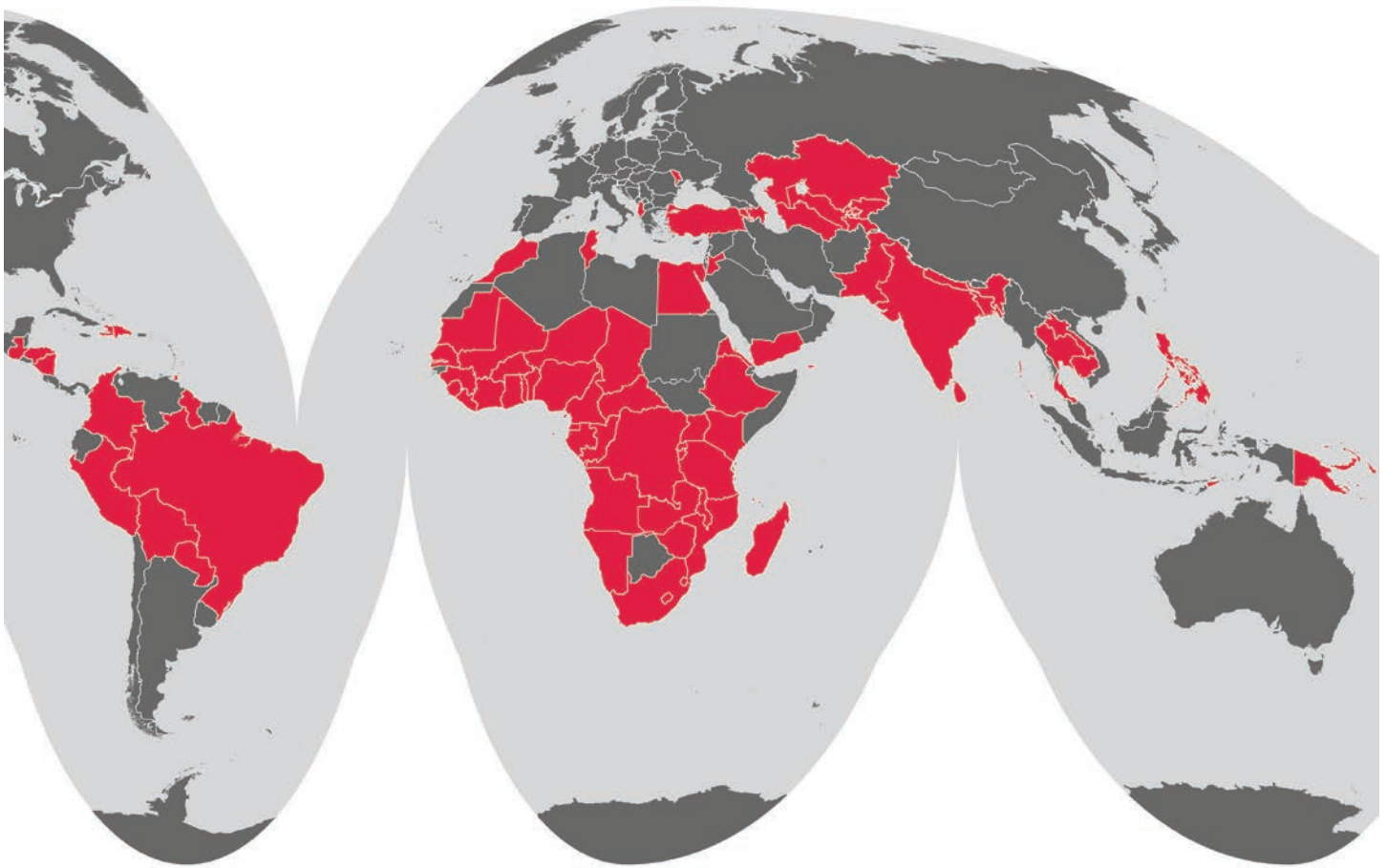
*at* THE DHS PROGRAM



**USAID**  
FROM THE AMERICAN PEOPLE



© 2018 Arturo Sanabria, Courtesy of Photoshare



## ANTHROPOMETRIC DATA IN THE DHS PROGRAM

Anthropometric data were first collected in DHS surveys in 1985. Still today, height and weight measurements are obtained for children under age 5 and women age 15-49.

Anthropometric data is also increasingly being captured for men. In some cases, waist circumference is also measured in adults to better assess the risk of non-communicable diseases as a result of over-nutrition. To date, The DHS Program has collected height and weight data in 238 surveys in 77 countries from children and adults.

# THE VALUE OF ANTHROPOMETRIC DATA

Anthropometry is the measurement of the human body and is an indicator of nutritional status. There are many types of measurements taken to capture size and body composition with the most common being height and weight.

Nutrition plays a critical role in the well-being of individuals, communities, and nations. Failure to address under- and over-nutrition results in poor health outcomes and reduced economic productivity.

The Sustainable Development Goals (SDGs) call to end all forms of malnutrition by 2030, including achieving targets for stunting and wasting in children under age five years and addressing the nutritional needs of adolescents and adults.

This brief provides recommendations to support high-quality anthropometric data collection in DHS surveys. It is intended for steering committees, implementing agencies, and other survey decision-makers.



# THE IMPORTANCE OF QUALITY ANTHROPOMETRIC DATA

Accurate anthropometric data informs country and global decision-making on nutrition policy and programming.

The World Health Organization (WHO) and UNICEF released recommendations on anthropometric data collection which highlight

the importance of specific procedures to produce good quality data. The DHS Program has actively adopted several new methods to train, collect, monitor, and report on data quality for DHS surveys.

In 2019 WHO/UNICEF released recommendations on the collection of anthropometric data in nationally representative surveys. The report defines criteria and standards for collecting, analyzing, and reporting malnutrition estimates.

Learn more about the 2019 WHO guidelines on anthropometry data collection in the full report at <https://www.who.int/nutrition/publications/anthropometry-data-quality-report/en>

Reference: Recommendations for data collection, analysis and reporting on anthropometric indicators in children under 5 years old. Geneva: World Health Organization and the United Nations Children's Fund (UNICEF), 2019. Licence: CC BY-NC-SA 3.0 IGO.



© 2017 Smile Foundation , Courtesy of Photoshare



This brief contains best practices for quality anthropometry data collection across various activities:



## SAMPLING



## EQUIPMENT



## TEAM COMPOSITION



## TRAINING OF FIELD WORKERS



## STANDARDIZATION



## SUPERVISION



## QUALITY ASSURANCE



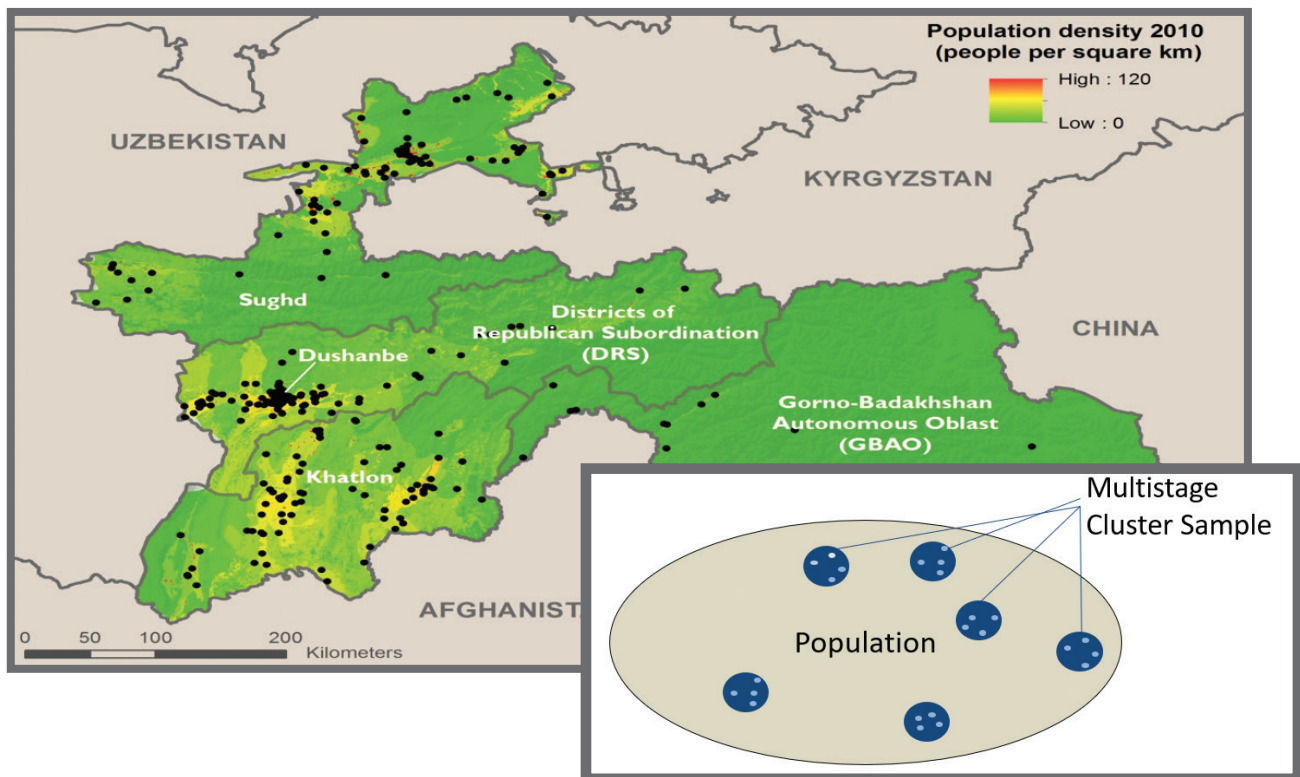
## DISSEMINATION



## SAMPLING

**Always calculate the sample size needed to report on anthropometry indicators and consider sub-sampling.** DHS surveys are designed to provide reliable estimates for most of the key DHS indicators at the national level and as well as at the country's first administrative level (region/province). The total sample size for a DHS depends on the country's demographic profile and the number of regions/provinces.

In most DHS surveys, anthropometry for children under 5 is measured in a subsample of households, usually one in every two households selected for the main survey. Prior to determining subsampling, the sample size should be assessed to ensure adequate survey precision for all the anthropometric indicators at the region/province level. Sub-sampling for anthropometry can reduce costs and these savings can be used for other activities that support data quality for anthropometry.

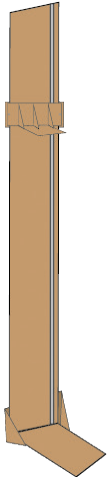






## EQUIPMENT

Equipment used by The DHS Program must meet the WHO/UNICEF specifications. There are four pieces of standard equipment for anthropometry:



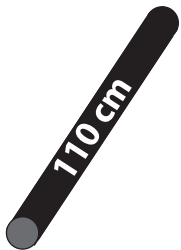
### Height/length board

A ShorrBoard® is used to take height/length measurements.



### Weighing scale

A SECA 878® digital scale is used to take weight measurements. The scale takes measurements in 0.1 kg increments.



Rod of known length such as 110cm. for calibration



Standard weight of at least 5kg for calibration

***New anthropometry equipment must be ordered for every DHS survey.***

The use of old equipment can result in inaccurate data.

***Calibration of equipment is needed to ensure devices function accurately when weighing and taking height measurements.***

Calibration must be done when equipment arrives in country, during training, and routinely throughout fieldwork. This allows for the quick identification of faulty equipment for replacement. To prevent stoppage and delays during fieldwork it is necessary to order back-up equipment at the time of making the original equipment order.



© The DHS Program/ICF



## TEAM COMPOSITION

A DHS data collection team consists of 6 or more persons, including three interviewers, one/two measurers\* and a supervisor. Two trained people are required to take height/length measurements for children in the DHS. At least one team member must be trained as a main measurer and another as an assistant. A parent or responsible adult's role is to calm the child during the procedure but they should not serve as the assistant to the measurement.

Depending on the survey budget and other survey requirements there are 4 different options for team composition for anthropometry collection (opposite page).

*Additional recruitment:* An additional 15% measurers should be recruited than will go to the field. There are 3 main reasons for over-recruitment. The first is to allow for drop out due to illness, family emergency, or other personal reasons. Second, those who do not pass the standardization exercise should not be selected for fieldwork. Another advantage is to allow those who performed at higher levels to be promoted to a supervisory role. A clear retention plan should also be developed.

\* Measurers/biomarker technicians can collect biomarkers in addition to anthropometry.



## TEAM COMPOSITION: OPTIONS

<p><b>Option 1</b></p>	<p><b>Who collects anthropometry:</b> Two biomarker technicians working as a pair</p> <p><b>Who is standardized*:</b> One of the biomarker technicians</p> <p><b>Impact on training requirements:</b> None; requires the fewest number of persons to be standardized.</p> <p><b>Equipment requirements:</b> One set per pair</p>
<p><b>Option 2</b></p>	<p><b>Who collects anthropometry:</b> Two biomarker technicians working separately</p> <p><b>Who is standardized*:</b> Both biomarker technicians</p> <p><b>Impact on training requirements:</b> High; requires longer biomarker training to accommodate standardization. Additionally the other biomarker technician and/or interviewers and/or supervisors will need to be trained as assistants.</p> <p><b>Equipment requirements:</b> One set per individual</p>
<p><b>Option 3</b></p>	<p><b>Who collects anthropometry:</b> One biomarker technician</p> <p><b>Who is standardized*:</b> One biomarker technician</p> <p><b>Impact on training requirements:</b> Modest- requires the fewest number of persons to be standardized. Additionally interviewers and/or supervisors will need to be trained as assistants.</p> <p><b>Equipment requirements:</b> One set per individual</p>
<p><b>Option 4</b></p>	<p><b>Who collects anthropometry:</b> One or more interviewers</p> <p><b>Who is standardized*:</b> One or more interviewers</p> <p><b>Impact on training requirements:</b> Highest- requires the greatest number of persons to be standardized. Additionally interviewers and/or supervisors will need to be trained as assistants.</p> <p><b>Equipment requirements:</b> One set per individual</p>

\*Standardization requires several inputs that make it difficult to train large numbers of persons in the role of measurer.



## TRAINING OF FIELDWORKERS

**Training for anthropometry requires different inputs from training for interviews.** Training involves lectures, videos, demonstrations, practice, and standardization. The hands-on nature of anthropometry requires individualized training for measurers to master techniques, including small group sessions and evening clinics. This requires a minimum ratio of 1:10 trainers to trainees.

Practice sessions with dolls and adults should be conducted prior to practice with children to familiarize measurers with procedures.

Anthropometry for children is unique thus practice with children is mandatory. Most surveys will require approximately 60 children under age 5 for anthropometry practice (this is assuming 20 measurers). Arrangements should be made to have a sufficient number of children of different ages under 5 years, including young children under 3 months, 3-5 months, and 6-11 months.

Successful strategies to recruit children include advertising and working with local community groups in advance of the training.



© The DHS Program/ICF



## Sample Training Schedule

(WHO/UNICEF recommends 6 days for anthropometry training plus 1 day for field supervisors)

- |              |  |
|--------------|--|
| <b>Day 1</b> | <ul style="list-style-type: none"><li>• Welcome and introductions, training outline and expectations</li><li>• Define anthropometry</li><li>• Familiarize with equipment used for anthropometry including use, maintenance, and calibration</li><li>• Learn procedures and precautions to take when measuring weight and height</li><li>• Understand roles of measurers and assistants</li><li>• Learn steps for measuring weight and height in adults and children</li><li>• Learn steps for measuring length in children</li><li>• Complete Biomarker Questionnaire (sections for height and weight)</li><li>• Complete Results Brochure</li></ul> |
| <b>Day 2</b> | <ul style="list-style-type: none"><li>• Show video of weight (standing) and height</li><li>• Demonstration of weight (standing) and height measurements</li><li>• Practice weight and height of adults and children 2 years+</li><li>• Introduce anthropometry check list</li></ul>  |
| <b>Day 3</b> | <ul style="list-style-type: none"><li>• Show video of weight (holding) and length</li><li>• Demonstration of weight (holding) and length measurements</li><li>• Practice with dolls and other objects</li><li>• Practice weight and length of children under 2 years</li></ul>   |
| <b>Day 4</b> | <ul style="list-style-type: none"><li>• Discuss theory of standardization (measurers reporting form, accuracy, and precision)</li><li>• Prepare standardization stations</li><li>• Practice standardization on adults</li></ul>  |
| <b>Day 5</b> | <ul style="list-style-type: none"><li>• Perform standardization exercise on children</li><li>• Discuss results of standardization</li><li>• Additional training on taking the height/length of children</li></ul>  |
| <b>Day 6</b> | <ul style="list-style-type: none"><li>• Repeat standardization of measurers on children for those who failed accuracy or precision</li><li>• Discuss final standardization results</li></ul>   |

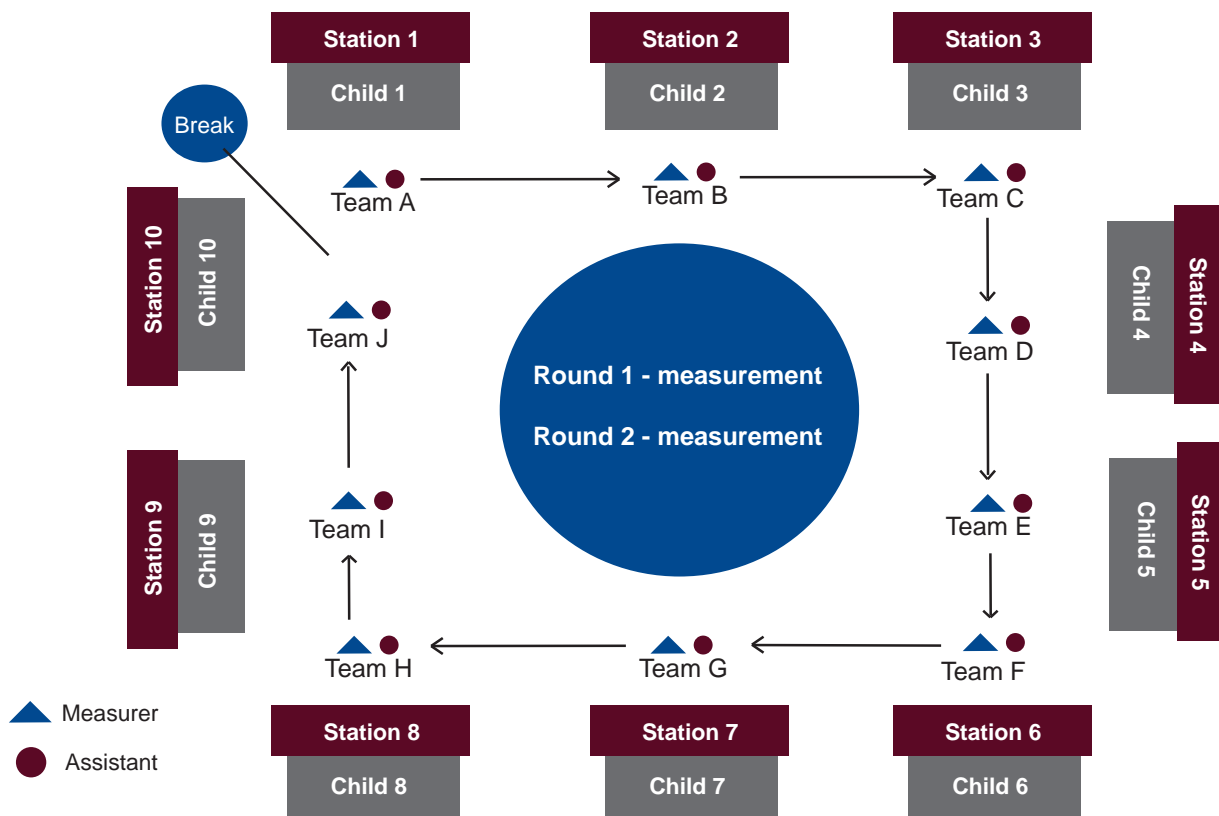


## ANTHROPOMETRY STANDARDIZATION

The standardization exercise tests the trainee's ability to measure children's height accurately and precisely. It takes place only after trainees have had sufficient time to practice techniques.

A measurer and an assistant work as a pair to perform two independent height measurements on 10 children (5 children less than 24 months and 5 children 24 to 59 months). To serve as the reference value, a gold standard trainer also obtains two height measurements on each child. If more than one standardization is done, the same person should serve as the gold standard across all standardization exercises when possible.

Accuracy is calculated by comparing the measurer to the gold standard trainer. Precision is calculated by comparing each measurer's replicate measurements of the same child. Measurers have to achieve a certain accuracy and precision to pass the standardization exercise. About one-third of measurers are expected to fail the first standardization. For those that fail, retraining, followed by a re-standardization is required. Only measurers that pass are to be recruited as measurers during the survey.



***Measurers must undergo standardization with children prior to survey fieldwork.***

Careful planning is needed to have a successful standardization in the pretest and main training. Key considerations include:

- Recruiting a large number of children. Different children need to be recruited per standardization exercise and they should not be the same children used in practice. Assuming 20 measurers, 42 children are needed for standardization and re-standardization, half of whom should be under 2 years old.
- Having a gold standard trainer take measurements during standardization. The expert must have previously demonstrated the ability to obtain precise and accurate measurements to take on this role.
- Allowing for sufficient time in the agenda for standardization. Typically two days are required for standardization.
- Depending on the number of measurers required for field work, several standardization exercises will have to be performed in parallel or sequentially, thus adding extra days to the training agenda.
- Arranging a suitable location with space and light (usually at the training venue). Caretakers and their children need to be prepared to stay at the venue for half a day.



© The DHS Program/ICF

***Child standardization exercises*** are carried out during training to ensure measurers can take accurate and precise measurements.

## ACCOMMODATIONS FOR CHILDREN AND THEIR GUARDIANS

Practice and standardization take several hours so it is important to take care of the needs of children and their guardians and caretakers. The sessions should take place in a calm location at the training venue. Children and their guardians must be provided with meals and drinks.

Reimbursement for local transport and provisions should be provided. The provisions (monetary or in-kind) are a small token of appreciation to recognize guardians and their children during anthropometry practice and standardization.



© 2017 Arturo Sanabria, Courtesy of Photoshare





© The DHS Program/ICF



## SUPERVISION

***Data-collection procedures for anthropometry require technical supervision to ensure correct measurement procedures.*** DHS surveys typically have two levels of supervision: team supervisors and fieldwork monitors. Team supervisors provide daily support to interviewers and measurers, while fieldwork monitors rotate and provide periodic supervision to data collection teams. Specialized individuals need to be trained to provide technical supervision. This can be the team supervisors, fieldwork monitors that provide supervision for the entire data collection team, or fieldwork monitors who only supervise measurers.

Technical supervisors must receive anthropometry training. Training schedules that do not allow for supervisors to participate in both the interviewer and biomarker training should be avoided. Solutions can include holding sequential instead of parallel training or dividing up supervision responsibilities between different individuals. Also consider selecting technical supervisors from amongst the highest performing trainees in the pretest or main training.



## ANTHROPOMETRY CHECKLISTS

Anthropometry checklists are used by supervisors to assist in the oversight of data collection. Supervisors use technical and procedural checklists to monitor work and provide constructive feedback to measurers. The technical checklist is the more important of the two checklists, because it will help support correct measurements.

It is preferable for both the team supervisor and fieldwork monitors to use the technical checklist. In cases where the training design does not allow for the team supervisors to participate in the anthropometry training, the team supervisors can use the procedural checklist. Fieldwork monitors must still be trained to use the technical checklist.

There are two types of supervisory checklists:

- The **procedural checklist** covers 10 items that are required to collect anthropometry data. The items are easily observable by supervisors and require minimal training.
- The **technical checklist** covers 47 items that are required to ensure high quality anthropometry data. The items can be observed easily, but require the supervisors to have participated in the anthropometry training.



© 2018 The DHS Program/ICF

*State coordinator administering the Biomarker Checklist during field practice for the 2018 Nigeria DHS.*

## ✓ QUALITY ASSURANCE: RE-MEASUREMENT

Re-measurement of children is a key data quality procedure. Re-measurement reduces this error and provides information on the quality of anthropometry data collected in the survey.

Re-measurements are performed for two reasons:

**Random:** In each cluster, 10% of children are randomly selected for re-measurement. This is done to expose poor height measurements by comparing the results between the measurers' first measurement and revisit measurement in the supervisor's tablet.

**Flagged:** Anthropometric z-scores are automatically calculated in the program while in the cluster. Children with unusual measurements for any of the anthropometry indicators are flagged. Re-measurement of children with flagged measurements can reduce the amount of incorrect data included in final datasets.

Additional time is needed for re-measurement while the team is still in the cluster.

© The DHS Program/ICF



*Field check tables provide summary statistics on data quality and are produced regularly during field work to identify problems.*



©The DHS Program/ICF



## QUALITY ASSURANCE: FIELD CHECK TABLES

Field check tables are used to monitor and evaluate the quality of the anthropometric data being collected in real time. The tables are run periodically as data from the field arrives to the central office and the output is provided to the implementing agency and DHS headquarters. This system helps monitor data as it is being captured and identifies patterns that indicate poor data quality, which can be communicated straight back to the team supervisors and fieldwork monitors for remedial action. This may require a technical supervisor to visit a team and provide re-training to address incorrect measurement procedures.



## DISSEMINATION OF ANTHROPOMETRIC DATA QUALITY

**Reporting on the quality of the anthropometric data is included in final reports.** DHS final reports have information on the training of measurers, including the child standardization exercise. This provides the user with information on the quality of the anthropometry training. The final reports also include summary statistics on anthropometry data quality. This reveals the quality of the anthropometry data in the survey and enhances confidence in its use.

© 2017 Riccardo Gangale/USAID, Courtesy of Photoshare







© 2015 Jaime S. Singlador, Courtesy of Photoshare

This document was produced with support provided by the United States Agency for International Development (USAID) through The DHS Program (#AID-OAA-C-13-00095). The views expressed are those of the authors and do not necessarily reflect the views of USAID or the United States Government.

The DHS Program assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Additional information about The DHS Program can be obtained from ICF, 530 Gaither Road, Suite 500, Rockville, MD 20850 USA; telephone: +1 301-407-6500, fax: +1 301-407-6501, email: [info@DHSprogram.com](mailto:info@DHSprogram.com), internet: [www.DHSprogram.com](http://www.DHSprogram.com).

The Demographic and Health Surveys Program  
ICF  
530 Gaither Road, Suite 500  
Rockville, MD 20850 USA  
[www.DHSprogram.com](http://www.DHSprogram.com).