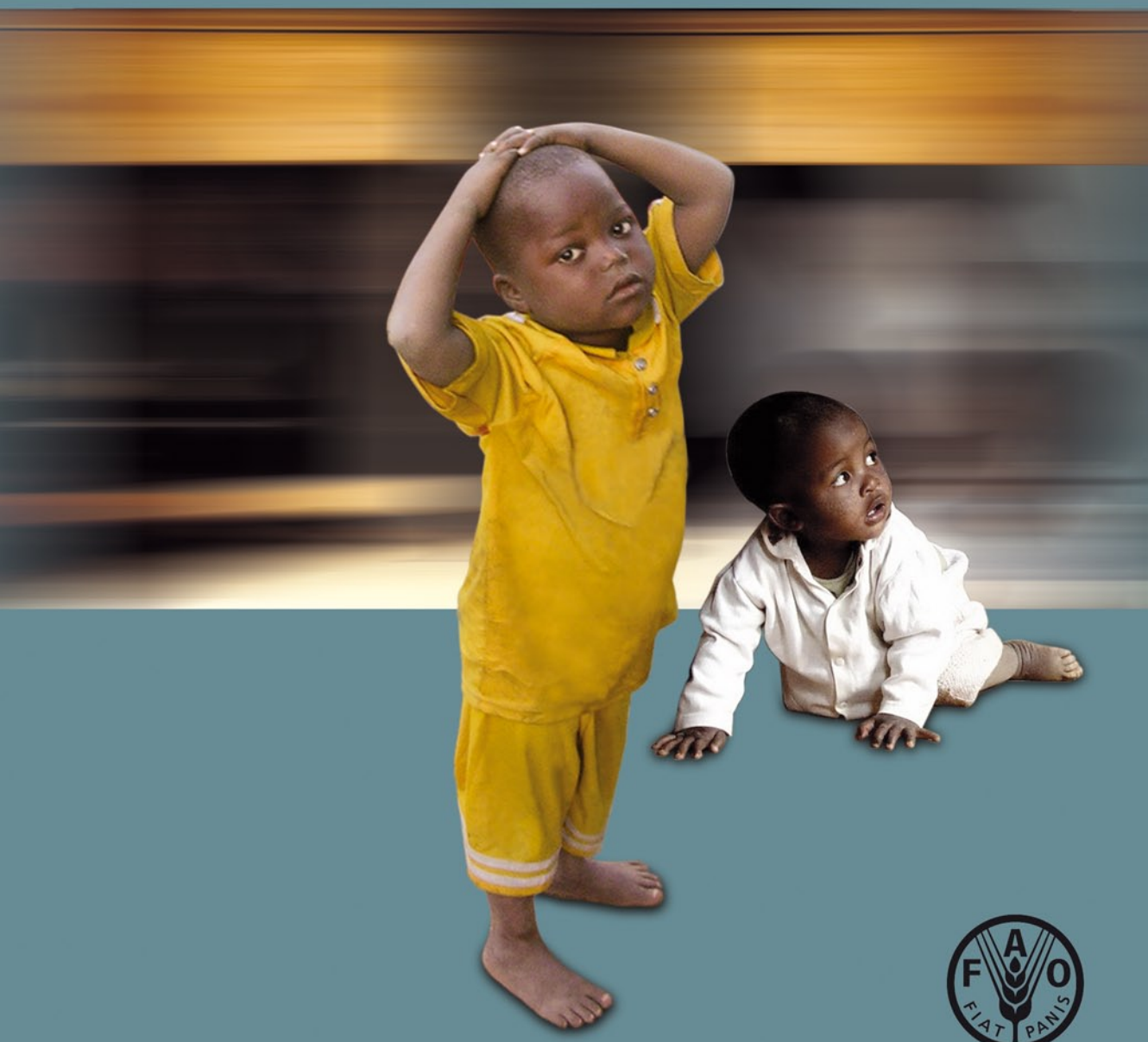
Guidelines for Estimating the Month and Year of Birth of Young Children



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Website: www.foodsec.org

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Glossary[1]

Age heaping - implausibly high numbers of children with an estimated age in months of exactly whole or half years such as 6, 12, 18, 24, 30, 36, 42, 48 and 54 months.

Anthropometry - the use of human body measurements to obtain information about nutritional status.

Age - a calculation of the number of days transpired between date of birth and the current date. For young children age is typically assessed in days or months while for older persons age is generally counted in completed years.

Age estimation - calculation of age based on an approximation of the date of birth or month and year of birth.

Date of birth - the day, month and year that a person was born.

Height/length for age* - a growth index that relates length or height to a child's age.

Local calendar of events - a customized calendar which provides dates of significant events for a specific geographic area. The local calendar of events is a tool used to assist in estimating child month and year of birth.

Stunted* - short for one's age; length/height-for-age below the -2 z-score line.

Underweight* - weight-for-age below the -2 z-score line.

Weight for age* - a growth index that relates weight to a child's age.

[1] * indicates these terms were taken from WHO, 2006.

1

Introduction

A child's age is an essential piece of information for evaluating the many facets of children's nutritional status. Several core food security and nutrition indicators require child age for their construction. Examples include anthropometric indices of weight-for-age and height-for-age as well as core infant and young child feeding indicators such as continued breastfeeding at one year and minimum acceptable diet. In many countries, there is no custom of recording children's date of birth and it becomes necessary to estimate the date of birth of the child by asking the child's mother[2], father or primary caretaker a series of questions in order to approximate the month and year of birth. This information, together with the date of survey data collection, can then be used to calculate the child's age in months and used for creating indicators which require child age.

Three indices (weight-for-age, height/length-for-age and weight-for-height/length) based on anthropometric measurements of children under five years of age are widely used. The indicator based on weight-for-age of children under the age of five is part of the Millennium Development Goals. Due to the widespread use of anthropometric indicators in children under five years of age, these guidelines and many of the examples provided are tailored for use in this context. However the basic principles of age estimation can also be applied in other contexts such as for evaluating feeding and care practices of infants and young children or for use with age groups over five years.

These guidelines are intended for health care workers, survey trainers and other persons who need to collect accurate information on child age in situations where there is no accurate written record of date of birth or a tradition of remembering birth dates. Examples of such situations are areas where the majority of child births occur in the home, often without the aid of a skilled attendant and there is no tradition of recording the date on which the event occurred. Estimation of child age may be needed for assessments based on one point in time, such as for use in a cross-sectional survey. They may also be needed on an ongoing basis for growth monitoring or sentinel site surveillance. These guidelines will try to address both of these uses.

For anthropometric assessment, the day, month and year of birth are needed to calculate exact age in days for deriving the z-scores based on the WHO child growth standards. The WHO has developed a software package called WHO Anthro software (www.who.int/childgrowth/software) designed to accommodate the cases in which only the child's month and year of birth are obtainable. In these situations, the software user ticks a box "Approximate date" which triggers a randomization process to pick a day within the selected. In order to correctly assess child growth using this software, at least the month and year must be accurately determined.

[2] Throughout these guidelines, the word "mother" is used to refer to the child's primary caregiver simply to avoid repetition. There may be situations where the primary caregiver may be someone other than the mother, such as the father, grandmother, or another relative or guardian.

In anthropometric assessments, inaccuracies in age estimation can lead to a systematic bias in the estimated prevalence of underweight and stunting. A study in Mali found that improper age estimation resulted in an underestimation of the prevalenceof malnutrition by 10-30 percent (Oshaug *et al.*, 1994). Bairagi and Ashan (1998) found that data collection errors in age rather than errors in height or weight measurements were responsible for implausible results in Bangladesh. In this study, they found an average error of 1.8 months which changed the estimates of malnutrition by 7 percent. Additional errors can occur when the unknown age is estimated using the child's stature (visually and unconsciously). In some cases, when age estimates are imprecise but not driven by the child's stature, there may be either an under- or overestimation of malnutrition rates. This type of misclassification can reduce statistical power to detect differences in the mean value of indices between groups.

In addition to errors in estimating malnutrition rates, inaccuracies in age estimation lead to higher standard errors in estimating the mean for these indices. Distributions of the z-scores are wider and flatter than the distribution of reference values (i.e. negative kurtosis). This has the same effect described above of reducing the statistical power of all comparisons or analyses using mean indices (which are used, for example, to identify the determinants of malnutrition, to compare groups, or to assess changes over time).

2

Age Estimation Techniques

These guidelines emphasize an important concept of using a local calendar of events to estimate a child's birthdate, or at least a child's month and year of birth, rather than trying to directly estimate a child's age in months. This is a slight shift in orientation from some previous approaches, where field workers were asked to try to estimate child age in months.

The reason for this shift is that more numerous errors occur when the age is estimated directly in months. Age heaping is much more pronounced when the mother is asked how old the child is because there is a strong tendency to round up or down to whole or half years. For example, a child whose true age in months is 26 months may be referred to as being two years (24 months) by the mother when asked the question "How old is your child?". Sometimes, the mother may count age by the number of harvests or other significant types of events since the childbirth. Calculation errors can occur when trying to transform what the mother says into a number of months.

For all these reasons, it's highly preferable to estimate a date of birth (month + year, and day whenever possible) rather than directly assessing the age in months[3]. Even asking the mother the question "how old is your child?" can bias the way the calendar of events will be used. On the other hand, it can be useful to check the age with the mother once the birth date has been approximated (for example, by asking the mother: "If I have correctly understood, will the child be three by the next harvest season?").

Using an accurate local calendar of events (a customized calendar which provides dates of significant events for a specific geographic area) can help to reduce errors in estimating a child's date of birth when written records are not available. When using the local calendar of events, the goal is to narrow down the age of the child to the nearest month and year of birth. This is done by asking the mother a series of 'before and after' questions with the aim of identifying two known events, one which occurred before and one which occurred after the child was born. This technique is called the 'sandwich' because the child's estimated month and year of birth is sandwiched between two identified events in the calendar. However, in some cases the mother can give more precise information such as "my child was born one week after the Tabaski feast" or "my child was born five days before the Independence Day"; this information should be recorded so that the entire date of birth can be estimated.

Two other techniques can be used. The index technique can be used to further narrow down the estimated month of birth in situations where the sandwich established using the calendar of local events was more than three months. To use the index technique, there must be another child of a similar age in the household or in the compound (when several families with close ties live in the same place), for whom a

[3] Anthropometric software packages will automatically calculate age using date of birth and date of survey

date of birth is known or recorded. The accuracy of this record should be verified. The mother can be asked if she remembers being pregnant or giving birth "at the same time" or "just before" or "just after" the birth of the child whose date of birth is known. If the answer is yes, the mother is asked about the number of months between the birth of her child and the birth of the other child.

The second technique is not used to estimate the month or year of birth, but simply to check among the ages of all children of the same mother for coherence and accuracy. This technique can be used when there is more than one child under five years of age living in the household. After all the ages have been estimated using the calendar of events, the sequential ages of each child can be reviewed with the mother. An obvious error of a birth interval less than nine months can be detected in this way, but the mother can also verify the number of months or years between the births.

Techniques for estimating month and year of birth and associated training are not always given sufficient attention in contexts where their use is necessary, such as for anthropometric surveys or growth monitoring within the health care setting. Some of the potential errors in estimation of month and year of birth can be reduced by carefully completing a calendar of local events, focusing on estimating a child's month and year of birth rather than age in months, the thorough training of interviewers in the use of the calendar, and field supervision. These guidelines describe how to prepare a calendar of local events, and provide training exercises for survey interviewers in using the calendar to estimate young children's month and year of birth.

3

How to Design and Construct a Calendar of Events

The key points for designing a calendar are choosing a format that (i) has sufficient room for writing events and adding information as needed, and (ii) is more likely to be familiar to the survey team if there have been previous anthropometric surveys in the area. In areas where the custom is to read from right to left, the calendar can be oriented in this direction rather than left to right (CDC and WFP, 2005).

When adding events to the calendar, keep in mind that the target audience is most commonly a woman with a child under the age of five years. You want to select events that are significant to women with young children.

First, identify the time frame to be included in the calendar. For example, a survey taking place in May 2008 and covering children 0-59 months old would include all months between May 2008 and May 2003. If data collection lasts more than one month, the addition of new month(s) and the deletion of the last eligible month(s) should be anticipated and discussed prior to and during survey training. For example, a survey beginning in May 2008 and continuing through July 2008 and covering children 0-59 months of age, would include all months between July 2008 and May 2003. At the beginning of data collection in May 2008, eligible months would include May 2008 to May 2003. From 1 June, the eligible months move to June 2008 to June 2003, with children born in May 2003 becoming ineligible in June and so on.

3.1 ADDING LOCAL EVENTS TO THE CALENDAR

Once the calendar format has been adapted to the local context, events need to be put into the calendar. The ideal is to have two to four events for each month of each year. Every month should have at least one event. It is important to have multiple events for as many months as possible, as different respondents are likely to be more familiar with certain types of events (religious holidays, for example) than others (school terms, for example). Where the precise date of an event is known (for example, the National Independence Day always occurs on 12 July) the date should be recorded in parenthesis on the calendar. When the event covers multiple dates or weeks, try to specify what part(s) of the month(s) the event occurred (for example, early, mid or late September).

Field work in Malawi confirms that local calendars of events should be constructed for each District involved in the survey. The major religious holidays and events will remain the same, but locally specific events, relevant to smaller geographic areas need to be incorporated. Due to their specificity to certain areas, these types of events will need to be added for each specific geographic area and livelihood zone included in the survey or surveillance.

Thorough completion of the calendar is critical for the success of age estimation. The time spent building a comprehensive calendar of events is largely compensated by the time saved when using it.

3.2 SOURCES OF INFORMATION FOR COMPLETING THE CALENDAR

Use key informants, including community leaders, and religious leaders familiar with major political and climatic events occurring in the area. Key informants, such as traditional birth attendants, women with children under five years, health staff and school teachers should be consulted to add more unique events. The most locally specific events will probably include vaccination campaign days in the area, elections of local officials, openings of new schools or health clinics, disease outbreaks in the area (e.g. cholera). Focus groups comprised of diverse individuals can also be useful, particularly so that dates given by any one individual can be confirmed and validated by a larger group.

3.3 RECURRING YEARLY EVENTS

The suggested starting point for completing the local calendar of events is by filling in occasions which occur every year. These types of events include national and religious holidays and significant agricultural, livestock and climactic seasonal events. For national, local and religious holidays and occasions, a specific day, month and year when the event occurred should be recorded on the calendar. For agricultural, farming, livestock, fishing and other seasonal events, a specific date cannot usually be precisely identified. However, these events are still very useful for helping the mother recall the time of year when the birth occurred.

Recurring yearly events with exact dates

Usually these events are major national and religious[4] holidays or events of local significance, such as the start of the academic school year. Certain events, such as national holidays or the national Independence Day, may occur on the same date every year. Others, such as the start and end of Ramadan or beginning and close of the school year, may change every year. These types of events are useful as they occur on precise dates. The exact date of the religious or national holiday should be written into the calendar. For example, Somalia's Independence Day is celebrated on 26 June.

[4] In Islamic areas, care should be taken to correctly identify the Gregorian (Western) calendar month corresponding to the Islamic event. For example, the start of Ramadan shifts by two weeks every year and therefore does not always occur during the same month of the Gregorian calendar. For example, the start of Ramadan fell in the month of September in 2006 and 2007, but began in the month of October in 2005. There are several sources on the internet to help with correspondence of Islamic events and the Gregorian calendar. For a good example, see: http://www.factmonster.com/ipka/A0760942.html

Recurring yearly events with no specific date
Recurring yearly events will also include seasonal climatic events such as the rainy, dry, hot or windy seasons or other typical period. Additional events of this type such as agriculture and pastoral events (planting and harvesting seasons, mango season, lambing/kidding of sheep/goats, vaccination of livestock, etc.) should also be included. These types of events will not have an exact starting or ending date which can be included in the calendar. It is also very helpful to note years in which there were significant deviations from the normal pattern. Regional level agricultural centers can be helpful in identifying when these events typically occur. For example, there may be a year included in the calendar when the rainy season arrived exceptionally late or early or was shorter or longer than usual, this type of information should be noted in the calendar next to the specific year in which it happened.

3.4 EVENTS SPECIFIC TO JUST ONE MONTH OF ONE YEAR

In addition to events which reoccur every year, there may be some important events which occurred only once. These events are particularly helpful for ensuring the 'sandwich' has been identified for the correct year. Examples of this type are elections of political leaders, fires or significant storms. Additionally, these events may be very locally specific such as the marriage or death of a prominent person, or specific health campaigns or visit of a prominent official to the area. Although you may not be able to identify this type of event for each month, try to identify as many commonly known events as possible.

3.5 CHOOSING ONE MAJOR EVENT FOR THE YEAR

Once all of the events have been entered into the calendar, try to identify one event per year to serve as a major event which can help verify that the correct year of birth has been estimated. The major event for the year need not be specific to that country if there were some global events of major significance. Examples could include the tsunami, an important national election, or the death of a prominent figure. The major event can be highlighted in the month in which it occurred, and repeated in the heading row for the year (as was done in the calendar for Malawi in Annex 1). During training, interviewers can be taught to verify that the correct year of birth has been identified by referring to the birth occurring before or after this major event. The December 2004 tsunami was highlighted as a major event in Somalia. Taking the example of a child whose month and year of birth has been sandwiched between Somaliland Independence Day on 18 May and Independence Day from Britain on 26 June, 2004, the year of birth could be verified by asking a questions such as "It seems Ibrahim should have been born about six months before the tsunami disaster occurred, is this correct?"

In certain cultures (for example in China and parts of Somalia) there is a traditional way of naming years. In China, the period roughly corresponding to 2008 is called the year of the rat, while 2007 was the year of the pig. Some livelihood groups in Somalia, particularly pastoralists, give each lunar year a corresponding name of the day of the week. For example, the 'Sunday' year began in August 2007 and continued through July 2008. The previous year was 'Saturday' which began in August 2006

and ended in July 2007. Check with key informants in your area to find out if there is a system such as those common in China and parts of Somalia. If such a system exists, this information can be incorporated into the calendar to help ensure the correct year of birth is estimated.

It is important to be both aware of and sensitive to local customs for keeping track of time. For example a "year" for the survey mother does not necessarily begin on 1 January and end on 31 December, but may start with the harvest, the first rainfall, or some other type of event. In Somalia, the long rainy season of *Gu* is an important marker of time. Parents often remember the number of *Gu* seasons that have passed since the birth of a child. These customs should be discussed during survey training so that all enumerators can make the best use of this information.

Many cultures do not use the Gregorian (Western) calendar. Alternative calendars commonly used include the Islamic, Hebrew, Indian, Chinese and Ethiopian or Amharic. Contexts where the Gregorian calendar is not commonly used present additional challenges. Extra time needs to be budgeted for constructing the calendar and ensuring the accurate matching of Gregorian dates with dates used in the predominant calendar type. Extra time will also need to be budgeted for training and field practice.

Once a detailed local calendar has been developed, it can be updated every time a new survey is planned. If data collection will occur routinely, for example as part of monitoring or surveillance activities, the calendar will need to be updated periodically. In most situations, it would not be advisable to update the calendar more frequently than once every three months.

4

How to use the calendar

When using the local calendar of events to estimate the month and year of birth of the child, the goal is to narrow down the age of the child to the nearest month and year of birth. This is done by asking the mother a series of 'before and after' questions to identify two known events, one that occurred before and one that occurred after the child was born. Alternatively, an event that occurred at the time when the child was born could be used.

4.1 STEPS FOR USING THE CALENDAR OF EVENTS

It is necessary to use a calendar of events only if the date of birth has not been recorded (for example on a birth or baptismal certificate, health card or religious text) or is not remembered by a parent. If there is a written record, members of the household should be asked if this date is correct.

1. Ask parent(s) if the date of birth of the child is recorded somewhere (birth certificate, child health card, holy book). Get confirmation from the parent as to whether this record is correct before using it. [5]
2. Ask parent(s) if they know the date on which the child was born (avoid asking the question "how old is your child?").
3. If the answer to one and two are no, then you will need to estimate the month and year of birth of the child using a local calendar of events.

When it is necessary to estimate the child's month and year of birth, the following steps can serve as a guide[6]. These steps are also summarized in a decision tree format (see section 4.2).

- Begin by asking the mother if she remembers when the child was born.[7]
- This estimate is used as a starting point, and should be followed up with a series of before and after questions until you have isolated an event which occurred before and another event which occurred after the birth of the child (this is called "making the sandwich").
- Once a month and year of birth have been established, verify this date using a before and after question related to a major yearly event.
- If the gap in the sandwich is 2 months (for example, the month can be narrowed down to May or June, but not further) select one of the months randomly (flip a coin).

[5] There may be a disagreement between the date of birth as remembered by a parent and the date of birth as recorded on a written record. In such cases the discrepancy should be noted.

[6] Religious holidays are important local events. However, the interviewer has to be sensitive to the religion of the respondent as populations with different religions can be mixed in the same location.

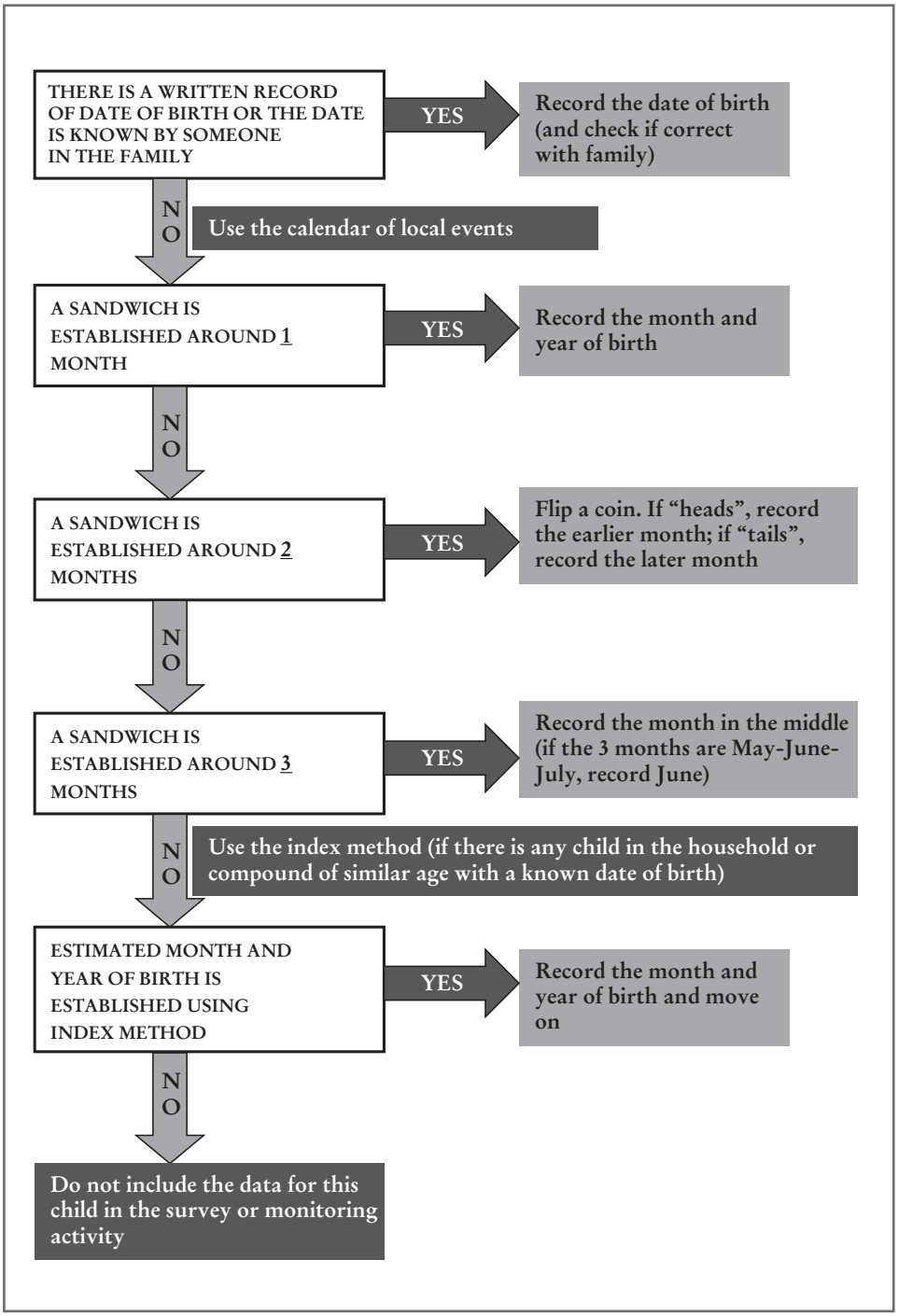
[7] If the response is a recurring yearly event, such as: "My child was born during the rainy season", then probe for the year with a follow up question (for example "Can you tell me what year that was?").

- If the gap in the sandwich is 3 months, select the month in the middle (for example, if the gap covers February, March, and April, then select March).
- If the gap in the sandwich is more than 3 months, use the index technique. Ask if there are other young children or siblings for whom the date of birth is known. Work from this known date to try to establish the month and year when the child was born.
- In most situations, if the gap cannot be reduced to 3 months or less and there are no other children in the household with a known date of birth, the data for that child should not be used in the survey or monitoring activity. The survey form should be designed with a space to record this information as it will be important for the overall survey results to monitor the number of ineligible children due to this problem.

The acceptable range of months for the gap in the sandwich may differ for various activities[8], depending on the level of precision required. The general recommendation in these guidelines is to allow for a maximum gap of three months. When the gap cannot be narrowed to less than 3 months, the technique of choosing the middle month, as described above, ensures that the error does not exceed one month. For example, if a 3 month gap covers May, June and July, then June is selected. If June was the actual month of birth, then the estimate is correct. If the actual month of birth was May or July, then the estimate is off by only one month.

[8] In survey contexts where the estimated age of the child in months is used to construct non-anthropometric indicators, such as those for infant and young child feeding and care practices, it may be useful to include children with a gap of more than three months. This decision should be discussed by the supervisory team before beginning enumerator training.

4.2 DECISION TREE - STEPS FOR ASSESSING MONTH AND YEAR OF BIRTH



5

Training of Survey Interviewers

To ensure accurate estimation of month and year of birth, interviewers or those responsible for monitoring activities must be adequately trained. A basic plan for a session covering this topic within an overall survey training program is outlined below. All training sessions should be adapted according to the local context and experience level and number of participants.

Approximate Time	Content	Materials
Minimum 3-4 hours	**Estimation of month and year of birth**	
[30 min]	• Intro: the importance of accuracy in determining the month and year of birth of a child	Presentation [trainer]
[15-20 min]	• Using written records	Health cards, birth certificates and examples of other written records
[45-60 min]	• Using a calendar of local events ==> Discussing and refining the calendar	Completed (draft) calendar of events [trainer]
[60-90 min]	==> Practicing with role play activities o Prepared role play dialogues o Semi-structured role plays	Prepared dialogues [trainers]
[30-45 min]	• Open discussion	
[15-20 min]	• Quality assurance	
[10-15 min]	• Preparing for field testing	Logistics (vehicles, team assignments, accommodations etc.)

5.1 DISCUSSING AND REFINING THE CALENDAR

The first aspect of training is to familiarize the interviewers with the calendar. Using the calendar of events developed for the survey, explain the information provided in each part of the calendar and ask for their help in filling in additional events. This exercise can also be useful for verifying the events and ensuring they are contextually appropriate.

To better understand the concept of estimating month and year of birth based on events, participants can be asked to divide into pairs and describe events that occurred during their own or their child's month and year of birth. For example, "I was born in summer. My sisters and brothers had their school holidays. In that year our king married. I also remember that it was the mango season." Examples can be discussed in plenary and any relevant events can be added to the calendar.

5.2 PRACTICING WITH ROLE PLAY ACTIVITIES

Once sufficient time has been spent going through the calendar, it is useful to go through a series of role play activities.

5.2.1 Role play dialogues

It is usually best for the trainers to start with several dialogues they have practiced beforehand. These should demonstrate both appropriate and inappropriate examples of interviewing techniques. Sample dialogues are provided below. The first dialogue emphasizes positive behaviors such as courtesy and attention to detail - presented in a manner that will build confidence and encourage those behaviors. The second emphasizes negative behaviors such as rudeness and carelessness - presented in a manner that participants will find somewhat ridiculous and should discourage those behaviors. These dialogues can be used as general examples, or adapted to reflect the local context (using relevant names and dates). The main point is to emphasize the appropriate and inappropriate interview techniques.

Sample dialogue 1: How to do an interview to determine month and year of birth

Interviewer (I): Do you have a record of when Patience was born?

Mother (M): I don't think so.

I: Do you have a birth certificate? A Health Card? Is the date of birth written anywhere - such as in the Holy Book?

M: We don't have any of those things here.

I: That is fine. Can you tell me what year Patience was born?

M: Patience is my firstborn child.

I: That is very good. What year was Patience born?

M: I think she is now four years old.

I: Good. Was Patience born before or after the President's wife came for her little sister's wedding? (*2 June 2004*)

M: Patience was already a baby when that happened.

I: Good. Was Patience born before or after Independence Day? (*24 January 2004*)

M: She was born after that.

I: Good. Was Patience born before or after the first rains? (*late March 2004*)

M: Before.

I: Was she born before or after the High School opened in Old Town? (*15 February 2004*)

M: Patience was born very soon before the High School opened. We think it is a sign she might go to that school some day.

I: That is a good sign. So, Patience was born in February 2004. Thank you.

Sample dialogue 2: How not to do an interview

Interviewer (I): Do you have a record of when this girl was born?

Mother (M): I don't think so.

I: Why not?

M: I don't know.

I: Just tell me how old that girl is.

M: Patience is my firstborn child.

I: Just tell me how old she is.

M: I think she is now four years old.

I: Are you sure?

M: Not really.

I: Then tell me how old she really is.

M: I told you Patience is four years old.

I: Four years is close enough. Next…

Additional structured dialogues showing practical examples linked to the calendar of local events for Malawi are provided in Annex 2.

5.2.2 Semi-structured role plays

Following the practiced dialogues, members of the group should practice by themselves in a semi-structured setting. To prepare for these exercises, write on separate pieces of paper a relevant name for a boy or girl, a month and year of birth (e.g. June 2006) and some brief suggestions for how the mother might behave. The following is an example, and there are additional examples in Annex 3.

> **Name of child**: Felicity
>
> **Month and year of birth**: February 2005
>
> **Suggestions**: You, as the mother, should be generally cooperative. However, you can ask some questions that are not relevant to the interview, such as "*How old are you?*" and "*Where does your family come from?*"

Everyone should have a copy of the local calendar of events in front of them for the semi-structured role play exercises.

- Ask for two volunteers from the group.
- Ask one volunteer to pretend to be the "mother" and the other to be the "interviewer" (it doesn't matter whether the volunteers are male or female; it is sometimes interesting to have men play the part of the mother).
- Explain that the interviewer should try to use only positive interview techniques and behaviours.
- Explain that the mother doesn't always have to be completely cooperative, but should not be deliberately contradictory (for example, the person playing the mother should not change the month or year of birth in the middle of the role play).
- Explain to the group that one of the trainers will be the "Stage Director" of the role play, and as Director can say "stop action" at any point and both volunteers should pause.
- Give one piece of paper to the mother without showing it to the interviewer, and give the mother some time to read and think for a moment.
- Explain that the first question the interviewer should ask is "*Please tell me the name of your child*" (assuming that the interviewers have learned about introductions in a different part of the training). Ask the larger group to remain quiet and observe the volunteers.
- If the interview starts to become either confused or particularly effective, the Director should say "stop action."
  ==> If the interviewer is unable to identify a month within an acceptable range after repeated questions, gently prompt him or her in the right direction. If that doesn't work, the Director should stop action again and suggest what parts of the interview could be done differently before re-starting the action.
  ==> If the mother is being excessively difficult or deliberately contradictory, the Director can stop action and offer advice as needed.

==> If either the interviewer or the mother demonstrates an interview technique that is notably positive, the Director can stop action and point it out for the group to discuss later.

Repeat this exercise with different volunteers until everyone is clear on the process. *Take as much time as necessary, as this is one of the most important parts of the training.*

5.3 PRACTICING IN FIELD TEST VILLAGES

During field testing, enumerators should have the opportunity for more practical experience with the tool. Ensure they are given sufficient time to use it properly and that a feedback exercise is provided after the field work. The calendar may be further adapted as a result of the field tests. Some of the events listed in the draft calendar may not have proven to be useful, and could be deleted. Other events might have been suggested by survey participants in the test villages, and should be added to the calendar.

The trainers should check the ages collected in the field testing to see if there is any tendency toward rounding out months representing whole or half year intervals (12, 24, 36, and 48 months) as this could indicate that probing is not occurring and enumerators need more practice with the technique. If this happens take some time to go over the process and emphasize the importance of finding the specific month the child was born.

6

Quality Enhancement checks

Quality enhancement checks are important both for surveys, and for surveillance. An analysis of the quality of anthropometric indicators from surveys in five countries found that errors in data collection were disproportionately attributed to a small number of survey teams (Bairagi and Langsten, 2008). Quality control should be undertaken during the course of field work and steps taken to remedy errors. These steps can include reinforcing how to use the local calendar of events and review of the importance of age estimation.

Supervisors should check the quality of age estimation during and after data collection. The purpose of checking during data collection is to detect and correct errors or inconsistencies on the survey forms while still in the survey area. When errors are caught early, it may be possible to go back to the household and correct the information. Once the team has left the survey area, it will be much more difficult to correct any errors. After data collection has been completed, it is possible to run checks on the full dataset to ensure that there have not been systematic errors. Moreover, the occurrence of age heaping should be investigated. If present, this would imply that the calendar of events was most likely not used.

6.1 QUALITY ENHANCEMENT DURING DATA COLLECTION

As the survey teams proceed, the supervisor should carefully review each completed questionnaire. The most common field errors are:

- Illegible handwriting on the survey form, making it difficult to read the digits correctly. Annex 3 shows standardized numbering which should be used for all numeric values written in on survey forms.
- Mixing information for different children if more than one child under the age of five years is eligible for the same mother.

6.2 QUALITY ENHANCEMENT AFTER DATA COLLECTION

Quality control checks can also be performed after data collection is complete, while this does not correct any existing errors, it can highlight areas for future improvement. "ENA for SMART" is a free software program which generates plausibility reports for anthropometric survey data. The following is an example of the plausibility of age estimation data generated by the ENA for SMART plausibility check program. [9]

[9] The software can be downloaded free of charge from the following link: http://www.nutrisurvey.de/ena/ena.html. In addition to providing information on the quality of age data, the software also provides information on the quality of height and weight measurements.

Example: Results from an ENA-SMART software plausibility check:

This sample output shows the likely errors in z-scores (anthropometric indices out of the range -3.0 - +3.0 z-scores) and provides an indication of which measurements (height, weight or age) are likely to be incorrect.

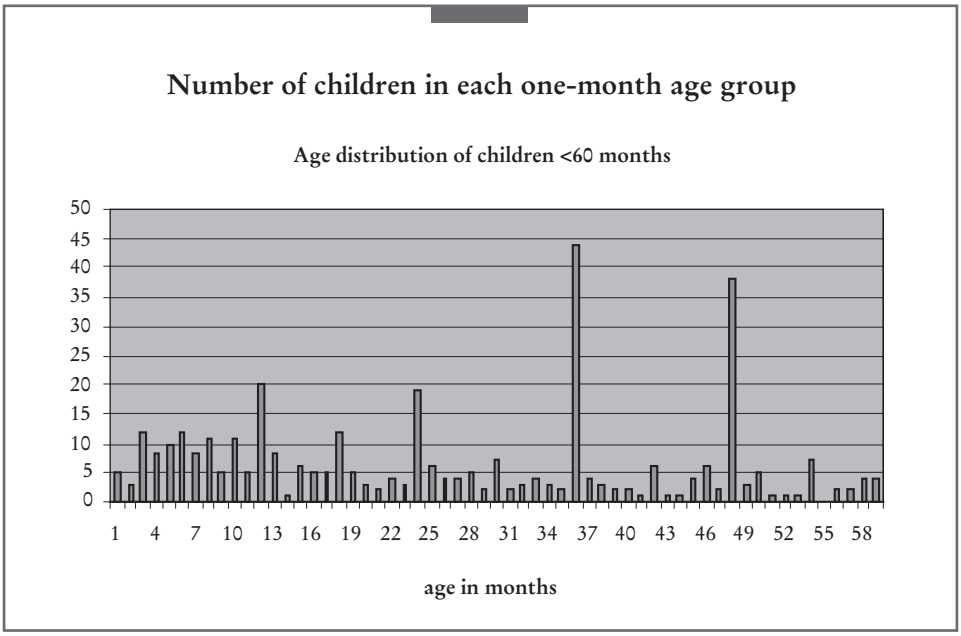
Line 4: height-for-age z-score (-6.561), age is probably incorrect

Line 26: height-for-age z-score (-4.109), age is probably incorrect

Line 31: height-for-age z-score (-5.073), age is probably incorrect

Line 64: weight-for-age z-score (-5.34), age is probably incorrect

Age distribution:
This graph illustrates a survey with age heaping.



These examples can also be incorporated into training exercises prior to conducting the survey to illustrate how the quality of the anthropometric data can be assessed through computerized program.

ANNEX 1

Example of Completed Calendar for Malawi (area of Lilongwe) June 2008

Year and Month of Birth:	Age in Months:	Local Events
2008		**Year the National Census took place (8 June, 2008)**
June	0	**National Population census (8 June)** Child Health Days (vitamin A, deworming - early June)
May	1	**Kamuzu Day (14 May)** Labour Day (1 May) Harvesting Xenophobia in South Africa (end May)
April	2	**Second school term starts (17 April)** Western/burley /flue cured tobacco stalk uprooting Newcastle disease vaccination
March	3	**Easter (23 March)** First school term ends (17 March) Auction floors open
February	4	**Critical hunger period** Green maize (mid February) Compost making
January	5	John Chilembwe day (15 January) First school term starts (7 January) **New Year (1 January)** "Banking and top dressing"
2007		**Year the First Lady died (28 May, 2007)**
December	6	**Christmas (25 December)** Eid al-Adha (20 December) World Aids Day (1 December) Child Health Days (vitamin A, deworming- early December)
November	7	Planting rains (mid November) **Third fertilizer subsidy - coupons (early November)** Third school term ends (23 November)

October	8	26 **Alliance for Democracy** (AFORD) **members** in a road accident (20 October) World Food Day (16 October) Eid al-Fitr (12 October) **Mother's day (8 October)**
September	9	**Garden preparation** Start of Ramadan (13 September) Land conservation campaigns
August	10	**Tobacco nursery establishment (end August)** Third school term begins (27 August) Newcastle disease vaccination
July	11	Second school term ends (27 July) National Education Day (19 July) **Independence Day (6 July)**
June	12	Freedom Day (14 June) **Child Health Days (vitamin A, deworming - early June)** Clearing of graveyards
May	13	**First lady dies (28 May)** Labour day (1 May) Harvesting Livestock deworming
April	14	Start harvesting Second school term begins (30 April) **Easter (8 April)** First school term ends (5 April)
March	15	**Martyr's day (3 March)** Auction floors open
February	16	**Critical hunger period** Green Maize (mid February) Compost making
January	17	John Chilembwe day (15 January) First school term starts (8 January) **New Year (1 January)** "Banking and top dressing"
2006		**Year Madonna adopted David Banda**
December	18	Eid al-Adha (31 December) **Christmas (25 December)** World Aids Day (1 December) Child Health Days (vitamin A, deworming- early December)
November	19	Planting rains **Second fertilizer subsidy (coupons from mid November)** Third school term ends (10 November)

October	20	**Madonna controversially adopts David Banda** Eid al-Fitr (23 October) World Food Day (16 Oct) **Mother's day (9 October)**
September	21	Start of Ramadan (23 September) **Garden Preparations** Manure application Land conservation campaigns
August	22	Tobacco nursery establishment **Third school term starts (21 August)** Newcastle disease vaccination
July	23	Former President Bakili Muluzi arrested for corruption Second school term ends (21 July) National Education Day (19 July) **Independence Day (6 July)**
June	24	Freedom day (14 June) Clearing of graveyard **Child Health Days (vitamin A, deworming- early June)**
May	25	**Visit of President Mugabe to Malawi (4 May)** Second school term starts (2 May) Labour day (1 May)
April	26	**Easter (16 April)** Vice President Cassim Chilumpha arrested on treason charges (28 April) Harvesting starts
March	27	First school term ends (24 March) **Martyrs day (3 March)** Auction floors open
February	28	**Critical hunger period** Green maize (mid February) Compost making
January	29	John Chilembwe day (15 January) Eid al-Adha (10 January) First school term starts (8 January) **New Year (1 January)** "Banking and top dressing"
2005		**Year Pope John Paul 2nd died (2 April, 2005)**
December	30	**Christmas (25 December)** First weeding (end December)
November	31	**Third school term ends (11 November)** Eid al-Fitr (5 November) Child Health Days (vitamin A, deworming- end November)

October	32	World Food Day (16 October) Start of Ramadan (5 October) **Mother's day (10 October)** First fertilizer subsidy (coupons)
September	33	**Garden preparations** Closing of Auction floors (end of September) Land conservation campaigns
August	34	Tobacco nursery establishment **Third school term starts (29 August)** Newcastle disease vaccination
July	35	Second school term ends (29 July) National Education Day (19 July) Measles campaign (mid July) **Independence Day (6 July)**
June	36	**Freedom day (14 June)** Clearing of graveyard Child Health Days (vitamin A, deworming- early June)
May	37	**Labour day (1 May)** Harvesting
April	38	Start harvesting Second school term begins (18 April) **Pope John Paul 2nd dies (2 April)**
March	39	Auction Floors open **Easter (27 March)** First school term ends (24 March) Martyrs day (3 March)
February	40	**Critical hunger period** Green maize (mid February) Compost making
January	41	Eid al-Adha (21 January) John Chilembwe day (15 January) First school term starts (4 January) **New Year (1 January)** "Banking and top dressing"
2004		**Third multiparty elections (17 May, 2004)**
December	42	**Christmas (25 December)** First weeding (end December)
November	43	Third school term ends (19 November) Eid al-Fitr (14 November) **Planting rains** Termination of fasting (first week of November) Child Health Days (vitamin A, deworming- end November)

October	44	World Food Day (16 October) Start of Ramadan (16 October) **Mothers day (11 October)**
September	45	**Garden Preparations** Closing of Auction floors (end of September) Land conservation campaigns
August	46	Tobacco nursery establishment **Third school term starts (23 August)** Newcastle disease vaccination
July	47	Second school term ends (21 July) National Education Day (19 July) Measles campaign (mid July) **Independence Day (6 July)**
June	48	Peak of cold season **Freedom Day (14 June)** Clearing of graveyard Child Health Days (vitamin A, deworming- early June)
May	49	**Third multi- party elections (17 May)** Second school term begins (2 May) Labour day (1 May) Harvesting
April	50	Start harvesting **Easter 11 April** First school term ands (8 April)
March	51	Auction Floors open **Martyr's day (3 March)**
February	52	**Critical hunger period** Eid al-Adha (1 February) Green maize Compost making
January	53	John Chilembwe day (15 January) First school term starts (5 January) **New Year (1 January)** "Banking and top dressing"
2003		**Campaigns for the third multiparty elections**
December	54	**Christmas (25 December)** First weeding (end December)
November	55	Planting rains Eid al-Fitr (25 November) **Third school term ends (21 November)** Child Health Days (vitamin A, deworming- end November)
October	56	Ramadan begins (27 October) **Mothers day (10 October)** Ridging

September	57	**Garden Preparations** Manure application Land conservation campaigns
August	58	Tobacco nursery establishment **Third school term starts (25 August)** Newcastle disease vaccination
July	59	Second school term starts (25 July) National Education Day (19 July) **Independence day (6 July)**
June	Too old	**Freedom day (14 June)** Clearing of graveyard Child Health Days (vitamin A, deworming - early June)
May	Too old	Labour day (1 May)

Note:
- Date for "Mother's Day" changes each year because it is on the second Monday of October.
- Beginning in 2008 "Freedom Day (14 June)" will no longer be celebrated.

ANNEX 2

Role play dialogues - Practical examples using the calendar for Malawi

During the training, participants should have copies of the calendar of local events for Malawi (Annex 1) in front of them so that they can follow. The dialogues begin with the assumption that the Interviewer has already asked for a written record of the date of birth, that no record is available, and that the Interviewer has already made an introduction and knows the name of the child from an earlier part of the interview. The comments written in *italics* explain what the Interviewer is thinking, and are not a spoken part of the dialogues.

Example 2.1: A sandwich that is relatively easy to make

Interviewer (I): Can you tell me what year Jacob was born?

Mother (M): Jacob is 2 years old.

I: (*That would be approximately June of 2006. I will start by confirming the year, using the main event for 2006 highlighted in the calendar*) Is that the same year that Madonna adopted David Banda?

M: Yes. It was.

I: (*That confirms the year was 2006. Now I will try to get the first half of the sandwich, starting with the main event for June 2006*) Was Jacob born before or after the Child Health Days?

M: It was before that.

I: (*That means June could be the first half of the sandwich. I'll check the main event for May*) Good. Was he born before or after the visit of President Mugabe to Malawi?

M: Before Mugabe came here.

I: (*Now 4 May could be the first half of the sandwich, but I have to check the main event for April*) Good. Was Jacob born before or after Easter?

M: After.

I: (*That means the sandwich is made. The first half of the sandwich is May, and the second half is April. I will flip a coin - it is "heads" which means I select the later month - May*)

Thank you. That was very helpful. We will say that Jacob was born in May 2006.

Example 2.2: A sandwich that is relatively difficult to make

Interviewer (I): Can you tell me what year Mary was born?

Mother (M): I'm not sure what year, but Mary is 4 years old.

I: (*That would be around June of 2004. I'll confirm the year*) Was Mary born in the year of the third multi-party elections?

M: Yes.

I: (*Then I will start with the main event in June*) Was Mary born before or after Freedom Day?

M: I don't remember that.

I: (*Then I'll try the other events in June*) Was she born before or after the peak of the cold season?

M: After that.

I: (*So June could be the first half of the sandwich. Now I will check the main event for July*) Was Mary born before or after Independence Day?

M: Sorry, I don't know.

I: That's OK (*Then I will check the main event for August*) Was she born before or after the third school term started?

M: I don't have any children in school yet, so I don't notice those times.

I: OK (*Then I will check the main event for September*) Was Mary born before or after the garden preparations?

M: Before the garden preparations.

I: OK (*We finally have the second half of the sandwich, but the gap is too wide. I'll work back through the other events in September*) Was Mary born before or after the closing of the auction floors?

M: Before.

I: Was she born before or after the land conservation campaign?

M: I don't remember. I am becoming forgetful like my own mother.

I: Don't worry. We will keep trying. Was Mary born before or after the time when the tobacco nurseries were established?

M: Before.

I: Good (*The gap is closing a bit*). Was she born before or after the chickens were given the injection against disease?

M: Before.

I: Good. (*The gap is closing some more*) Was Mary born before or after the second school term ended?

M: I don't remember.

I: That's OK. You already said you don't have any children in school. Was Mary born before or after National Education Day?

M: Sorry, I don't remember.

I: Don't worry we're almost finished. Was she born before or after the measles campaign?

M: I don't know.

I: That's OK (*I think we are done. The first half of the sandwich was the peak of the cold season in June, and the second half was the tobacco nurseries in August. The gap covers part of June, all of July, and part of August. As I have learned to select the month in the middle, I will write July.*)

Thank you. We will say that Mary was born in July 2004.

ANNEX 3

Samples of Semi-Structured Role Plays

These examples should be adapted to reflect the local context (using relevant names and dates). Prepare enough examples to cover the number of interviewers being trained. For example, if twelve interviewers are being trained, prepare twelve to fourteen examples.

Name of child: Adam

Month and year of birth: March 2007

Suggestions: You, as the mother, should be generally cooperative. However, be vague and confused about any dates related to politics (such as anything the President did, or when elections took place, etc.) saying, *"I do not remember those things".*

Name of child: Samuel

Month and year of birth: July 2003

Suggestions: You, as the mother, are being distracted by something in the background (children playing, a barking dog). You can say something such as *"What? I already told you Sam is four years old*. If the interviewer is patient, start being more helpful and pay better attention.

Name of child: Faith

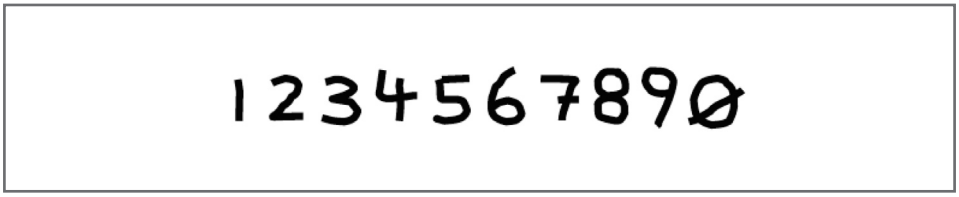
Month and year of birth: December 2005

Suggestions: You, as the mother, should be quite shy. Speak softly and avoid eye contact. You should be most responsive to religious holidays or events of any denomination (for example, you are familiar with both Christian and Muslim holidays).

ANNEX 4

Standardized way of writing digits

It is important that all interviewers and supervisors write numbers in the same way. During the training, members of the survey team should practice writing numbers in the following manner:



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