

# Rapid Assessment Method for Older People (RAM-OP): The Manual

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# The RAM-OP Manual





# Introduction

Older people (generally defined as people aged sixty years and older) are a vulnerable group for malnutrition in humanitarian and developmental contexts. Due to their age they have specific nutritional needs, such as easily digestible and palatable food adapted to those with chewing problems, which is dense in nutrients. In famine and displacement situations where populations are dependent on food distributions, older people often find the general ration inappropriate to their tastes and needs, have difficulties accessing the distributions, or have difficulties transporting rations home. As a result, older people can become malnourished and in need of specifically targeted food interventions. In times of drought or food scarcity, older people tend to reduce their food intake in order to share or give up their ration to younger members of their families. They are then at risk of malnutrition.

Despite these potential vulnerabilities in humanitarian situations, older people are rarely identified as a group in need of specific nutritional or food assistance. Surveys and assessments almost always focus on children, and sometimes on pregnant and lactating women. Humanitarian workers argue that assessing the nutritional status and needs of older people is both costly and complicated. As a consequence, the nutritional status and needs of older people in crisis go unidentified and unaddressed.

HelpAge International, VALID International, and Brixton Health, with financial assistance from the Humanitarian Innovation Fund (HIF), have developed a Rapid Assessment Method for Older People (RAM-OP) that provides accurate and reliable estimates of the needs of older people. The method uses simple procedures, in a short time frame (i.e. about two weeks including training, data collection, data entry, and data analysis), and at considerably lower cost than other methods. The RAM-OP method is based on the following principles:

- Use of a familiar “household survey” design employing a two-stage cluster sample design optimised to allow the use of a small primary sample ( $m = 16$  clusters) and a small overall ( $n = 192$ ) sample.
- Assessment of multiple dimensions of need in older people (including prevalence of global, moderate and severe acute malnutrition) using, whenever possible, standard and well-tested indicators and question sets.
- Data analysis performed using modern computer-intensive methods to allow estimates of indicator levels to be made with useful precision using a small sample size.

The following tools are currently available under the General Public Licence / Free Documentation License, meaning that you are free to copy and adapt these tools:

- an English language manual / guidebook
- a questionnaire (available in English and French)
- data entry and data checking software (available in English and French)

- data analysis software.

We believe that the availability of a rapid, low-cost, and user-friendly method will encourage governments, UN agencies, as well as international and local non-governmental organisations to actively assess the situation of older people in humanitarian contexts, and implement, monitor, and evaluate relevant and timely responses to address their needs.

# Chapter 1

## Sampling

### 1.1 The RAM-OP sample

RAM-OP uses a two-stage sample:

**First stage sample:** A sample of communities (e.g. villages or city-blocks) in the survey area is taken. A sampled community is also called a primary sampling unit (PSU).

**Second stage sample:** Domestic dwellings are sampled from within the communities selected in the first stage sample. All eligible individuals in the sampled dwelling are included in the sample.

#### 1.1.1 The first-stage sample

The first stage sample is a systematic spatial sample. Two methods can be used and both methods take the sample from all parts of the survey area:

- **List-based method:** Communities to be sampled are selected systematically from a complete list of communities in the survey area. This list of communities is sorted by one or more non-overlapping spatial factors such as district and subdistricts within districts:



Figure 1.1: Communities listing by district and sub-district

- **Map-based method:** Communities to be sampled are selected from the centres of the squares of a grid drawn over a map. The map must be sufficiently well made and of sufficiently large scale to show the position of every community in the survey area. This type of sample is known as a centric systematic area sample and is often referred to as a CSAS sample.

**Note:** *Population proportional sampling* (PPS) is **not** used in RAM-OP surveys. Population estimates for all communities are **not** required for sampling purposes. Population estimates are required only for the selected communities. These are used during data analysis in order to weight results by population size. If this information is not available before the survey, it can be collected during the survey.

### 1.1.2 The second stage sample

The second stage within-community sample uses a method called map-segment-sample. This method takes the within-community sample from all parts of a sampled community.

## 1.2 Implicit stratification

Both the first and second stage samples use a form of spatial stratification:

- The list-based method's first stage systematic spatial sample stratifies the sample by non-overlapping spatial factor such as districts and subdistricts within districts.
- The map-based (CSAS) method's first stage sample stratifies the sample by grid square.
- The map-segment-sample second stage within-community sample stratifies the sample by parts of the community being sampled.

- The first and second stage samples also ensure that a reasonably even spatial sample is taken from the entire survey area and from each of the sampled communities.

These sampling procedures provide *implicit stratification* and tend to spread the sample properly among important sub-groups of the population such as rural / urban / peri-urban populations, administrative areas, ethnic sub-populations, religious sub-populations, and socio-economic groups. This often improves the precision of estimates made from survey data.

The use of implicit stratification improves the efficiency of a two-stage cluster sample and allows RAM-OP to use relatively small sample sizes compared to other methods, such as SMART surveys. The use of modern computer-intensive data analysis techniques also allows RAM-OP to make better use of the available sample than is done in other methods.

## 1.3 RAM-OP survey sample size

The following shorthand symbols will be used when describing sample designs:

$m$  = Number of primary sampling units (PSUs).

$n$  = Size of the sample of individuals or households from a PSU.

$n$  = May also mean the overall survey sample size (this meaning will be made clear in the text).

$N$  = Population

The overall sample size for a RAM-OP survey is about  $n = 192$  individual subjects. You should aim to collect an overall sample of at least  $n = 192$  individuals.

The RAM-OP sample is collected in two stages:

- The first stage sample uses a sample size of about  $m = 16$  communities (or PSUs).
- The second stage sample uses a sample size of about  $n = 12$  eligible subjects sampled from each of the communities selected for inclusion in the first stage sample.

The overall sample size from  $m = 16$  communities and  $n = 12$  eligible subjects is about:

$$\text{overall sample size} \approx m \times n \approx 16 \times 12 \approx 192$$

It is not recommended that fewer than  $m = 16$  communities are sampled.

## 1.4 RAM-OP survey sample size

Sampling fewer than  $m = 16$  communities will tend to reduce the precision with which estimates can be made. If you have the resources to sample more than  $m = 16$  communities then you should do so. A sample of  $m = 24$  communities and  $n = 8$  eligible subjects, for example, will tend to yield estimates with better precision than a sample with  $m = 16$  communities and  $n = 12$  eligible subjects.

Do not be tempted to increase the size of the within-community sample in order to achieve an overall sample size of  $n = 192$  from fewer than  $m = 16$  communities. Doing so will tend to

reduce the precision with which estimates are made. It may also be impossible to do this in many settings.

Here, for example, is a *population pyramid* for a typical developing country:

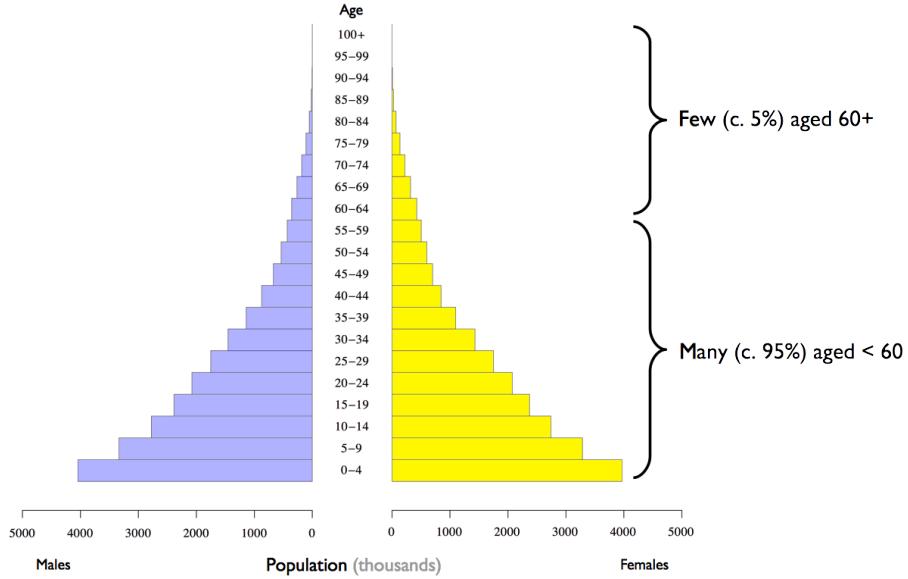


Figure 1.2: Population pyramid for a typical developing country

If the average community population is  $N = 300$  then there will be fewer than 15 people aged 60 years and older in about half of the selected communities. This is because about half of the selected communities are likely to have a population below the average population.

## 1.5 Eligibility

Older people are usually defined as persons aged 60 years and older (UN definition). This means your sample will usually be restricted to people aged 60 years and older.

In some settings different eligibility criteria may apply. This will likely be the case in settings with very high life-expectancies (usually middle and high income countries) or very low life-expectancies (usually low income countries and in emergencies).

In a setting of very high life-expectancy you may want to restrict eligibility - to persons aged 65 years or older, for example. A local definition of older people is likely to be available.

In a setting with very low life-expectancy, very few people are aged 60 years or older. For example:

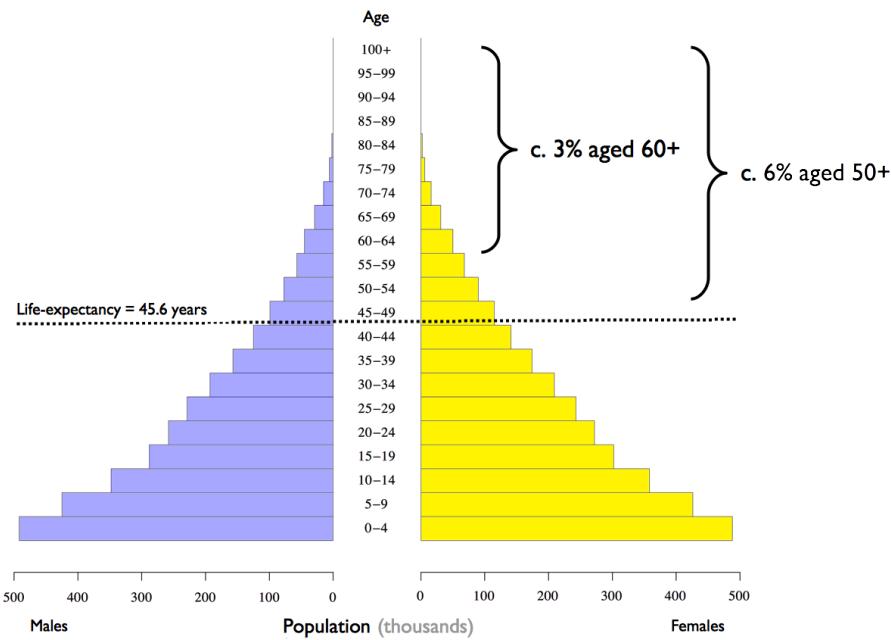


Figure 1.3: Population pyramid for a setting with low life-expectancy

It is common in such setting for there to be a local definition of older people. This will usually be “persons aged 50 years or older” or “persons aged 55 years or older”.

## 1.6 Age distribution, eligibility criteria, and sample design

The age distribution of the population and the survey eligibility criteria will affect the sample design in terms of the number of communities that you will need to sample ( $m$ ) and the number of older persons ( $n$ ) that can be sampled from each community.

The overall sample size for a RAM-OP sample should be at least  $n = 192$  usually collected as  $n = 12$  eligible subjects sampled from  $m = 16$  communities. If older people make up a very small proportion (i.e. much less than 5%) of the total population and / or the average population of communities is small then you will usually need to sample more than  $m = 16$  communities in order to get about  $n = 192$  older people in the overall sample. This is likely to occur when there are fewer than 20 to 25 older people in a community of average size.

You can calculate the number of older people that you would expect to be living in a community of average size using the following formula:

$$n_{\text{aged } 60+ \text{ in an average village}} = \text{average village population}_{\text{all ages}} \times \frac{\text{percentage of population}_{\text{aged } 60+}}{100}$$

If this is below about 20 people then you should consider how you will collect the required overall sample size. Three approaches may be used:

- **Relax the eligibility criteria:** You may decide to define older people as “persons aged 50 years or older” or “persons aged 55 years or older”. This may double the size

of the eligible population and make the sample easier to collect. This approach is only reasonable if life-expectancy is low.

- **Increase the number of communities that you plan to sample:** You may choose to collect your sample as  $n = 7$  eligible subjects sampled from  $m = 30$  communities giving an expected overall sample size of  $n = 210$ . This would be a very good sample. The disadvantage of this approach is that survey costs increase with the number of communities that are sampled, because a lot of survey time and vehicle costs are spent on travelling to and from the selected communities.
- **Take a “top-up” sample only when you need to:** The basic procedure when a selected community is small and likely to contain fewer than  $n = 12$  older people is to collect data on all older people in the selected community using a door-to-door census. If the within-community sample size is much smaller than the required one then a “top-up” sample is taken from the nearest neighbouring community using the map-segment-sample method (or a door-to-door census if this community is also small). The advantage of this approach is that travelling time and survey costs are better controlled.

If the proportion of older people is not very small and / or communities are large then you should have no problems achieving the overall sample size.

## 1.7 Practical sampling

### 1.7.1 The first stage sample - list-based sampling

The first stage sample can be drawn from a list of all communities. The list-based sample is a simple systematic sample taken from a complete list of communities in the survey area sorted by one or more non-overlapping spatial factors (such as administrative units or electoral wards) in the survey area. *Population proportional sampling* (PPS) is not used since this would concentrate the sample in the larger communities.

Below is a worked example of how a RAM-OP first stage, list-based sample can be drawn from a survey area composed of 67 villages.

**Step 1:** Calculate the *sampling interval* by dividing the total villages in the survey area (67 villages) with the number of villages to be drawn from the sample (16 villages).

$$\text{Sampling Interval} = \left\lfloor \frac{N_{\text{villages}}}{N_{\text{sample}}} \right\rfloor = \left\lfloor \frac{67}{16} \right\rfloor \approx \lfloor 4.19 \rfloor \approx 4$$

The *sampling interval* needs to be a whole number. Remember to **always round down** when calculating the *sampling interval* to the nearest whole number.

**Step 2:** Choose a *random starting point* between 1 and *sampling interval*. In this example, this would be a random number **between 1 and 4**.

A random number can be selected through simple lottery (i.e., draw from a lot of 4 numbered from 1 to 4). A standard spreadsheet software can also be used to draw the random number using the `RANDBETWEEN` function as follows:

`RANDBETWEEN(1, 4)`

**Step 3:** Using the *random starting point* and the *sampling interval*, select the sampling villages from a list of all villages organised/sorted by a **non-overlapping** spatial factor such as district or sub-district.



Figure 1.4: Selection of sampling villages using lists

This procedure will sometimes select more than 16 communities. In this example, seventeen villages (i.e. at positions 2, 6, 10, 14, 18, 22, 26, 30, 34, 38, 42, 46, 50, 54, 58, 62, and 66 in the list) will be selected. When this happens you should sample **all** of the selected communities.

### 1.7.2 The first stage sample - map-based sampling

An alternative approach to list-based sampling is to use map-based sampling. The map-based (CSAS) sample selects communities from the centre of squares of a grid drawn over a map. The map must be sufficiently well made and of sufficiently large scale to show the position of **all** communities in the survey area.

A square grid is drawn over the map. The size of the grid squares should be small enough so that the number of squares covering the survey area is the same as (or very similar to) the number of communities that you plan to sample. You may need to experiment with different grid sizes to achieve this. Figure 1.6 shows an example map and grid with  $m = 16$  grid squares.

The sample is drawn by selecting the community that is located closest to the centre of each grid square:

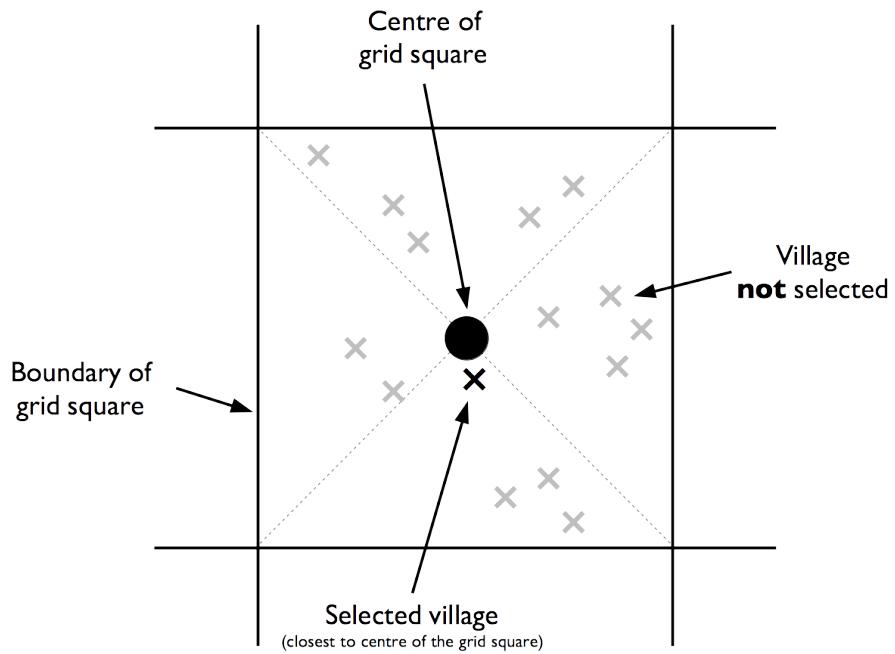


Figure 1.5: Selection of sampling villages using maps

If two or more villages are located the same distance from the centre of a grid square then a single village is picked at random, by tossing a coin for example.

Figure 1.7 shows the sample selected by this process for the area shown in Figure 1.6.



Figure 1.6: Drawing a square grid over the map



Figure 1.7: Drawing the first-stage CSAS sample

Both the list-based and the map-based (CSAS) sampling methods spread the sample of communities evenly across the entire survey area. Each community has an equal chance of being included in the sample. Population proportional sampling (PPS) is not used since this would concentrate the sample in the larger communities.

The same method can be used when sampling in urban contexts. Figure 1.8 shows a sample drawn from a list of census enumeration areas sorted by administrative district. Figure 1.9 shows a sample drawn using the map- based (CSAS) method. In both cases the primary sampling units (PSUs) are census enumeration areas.

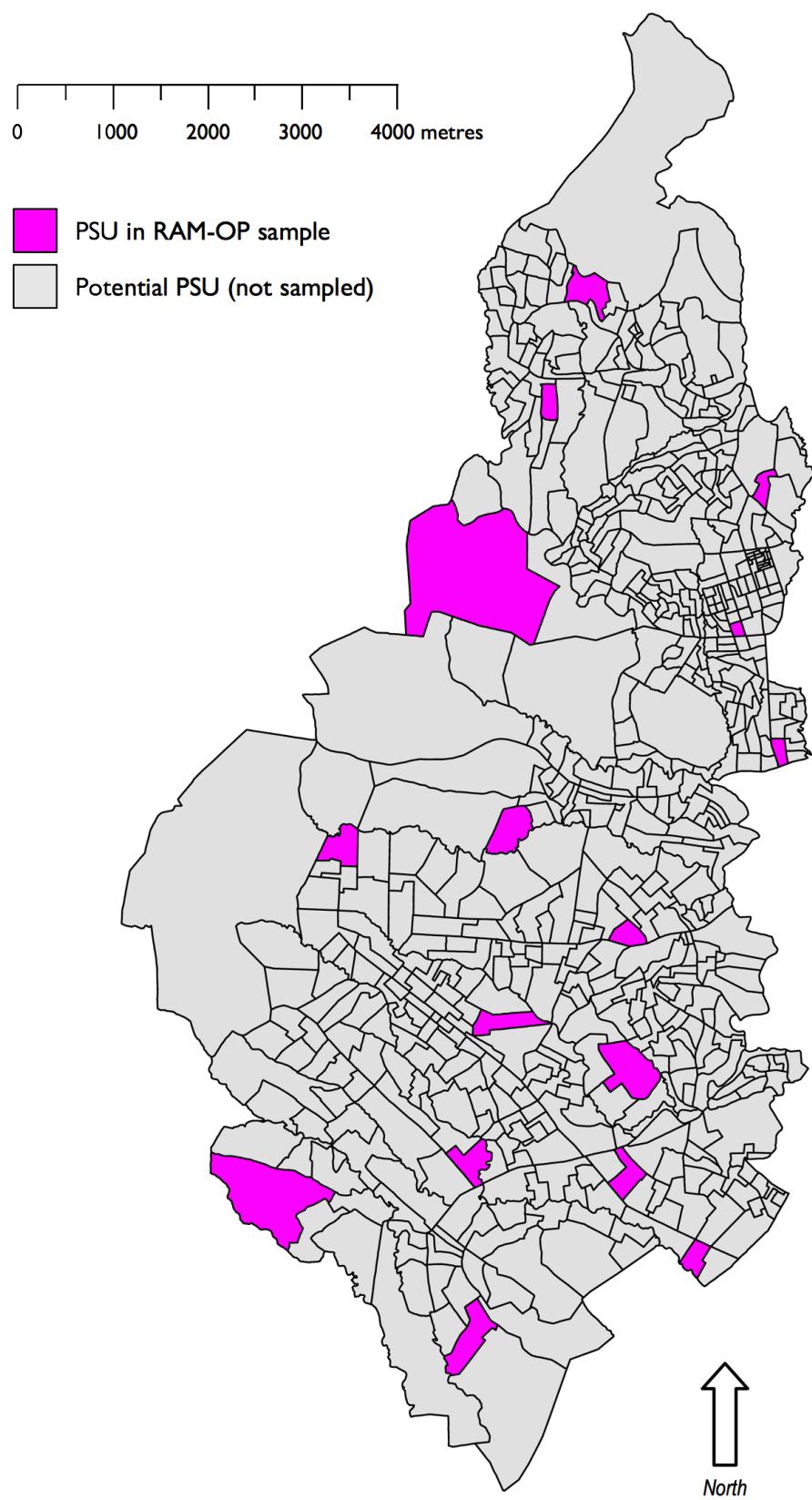


Figure 1.8: Example of an urban sample (list-based)

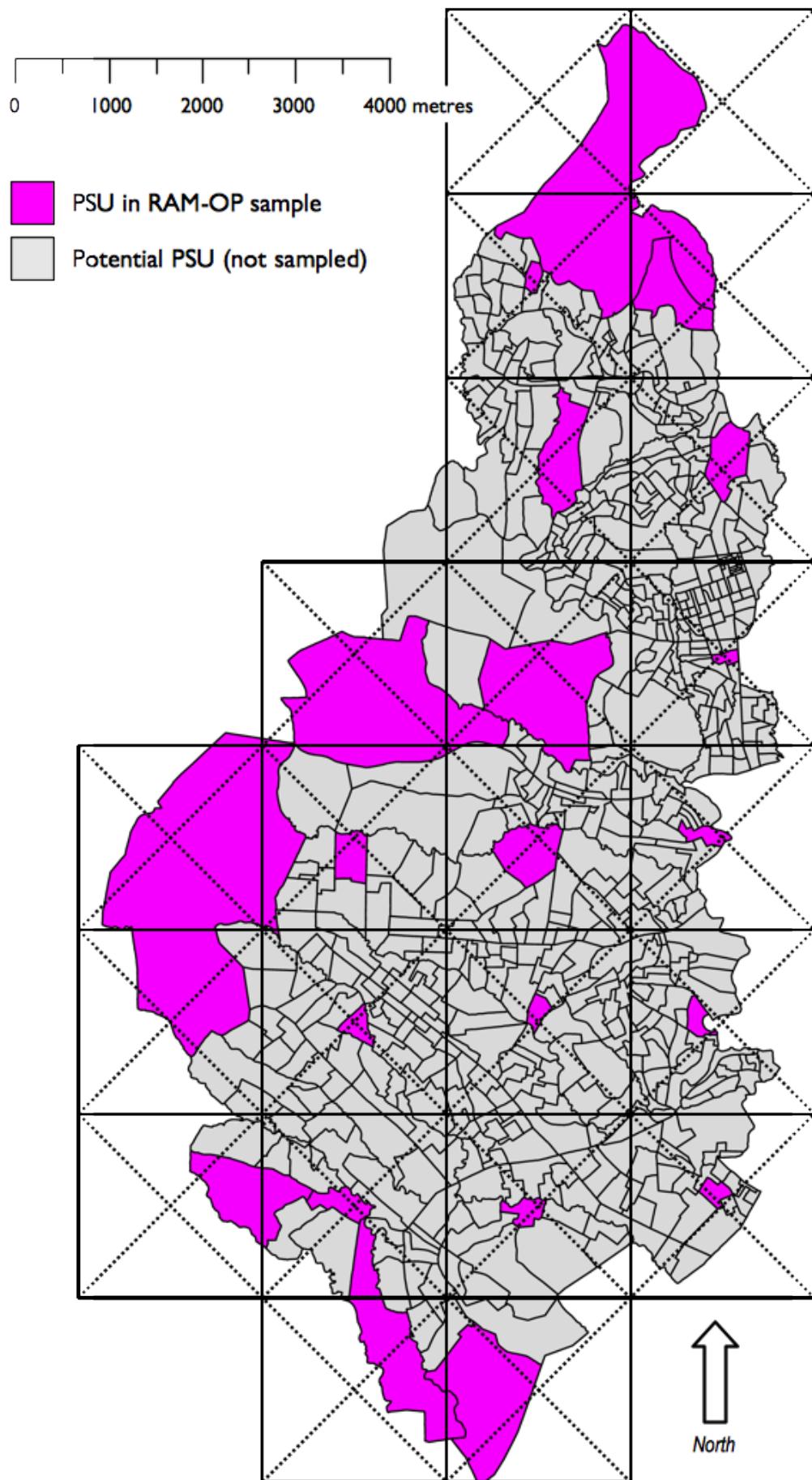


Figure 1.9: Example of an urban sample (map-based)

**Note:** In this example twenty-one (21) blocks have been selected. It can be difficult to achieve exactly the number of blocks that you need when using this type of sample. It is best to select more rather than fewer blocks than you need. Here we would take our sample as  $n = 10$  individuals from  $m = 21$  blocks (overall  $n = 210$ ).

### 1.7.3 The second stage (within-community) sample

The second stage (within-community) sample uses a map-segment-sample approach:

**Map:** Make a rough map of the community to be sampled. It is helpful to think of communities as being made of ribbons (i.e. lines of dwellings located along roads, tracks, or rivers) and clusters of dwellings.

Here is an example of a ribbon of dwellings:



Figure 1.10: Example of a ribbon of dwellings

Here is an example of a cluster of dwellings:

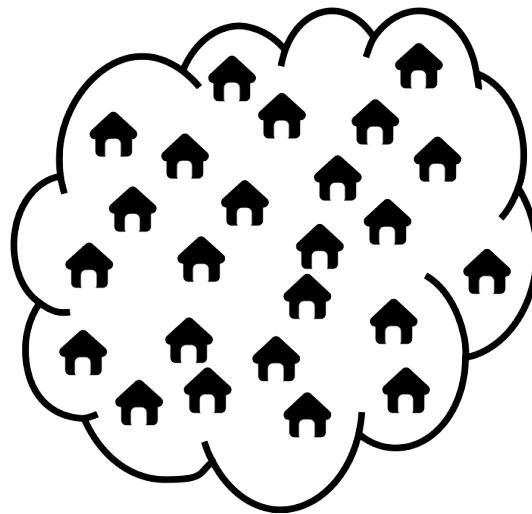


Figure 1.11: Example of a cluster of dwellings

**Segment:** Divide the community into ribbon and cluster segments defined by the physical layout of the community being sampled.

**Sample:** Ribbons and clusters are sampled in different ways:

- **Ribbons** are sampled using **systematic sampling**.
- **Clusters** are sampled using a **random walk** method.

**Note:** If a small community is selected that is likely to have fewer than the required number of eligible persons then **all** eligible persons in that community are sampled by moving door-to-door.

### 1.7.4 Mapping the community - single and multiple clusters

Some communities consist of a single cluster of dwellings:

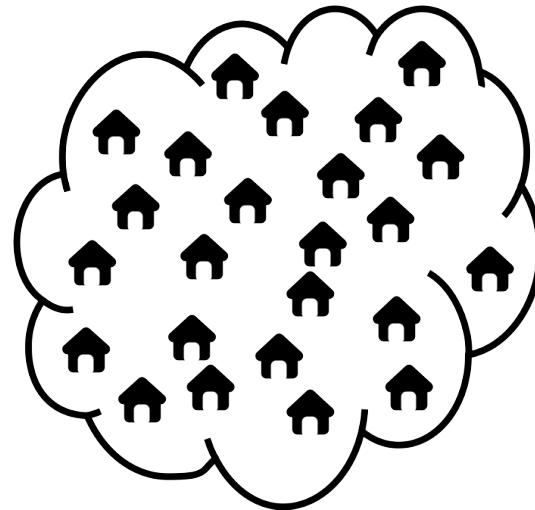


Figure 1.12: Example of a cluster of dwellings

or a set of clusters of dwellings:

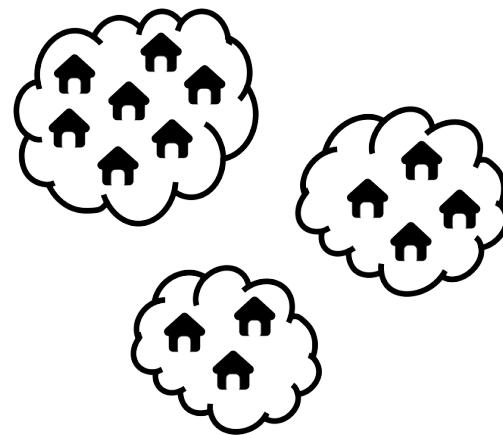


Figure 1.13: Example of a set of clusters of dwellings

For communities (or parts of communities) structured in this way we use a sampling method called the **random walk**.

### 1.7.5 Mapping the community - ribbon communities

Ribbon communities have dwellings arranged in a line:



Figure 1.14: Dwellings arranged in a line

or in a several lines:



Figure 1.15: Dwellings arranged in several lines

For communities (or parts of communities) structured in this way we use a sampling method called **systematic sampling**.

### 1.7.6 Mapping the community - mixed communities

Some communities are a mixture of clusters and ribbons:



Figure 1.16: Mixture of clusters and ribbons

For mixed communities we use a mixture of the **random walk** method (in the clusters) and **systematic sampling** (along the ribbons).

**Segmentation** involves dividing a community into several parts and taking part of the within-community sample from each **segment**. With simple communities, segmentation is not required and we take a single sample from the entire community using the appropriate sampling method.

### 1.7.7 Segmentation

For more complicated communities we divide the community into several parts or segments, such as a community made up of several clusters:

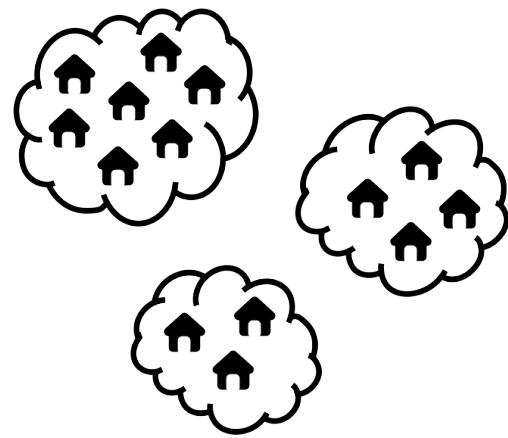


Figure 1.17: Example of a set of clusters of dwellings

or a community made up of several ribbons:

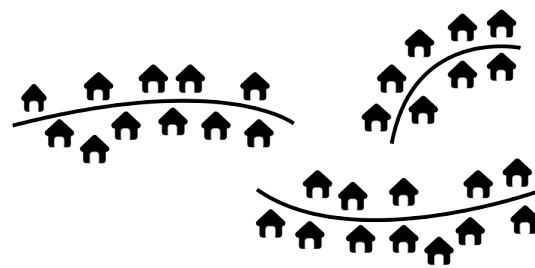


Figure 1.18: Dwellings arranged in several lines

or a mixed community:

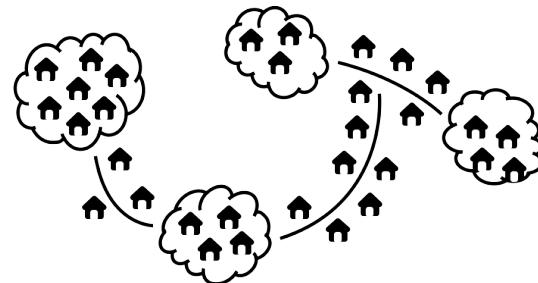


Figure 1.19: Mixture of clusters and ribbons

We take a small sample from each segment using the appropriate sampling method.

For example, with a community made up of three segments:

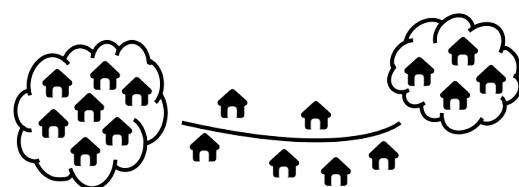


Figure 1.20: Community made up of three segments

we would take one third of the overall sample from each segment.

If the within-community sample size is twelve eligible subjects. we would sample four eligible subjects from each segment (i.e.  $12/3 = 4$ ).

Dividing the sample up in this way means that we will sample from every part of the community rather than just one part of the community.

When taking the sample we use the random walk method to take part of the sample from clusters and the systematic sampling method to take part of the sample from ribbons.

Segments should be either ribbons or clusters but should **never** contain both a ribbon and a cluster. This is because clusters and ribbons are sampled in different ways.

A dwelling can only belong to one segment. Segments should **not** overlap.

### 1.7.8 Sample dwellings

**All** segments should be sampled.

If, for example, there are five segments in a community:



Figure 1.21: Community made up of five segments

and the within-community sample size is twelve eligible subjects, then you would plan to sample two eligible subjects from each segment (i.e.  $12/5 = 2.4$  **rounded down** to two) and, if necessary, return to the **largest** segment to complete the sample.

**All** segments should be sampled, even if this means that you take a larger sample than you expected to.

Remember that different types of segment are sampled in different ways:

- Dwellings in **cluster segments** are sampled using a method called the **random walk**. This involves sampling houses by walking in random directions within the cluster.
- Dwellings in **ribbon segments** are sampled using a method called **systematic sampling**. This involves sampling houses at regular intervals along the ribbon.

We will look at each of these sampling methods in turn.

### 1.7.9 Random walk sampling

The **random walk** method is used to sample dwellings in **cluster segments**. Sampling proceeds as follows:

1. Move to the approximate centre of the cluster.

2. Select a **random direction** by spinning a bottle on the ground. The neck indicates the **sampling direction**. This is the direction you should walk in order to sample a dwelling. Walk in the sampling direction counting the dwellings that you pass. Sample the third **dwelling**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling with an eligible person. Sample **all** eligible persons in the selected dwelling.
3. Apply the survey questionnaire for **all** eligible persons in the selected dwelling.
4. Select the next dwelling to sample by spinning a bottle and walking in the indicated direction. Count the dwellings you pass. Sample the **third** dwelling. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling with an eligible person. Sample all eligible persons in the selected dwelling. If you reach the edge of the cluster segment then return to the centre of the cluster and repeat step (2) above. Remember to keep count of the number of eligible persons sampled from the segment.
5. Stop sampling in the segment when you have sampled the required number of eligible persons from the segment. Since you sample **all** eligible persons in a selected dwelling, you may sample a few more eligible persons than expected. This is OK. Always sample **all** eligible persons in a selected dwelling.

If, when you have sampled all segments, you have not sampled twelve eligible persons, you should return to the **largest** segment to finish sampling using the appropriate sampling method.

The random walk method is illustrated in Figure 1.22.

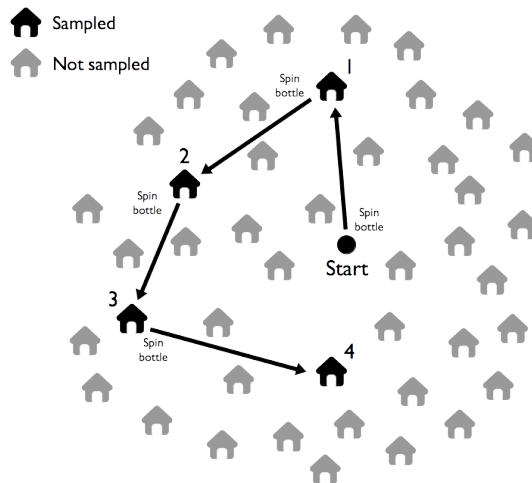


Figure 1.22: Random walk sampling in a cluster segment

### 1.7.10 Systematic sampling

The **systematic sampling** method is used to sample houses in **ribbon segments**.

Sampling proceeds as follows:

1. Move to one end of the ribbon segment.
2. Walk to the other end of the segment counting the houses that you pass.
3. Calculate the **step size** by dividing the number of dwellings in the segment by the required sample size for the segment. Use the **whole number** part of the result only. Do **not** round up.

4. Pick a random number between one and the step size. This is your **starting point**. Select the first dwelling to sample by walking along the segment counting the dwellings that you pass and sample the dwelling indicated by the **starting point**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling in any direction with an eligible person. Sample **all** eligible persons in the selected dwelling.
5. Select the next dwelling to sample by walking along the segment. Count the dwellings that you pass. Sample the dwelling indicated by the **step size**. If there are no eligible persons in the selected dwelling then sample the **nearest** dwelling in any direction with an eligible person. Sample **all** eligible persons in the selected dwelling.
6. Stop sampling in the segment when you reach the end of the ribbon segment. This may mean that you sample extra eligible persons. This is OK. Do **not** stop sampling from a ribbon until you reach the end of the ribbon.

If, when you have sampled all segments, you have not sampled twelve eligible persons, you should return to the **largest** segment to finish sampling using the appropriate sampling method.

The systematic sampling method is illustrated in Figure 1.23.

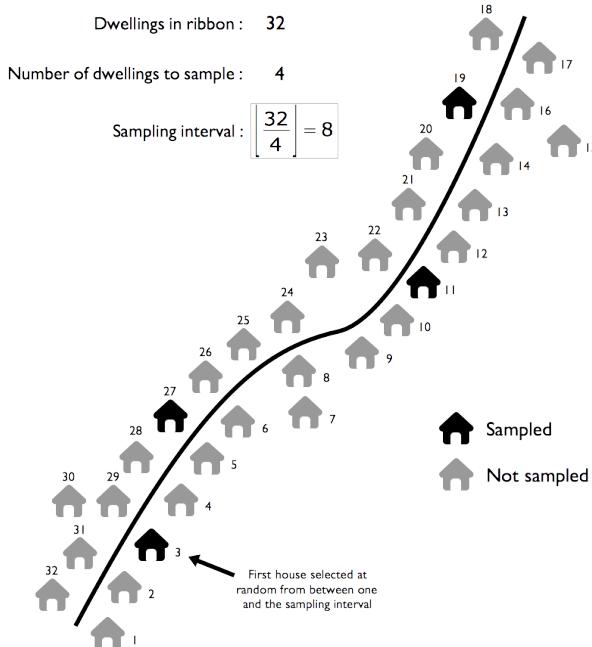


Figure 1.23: Systematic sampling in a ribbon segment

### 1.7.11 Sampling in urban settings

In urban areas the first stage sample is taken by replacing sub-districts with “sections” and communities with city blocks. Examples of sections may be administrative districts/sub-districts or electoral wards.

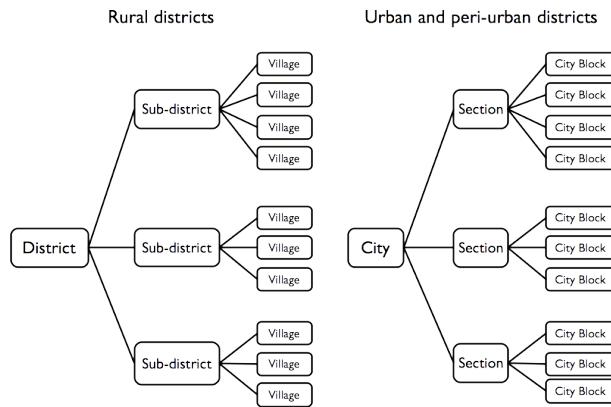


Figure 1.24: Administrative divisions in an urban setting

Census enumeration areas (EAs) are usually city blocks. Central statistics offices can usually provide lists of EAs by “section” and large-scale maps of EAs selected for sampling (See Figure 1.25 and Figure 1.26). These maps make it easy to locate EAs and their boundaries. The sample of EAs can be decided using list-based or map-based (CSAS) sampling.

In these settings, eligible persons may be sampled by moving from door-to-door. All dwellings in the selected block are sampled and all eligible persons in the selected dwellings are sampled. This means that all eligible persons in a selected block are sampled.

If city blocks are large then a type of systematic sampling may be used. With this method a rough map of the streets in the block is made and the number of doorways on each street is counted and copied onto the rough street map (as shown in Figure 1.27). The total number of doorways on all streets is calculated. A step size is calculated by dividing the total number of doorways on all streets by the number of dwellings to be sampled. A systematic sample along a route around the block that includes all streets in the block is taken. Streets can be sampled in any order. If you find that you have sampled all streets but have not yet sampled the required number of eligible persons then you should return to the street with the largest number of houses to collect the remainder of the sample.

The number of blocks to be sampled will depend on the expected number of eligible persons in each block. You should aim for an overall sample size of about  $n = 192$ . You should not sample fewer than  $m = 16$  blocks.

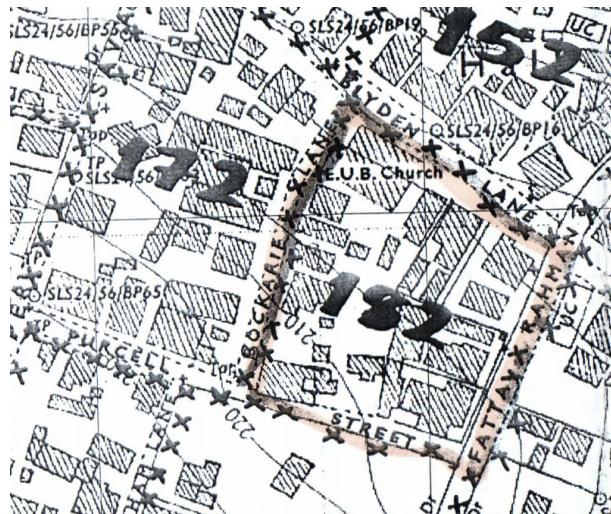


Figure 1.25: Enumeration area map for a city block in Freetown, Sierra Leone

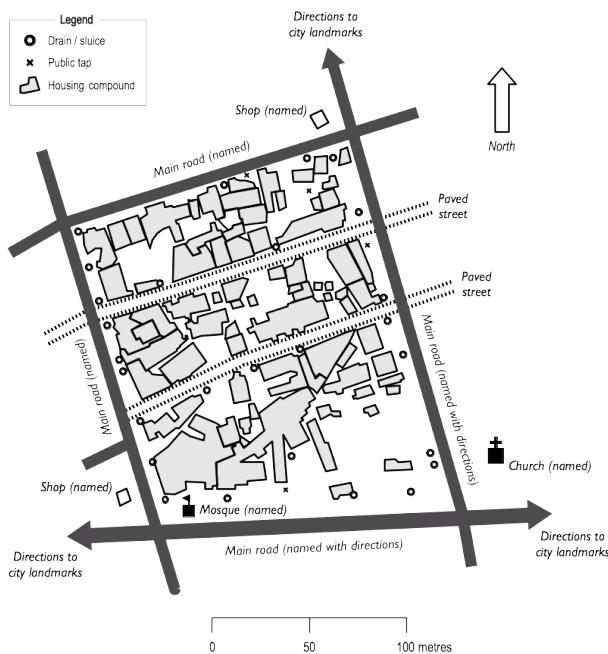


Figure 1.26: Enumeration area map for a city block in Addis Ababa, Ethiopia

There are :

$$98 + 13 + 25 + 59 + 47 + 63 + 12 + 86 = 403 \text{ doorways}$$

We want to select 12 houses. The step size is :

$$\text{Step size} = \left\lfloor \frac{403}{12} \right\rfloor = 33$$

So we sample every 33<sup>rd</sup> doorway

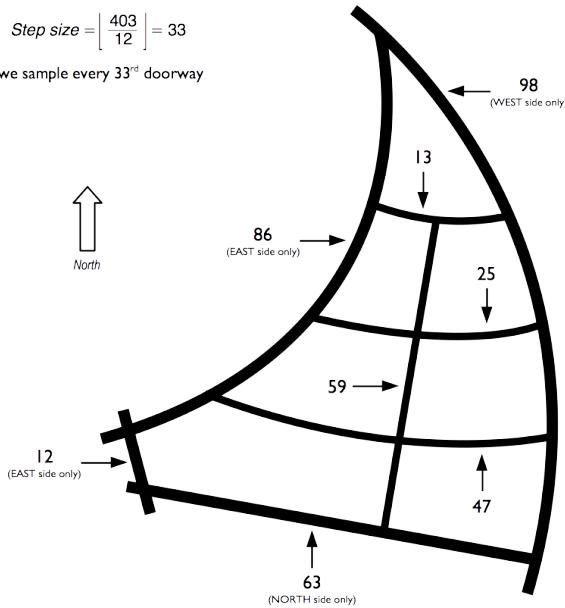


Figure 1.27: Systematic sampling in a city block

When useful lists and maps are not available then satellite imagery available through free services such as Google Earth (<http://earth.google.com>) may be used.

The quality (resolution) of the images available from these services is variable but is usually good enough to allow you to segment the town into small areas of approximately equal volume (approximately the same number of dwellings) in each:



Figure 1.28: Segmenting a town into smaller sampling areas

When creating segments using maps or satellite images it is a good idea to use main roads, rivers, canals, railway lines, public parks, etc as boundaries. This simplifies the segmentation process and also simplifies fieldwork by making areas and their boundaries easier to locate and sample.

The first stage sample can be list-based (such as where each area is numbered in a systematic north to south and east to west order and a systematic sample taken) or map-based (CSAS).

Larger scale “maps” of blocks to be sampled can also be made using satellite imagery (see Figure 1.29).



Figure 1.29: A large scale “map” of a city block made from satellite imagery

# **Chapter 2**

## **Indicators**

### **2.1 The RAM-OP indicator set**

RAM-OP surveys collect and report on data for a broad range of indicators relevant to older people.

These indicators cover the following dimensions:

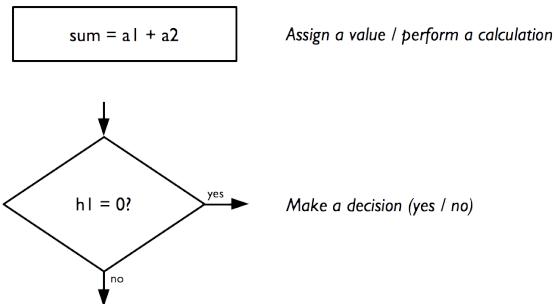
- Demography and situation
- Food intake
- Severe food insecurity
- Disability
- Activities of daily living
- Mental health and well-being
- Dementia
- Health and health-seeking behaviour
- Sources of income
- Water, sanitation, and hygiene
- Anthropometry and screening coverage
- Visual impairment

Data for a small group of miscellaneous indicators are also collected and reported.

The RAM-OP indicator set has been designed on a modular basis. Each module is a set of indicators relating to a single dimension from the list given above and is collected using a dedicated set of questions and measurements. This means that the RAM-OP questionnaire also consists of a set of modules.

Whenever possible, RAM-OP uses standard and validated indicators and question sets.

Indicators are described below, showing the questionnaire components that are used to collect and record the data required, and flowcharts of the process used to derive indicators from the collected data. Standard symbols are used. For example:



A non-standard symbol is used to show **recode operations**. A recode operation shows changes that are made to data so that it can be used to derive indicators without having to show many decision nodes in the flowchart. They are also used to specify what should be done with missing or out-of-range values. For example:

RECODE d1 (respondent)		
Old Values	New Values	Notes
1	1	subject
2	2	family carer
3	3	other carer
4	4	other
Others	1	subject

No change

For others values (including missing values)  
we assume the respondent is the subject

RECODE d2 (age)		
Old Values	New Values	Notes
888	NA	DK / refused

Set data for don't know / refused to NA  
(NA = not available / missing data)

### 2.1.1 Demography and situation

The demography and situation indicators are used to describe the survey sample and are derived from this questionnaire component:

d1	Who is answering these questions?	1 = Subject 2 = Family carer 3 = Other carer 4 = Other	[ ]
d2	How old are you (age in years)?	888 = DK / REFUSED	[ ][ ][ ]
d3	Sex	1 = Male; 2 = Female	[ ]
d4	Marital status	1 = Single (never married) 2 = Married 3 = Living together 4 = Divorced 5 = Widowed 6 = Other	[ ]
d5	Do you live alone?	1 = Yes; 2 = No	[ ]

Each of the questions yields a separate indicator:

RECODE d1 (respondent)		
Old Values	New Values	Notes
1	1	subject
2	2	family carer
3	3	other carer
4	4	other
Others	1	subject

*Respondent types reported as separate indicators*

RECODE d2 (age)		
Old Values	New Values	Notes
888	NA	DK / refused

*Mean age is reported  
Age-groups (50-59;60-69;70-79;80-89;90+)  
are reported as separate indicators*

RECODE d5 (living alone)		
Old Values	New Values	Notes
1	1	Yes
2	0	No

*Living alone is reported  
Sex of the subject and marital status of the subject are also reported*

### 2.1.2 Food intake

Food-intake indicators are derived from this questionnaire component. This data can be queried to yield a large number of useful indicators.

- |     |   |                 |     |
|-----|---|-----------------|-----|
| f1  | How many meals did you eat since this time yesterday (Ask about breakfast, lunch, dinner, and snacks)?                                      | Number of meals | [ ] |
| f2  | Since this time yesterday did you eat any of the following foods ...  |                 |     |
| f2a | Tinned, powdered or fresh milk?   | 1 = Yes; 2 = No | [ ] |
| f2b | Sweetened or flavoured water, "soda" drink, alcoholic drink, beer, tea or infusion, coffee, soup, or broth?                                 | 1 = Yes; 2 = No | [ ] |
| f2c | Any food made from grain such as millet, wheat, barley, sorghum, rice, maize, pasta, noodles, bread, pizza, porridge?                       | 1 = Yes; 2 = No | [ ] |
| f2d | Any food made from fruits or vegetables that have yellow or orange flesh such as carrots, pumpkin, red sweet potatoes, mangoes, and papaya? | 1 = Yes; 2 = No | [ ] |
| f2e | Any food made with red palm oil or red palm nuts?   | 1 = Yes; 2 = No | [ ] |
| f2f | Any dark green leafy vegetables such as cabbage, broccoli, spinach, moringa leaves, cassava leaves?   | 1 = Yes; 2 = No | [ ] |
| f2g | Any food made from roots or tubers such as white potatoes, white yams, false banana, cassava, manioc, onions, beets, turnips, and swedes?   | 1 = Yes; 2 = No | [ ] |
| f2h | Any food made from lentils, beans, peas, groundnuts, nuts, or seeds?  | 1 = Yes; 2 = No | [ ] |

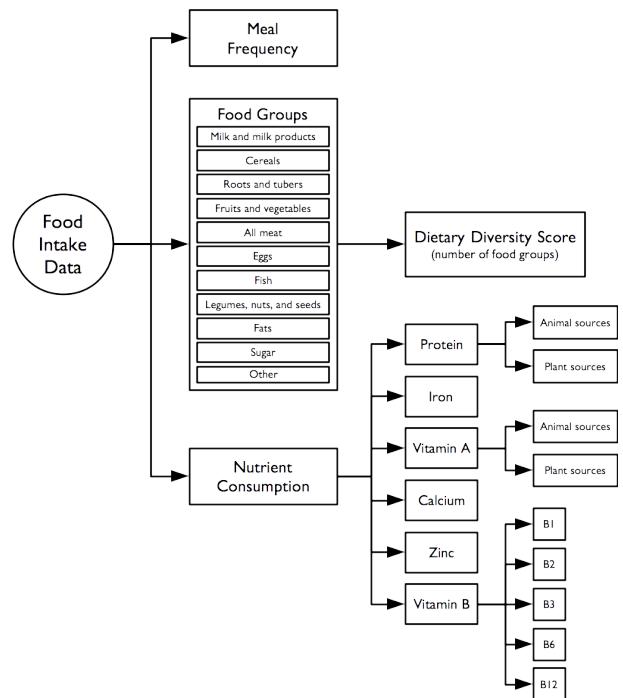
f2i	Any other fruits or vegetables such as banana, plantain, avocado, cauliflower, coconut?	1 = Yes; 2 = No	[ ]
f2j	Liver, kidney, heart, black pudding, blood, or other organ meats?	1 = Yes; 2 = No	[ ]
f2k	Any meat such as beef, pork, goat, lamb, mutton, veal, chicken, camel, or bush meat?	1 = Yes; 2 = No	[ ]
f2l	Fresh or dried fish, shellfish, or seafood?	1 = Yes; 2 = No	[ ]
f2m	Cheese, yoghurt, or other milk products?	1 = Yes; 2 = No	[ ]
f2n	Eggs?	1 = Yes; 2 = No	[ ]
f2o	Any food made with oil, fat, butter, or ghee?	1 = Yes; 2 = No	[ ]
f2p	Any mushrooms or fungi?	1 = Yes; 2 = No	[ ]
f2q	Grubs, snails, insects?	1 = Yes; 2 = No	[ ]
f2r	Sugar, honey and foods made with sugar or honey such as sweets, candies, chocolate, cakes, and biscuits?	1 = Yes; 2 = No	[ ]
f2s	Salt, pepper, herbs, spices, or sauces (hot sauce, soy sauce, ketchup)?	1 = Yes; 2 = No	[ ]

---

There are three related sets of diet-related indicators:

- meal frequency
- food groups consumed / dietary diversity
- indicators of nutrient consumption.

The indicator hierarchy is:



The data on the number of meals taken in the previous twenty-four hours forms a *meal frequency score*.

Food intake data from each subject is combined into a *dietary diversity score*. The dietary diversity score is a crude measure of food security. The dietary diversity score ranges between zero (i.e. no food groups) and eleven (i.e. eleven food groups). Higher values of the dietary diversity score are associated with better food security.

The meal frequency score and the dietary diversity score follow:

- Swindale A, Bilinsky P, *Household Dietary Diversity Score (HDDS) for measurement of household food access: Indicator guide.*, Washington DC, Food and Nutrition Technical Assistance (FANTA) Project, 2006
- Kennedy G, Ballard T, Dop MC, *Guidelines for Measuring Household and Individual Dietary Diversity*, Rome, Food and Agricultural Organization, 2010

The data on the types of food consumed in the previous twenty-four hours are analysed in order to determine the diet's content of specific micronutrients that are important for older people. This also follows Swindale & Bilinsky (2006) and Kennedy et al (2010), and:

- World Health Organisation, *The management of nutrition in major emergencies*, Geneva, WHO, 2000

### 2.1.3 Meal frequency

The meal frequency score indicator is the answer given to the first food intake question:

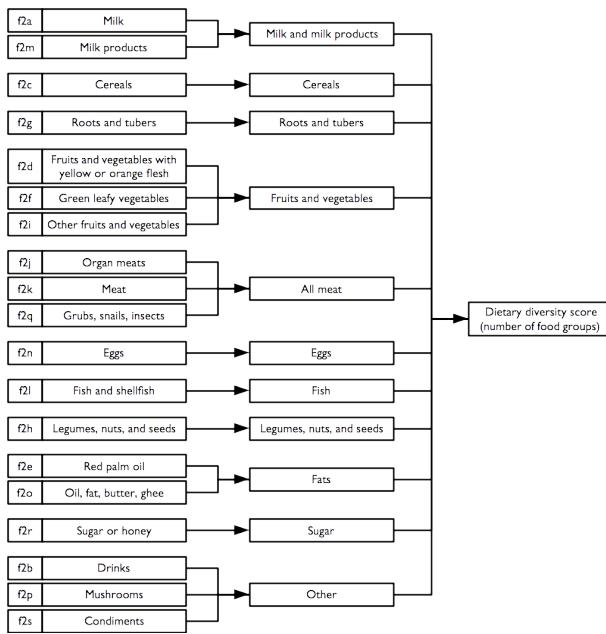


Meal frequency is a crude measure of food security.

Higher values of meal frequency are associated with better food security.

### 2.1.4 Food groups and dietary diversity

Questions relating to the consumption of individual food items / food types are combined to create food groups and the number of food groups consumed are counted to create a dietary diversity score:



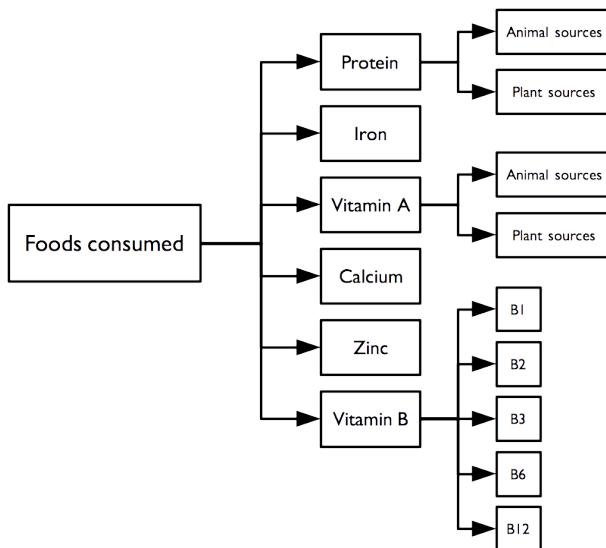
The consumption of the eleven individual food groups and the dietary diversity score are reported separately.

The dietary diversity score is a crude measure of food security. The dietary diversity score ranges between zero (no food groups) and eleven (eleven food groups). Higher values of the dietary diversity score are associated with better food security.

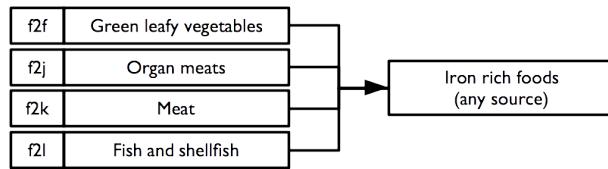
## 2.1.5 Indicators of nutrient consumption

### Overview

Questions and combinations of questions relating to the consumption of individual food items and food types can be used to determine whether the reported diet is likely to be provide sufficient nutrients of various types:



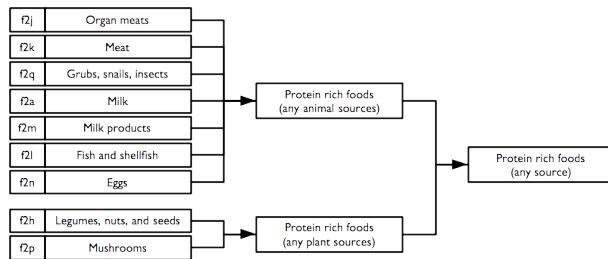
Each indicator is formed using logical “or” operations (i.e. the indicator is true if **any** of the constituent foods are consumed). For example, the indicator for the consumption of iron rich foods:



requires the consumption of one or more of green leafy vegetables, organ meats, meat, or fish and shellfish. Consumption of **any** of these foods is sufficient to indicate that the survey subject consumes iron rich food.

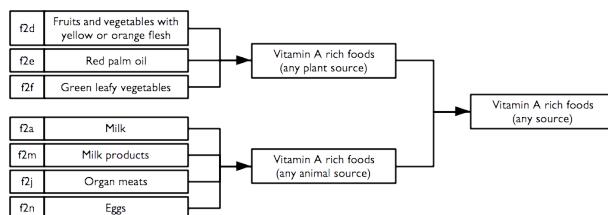
### 2.1.5.1 Protein rich foods

Indicators of consumption of protein rich foods from animal sources, plant source, and any / all sources are calculated as:



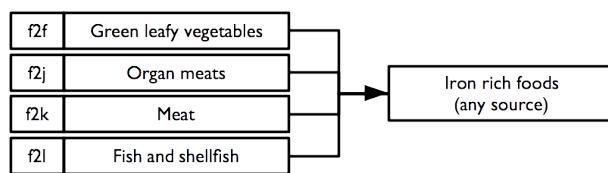
### 2.1.5.2 Vitamin A rich foods

Indicators of consumption of vitamin A rich foods from animal sources, plant source, and any / all sources are calculated as:



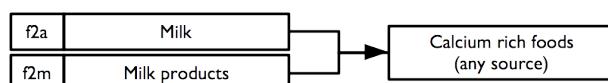
### 2.1.5.3 Iron rich foods

An indicator of consumption of iron rich foods from any / all sources is calculated as:



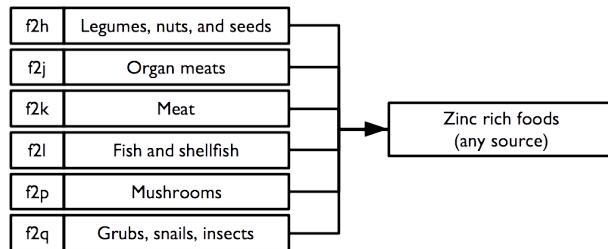
### 2.1.5.4 Calcium rich foods

An indicator of consumption of calcium rich foods from any / all sources is calculated as:



### 2.1.5.5 Zinc rich foods

An indicator of consumption of zinc rich foods from any / all sources is calculated as:



### 2.1.5.6 Vitamin B rich foods

Indicators of consumption of vitamin B rich foods from any / all sources are calculated as:



Note that the vitamin B complex indicator requires that at least one food from each of the B1, B2, B3, B6, and B12 rich food combinations is consumed.

### 2.1.6 Severe food insecurity

An indicator of severe food insecurity (hunger) is derived from this questionnaire component:

---

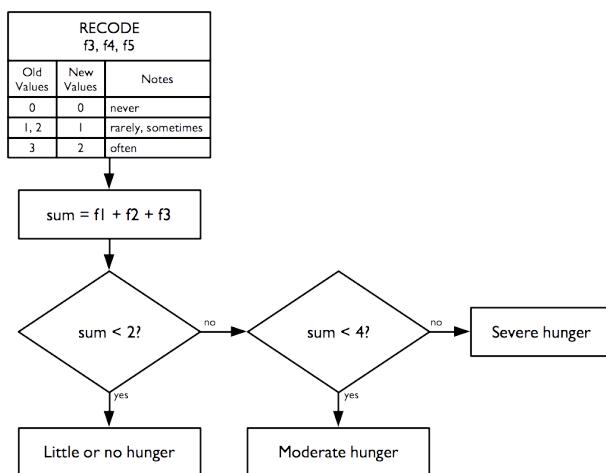
**Hunger – Ration - Relief**

---

f3	In the past four weeks, how often was there ever no food to eat of any kind in your home because of lack of resources to get food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x)	[ ]
f4	In the past four weeks, how often did you go to sleep at night hungry because there was not enough food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x)	[ ]
f5	In the past four weeks, how often did you go a whole day and night without eating anything at all because there was not enough food?	0 = Never 1 = Rarely (1-2x) 2 = Sometimes (3-10x) 3 = Often (> 10x)	[ ]

---

and is calculated as:



This indicator is the *Household Hunger Scale (HHS)* and is a simple, well-validated, and widely used indicator of severe food insecurity:

- Ballard T, Coates J, Swindale A, Deitchler M, *Household Hunger Scale: Indicator Definition and Measurement Guide*, Washington DC, FANTA-2 Bridge, FHI 360, 2011
- Ruel MT, Ballard TJ, Deitchler M, *Measuring and Tracking the Access Dimension of Food Security: Available Indicators and Recommendations for Future Investments*, Global Nutrition Report 2014: Technical Note 6, Washington DC, International Food Policy Research Institute, 2014

## 2.1.7 Disability

Indicators of disability across six different domains are derived from this questionnaire component:

---

### Disability (Washington Group)

---

---

wg1	Do you have difficulty seeing, even if wearing glasses?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]
wg2	Do you have difficulty hearing, even if using a hearing aid?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]
wg3	Do you have difficulty walking or climbing steps?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]
wg4	Do you have difficulty remembering or concentrating?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]
wg5	Do you have difficulty with self-care such as washing all over or dressing?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]
wg6	Using your usual (customary) language, do you have difficulty communicating, for example understanding or being understood?	0 = No difficulty 1 = Some difficulty 2 = A lot of difficulty 3 = Cannot do at all	[__]

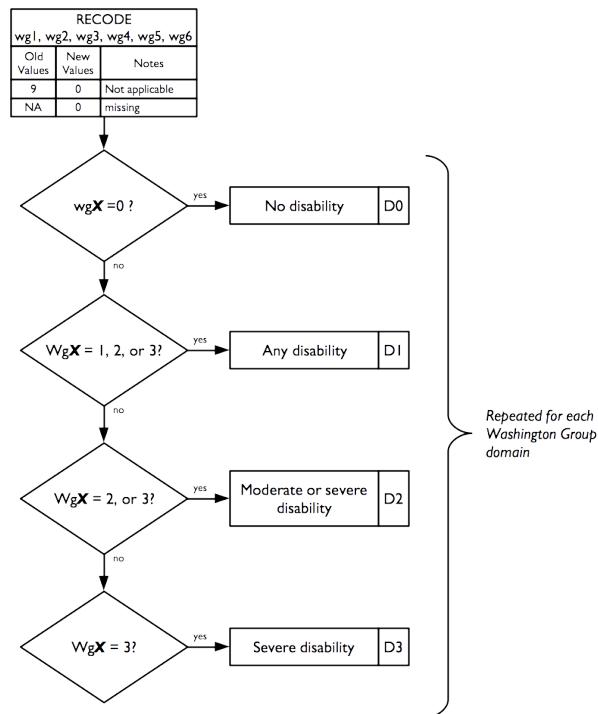
---

Individual disability indicators are reported for each domain (i.e. vision, hearing, mobility, remembering, self-care, and communication) of disability in the Washington Group's short set of question designed to identify people with a disability in a census or survey format:

- <http://www.washingtongroup-disability.com>
- [https://www.cdc.gov/nchs/washington\\_group/wg\\_documents.htm](https://www.cdc.gov/nchs/washington_group/wg_documents.htm)

Overall disability prevalence indicators are also reported.

Indicators of disability in each domain are calculated as:



Overall disability prevalence indicators are calculated as:

---

P0 = 1	if no domain has D1 = 1, else = 0 (no disability in any domain)
P1 = 1	if at least one domain has D1 = 1, else = 0
P2 = 1	if at least one domain has D2 = 1, else = 0
P3 = 1	if at least one domain has D3 = 1, else = 0
PM = 1	if at more than one domain has D1 = 1, else = 0 (M stands for "Multiple")

---

## 2.1.8 Activities of daily living

Indicators of how well the subject copes with activities of daily living are derived from this questionnaire component:

### Activities of Daily Living

---

- |    |  |                 |     |
|----|--|-----------------|-----|
| a1 | Do you need help with bathing more than one part of your body or getting in or out of the tub or shower?             | 1 = Yes; 2 = No | [ ] |
| a2 | Do you need help getting dressed partially or completely (not including tying of shoes)?                             | 1 = Yes; 2 = No | [ ] |
| a3 | Do you need help going to the toilet or cleaning yourself after using the toilet or do you use a commode or bed-pan? | 1 = Yes; 2 = No | [ ] |
| a4 | Do you need someone (i.e. not a walking aid) to help you move from a bed to a chair?                                 | 1 = Yes; 2 = No | [ ] |
| a5 | Are you partially or totally incontinent of bowel or bladder?  | 1 = Yes; 2 = No | [ ] |

---

a6	Do you need partial or total help with eating?	1 = Yes; 2 = No	[ ]
a7	Is someone taking care of you or helping you with everyday activities such as shopping, cooking, bathing and dressing?	1 = Yes; 2 = No	[ ]

---

Individual *independence* indicators are reported for each dimension (i.e. bathing, dressing, toilet, mobility, continence, and eating) of daily living activities.

A composite indicator of the degree of *independence* (i.e. how well the subject can cope with activities of daily living) is also reported. This indicator is the *Katz Index of Independence in Activities of Daily Living* (or the *Katz Index of ADL* for short) and is a simple, well-validated, and widely used indicator of how well the subject can cope with activities of daily living:

- Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW, *Studies of illness in the aged. The Index of ADL: A standardized measure of biological and psychosocial function*, JAMA, 185(12), 1963, pp. 914-9
- Katz S, Down TD, Cash HR, Grotz, RC, *Progress in the development of the index of ADL*, The Gerontologist, 10(1), 1970, pp. 20-30
- Katz S, *Assessing self-maintenance: Activities of daily living, mobility and instrumental activities of daily living*, JAGS, 31(12), 1983, pp. 721-726

The Katz Index of ADL ranges between zero (complete dependence) and six (independence).

The seventh question of this module, which is not part of the Katz Index of ADL, is reported separately and indicates whether the subject has someone to help them with activities of daily living:

---

### Activities of Daily Living

---

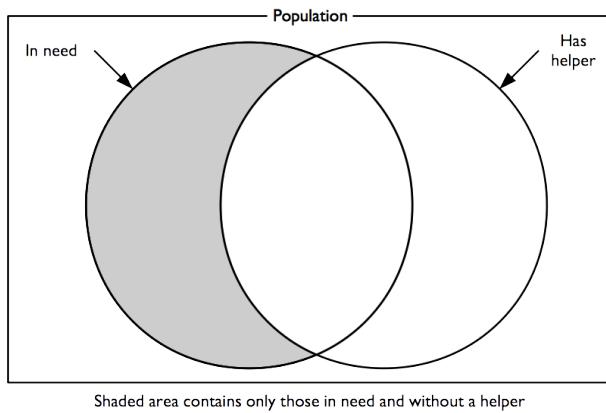


---

a7	Is someone taking care of you or helping you with everyday activities such as shopping, cooking, bathing and dressing?	1 = Yes; 2 = No	[ ]
----	--	-----------------	-----

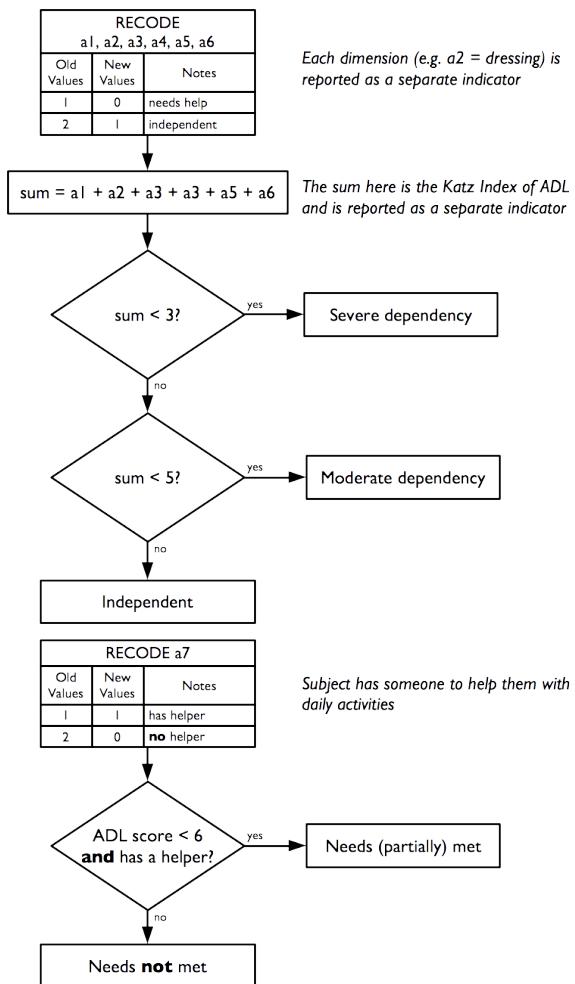
---

It is not possible to know if the help available completely meets a subject's needs, but we can identify the proportion of subjects needing help with one or more activities of daily living who also report not having someone to help them:



This is an indicator of unmet need.

Indicators of how well the subject can cope with activities of daily living and probable unmet need are calculated as:



### 2.1.9 Mental health and well-being

Indicators of mental health and well being are derived from this questionnaire component:

---

#### Mental Health & Wellbeing

---

k6a	About how often during the past four weeks did you feel nervous – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[__]
k6b	During the past four weeks, about how often did you feel hopeless – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[__]
k6c	During the past four weeks, about how often did you feel restless or fidgety – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[__]
k6d	During the past four weeks, about how often did you feel so depressed that nothing could cheer you up – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 6 = Don't know 7 = Refused	[__]
k6e	During the past four weeks, about how often did you feel that everything was an effort – all of the time, most of the time, some of the time, a little of the time, or none of the time?	1 = All of the time 2 = Most of the time 3 = Some of the time 4 = A little 5 = None 6 = Don't know 7 = Refused	[__]

---

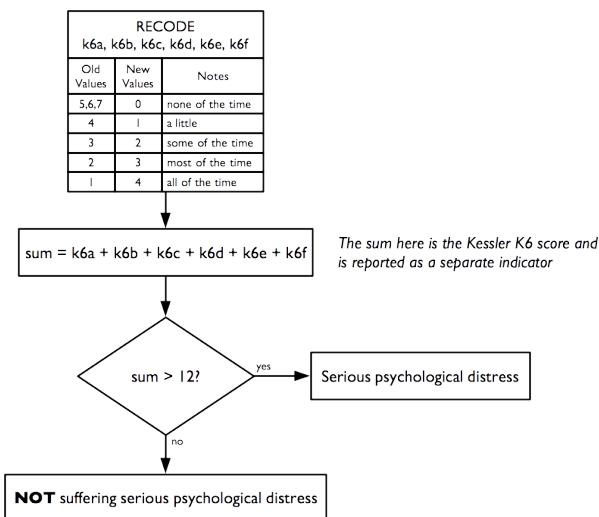
k6f	<p>During the past four weeks, about how often did you feel worthless – all of the time, most of the time, some of the time, a little of the time, or none of the time?</p>	1 = All of the time 2 = Most of the time 3 = Some of the time 5 = None 4 = A little 6 = Don't know 7 = Refused	<input type="text"/>
-----	---	--	----------------------

---

A score is calculated. This is the *Kessler K6 Psychological Distress Scale*. The score ranges from zero (indicating no psychological distress) to twenty-four (indicating severe psychological distress). A score of thirteen or more indicates serious psychological distress. The Kessler K6 Psychological Distress Scale is a widely recommended, widely used, accurate, reliable, and simple measure of psychological distress:

- Kessler RC, Andrews G, Colpe LJ, Hiripi E, Mroczek, DK, Normand SLT, et al, “Short screening scales to monitor population prevalences and trends in non-specific psychological distress”, *Psychological Medicine*, 32(6), 2002, pp. 959–976
- Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, “Screening for Serious Mental Illness in the General Population”, *Archives of General Psychiatry*, 60(2), 2003, pp. 184-189

Indicators of mental health and well-being are calculated as:



### 2.1.10 Dementia

An indicator of probable dementia is derived from this questionnaire component:

---

#### Dementia Screen

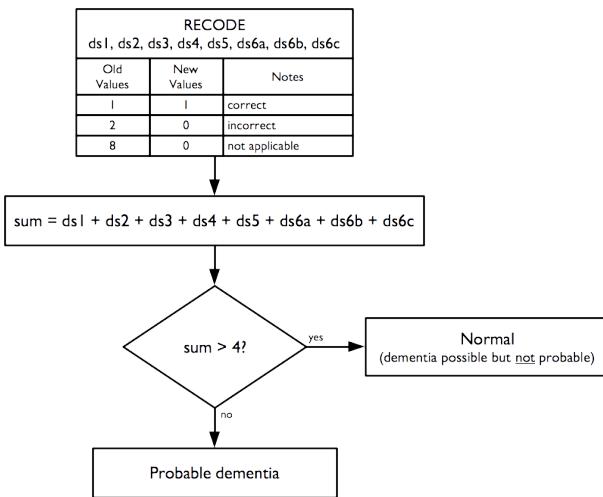
---

ds0 | This section can only be completed if the subject is answering for themselves. || If the respondent is not answering for themselves then record '8' as the answer for all | questions below and continue with the interview. Write the reason why the subject is not | answering for themselves in the OBSERVATIONS section at the end of the questionnaire. | | Say : || I am going to tell you three words. || I would like you to repeat them after me. | | "CHILD" || "HOUSE" || "ROAD" || Repeat the three words, up to a maximum of six (6) times, or until the person has | remembered them all correctly. || Say : || Try to remember these words. I will ask about them later.

---

ds1	Point to your nose and ask : <b>What do we call this?</b>	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds2	What do you do with a hammer?  Accept answers such as :	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
	* Drive a nail into something * Straighten metal * Hit a wedge or something else * Use with a chisel		
ds3	What day of the week is it?	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds4	What is the season?	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds5	Say: Please point first to the window and then to the door.	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds6	Do you remember the three words I asked you to remember a few minutes ago?		
ds6a	CHILD	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds6b	HOUSE	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]
ds6c	ROAD	1 = Correct 2 = Incorrect 8 = Not applicable	[ ]

The indicator of *probable* dementia is calculated as:



This indicator is derived from the Community Screening Instrument for Dementia (CSID) developed by the 10/66 Dementia Research Group. This is a simple, validated, and widely used indicator of probable dementia:

Prince M, et al, “A brief dementia screener suitable for use by non-specialists in resource poor settings - The cross-cultural derivation and validation of the brief Community Screening Instrument for Dementia”, *International Journal of Geriatric Psychiatry*, 26(9), 2011, pp. 899–907

### 2.1.11 Health and health-seeking behaviour

Indicators of health and health-seeking behaviour for chronic and acute conditions are derived from this questionnaire component:

---

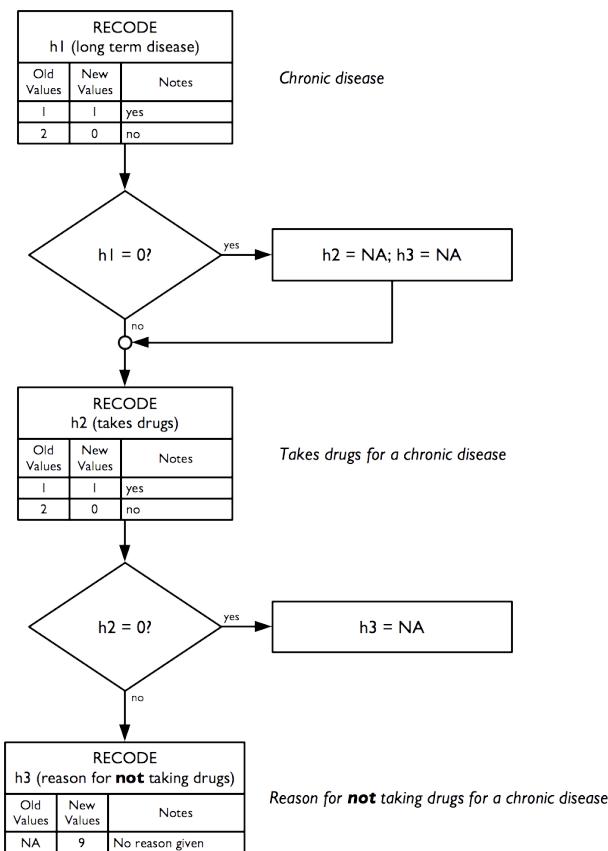
#### Health Seeking & Healthcare

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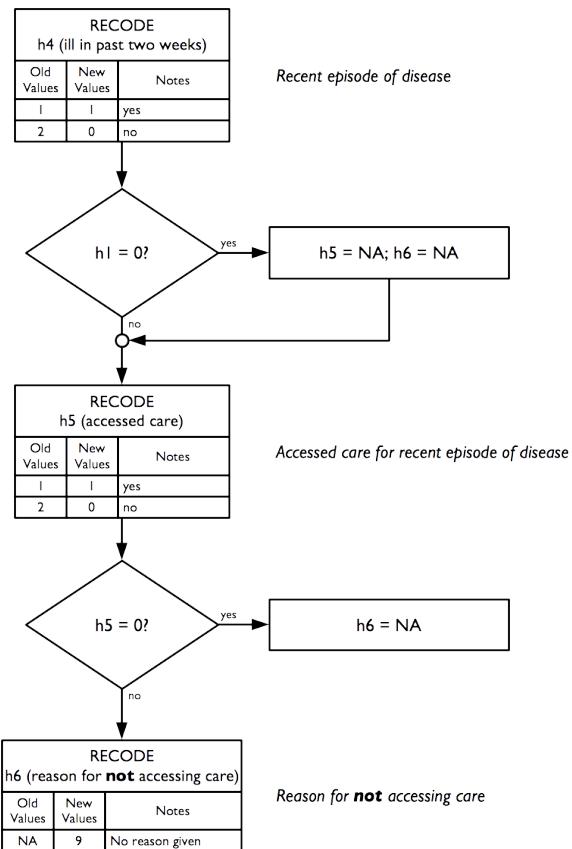
- |    |  |  |     |
|----|--|--|-----|
| h1 | Do you suffer from a long term disease that requires you to take regular medication? | 1 = Yes; 2 = No  | [ ] |
| ?? | If <b>NO</b> jump to question h4 (below)   |  |     |
| h2 | Do you take drugs regularly for this?  | 1 = Yes; 2 = No  | [ ] |
| ?? | If <b>YES</b> jump to question h4  |  |     |
| h3 | Why not?<br><br>Prompt for the main reason   | 1 = No drugs available<br>2 = Too expensive / no money<br>3 = Too old to look for care<br>4 = Use traditional medicine<br>5 = Drugs don't help<br>6 = No-one to help me<br>7 = No need<br>8 = Other<br>9 = No reason given | [ ] |
|    | Record main reason only  |  |     |
| h4 | Have you been ill in the past two weeks?   |  |     |

??	If <b>NO</b> jump to question m1 (below)	
h5	Did you go to the pharmacy, dispensary, health centre, health post, clinic, or hospital?	1 = Yes; 2 = No [ ]
?? h6	If <b>YES</b> then jump to question m1 (below) Why not? Prompt for the main reason Record main reason only	1 = No drugs available 2 = Too expensive / no money 3 = Too old to look for care 4 = Use traditional medicine 5 = Drugs don't help 6 = No-one to help me 7 = No need 8 = Other 9 = No reason given

Indicators of health and health-seeking behaviour for chronic conditions are calculated as:



Indicators of health and health-seeking behaviour for acute conditions are calculated as:



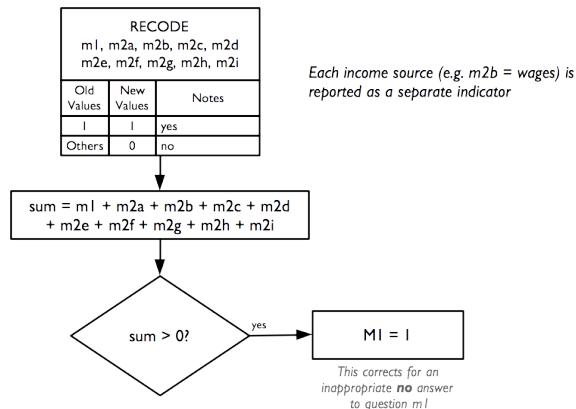
### 2.1.12 Sources of income

Indicators related to sources of income are derived from this questionnaire component:

<b>Income</b>				
m1	Do you have a personal source of income or money?	1 = Yes; 2 = No		[ ]
??	Continue to question m2 even if the subject reports having no personal income...			
m2	Where does your income or money come from? (prompt “Anything else?”)			
m2a	Agriculture, livestock, or fishing	1 = Yes; 2 = No	[ ]	
m2b	Wages or salary	1 = Yes; 2 = No	[ ]	
m2c	Sale of charcoal, bricks, firewood, poles, etc.	1 = Yes; 2 = No	[ ]	
m2d	Trading (e.g. market, shop)	1 = Yes; 2 = No	[ ]	
m2e	Private pension, investments, interest, rents, etc.	1 = Yes; 2 = No	[ ]	
m2f	Spending savings Sale of household goods, personal goods, or jewellery Sale of livestock, land, or other assets	1 = Yes; 2 = No	[ ]	

m2g	Aid, gifts, charity (e.g. from church, mosque, temple), begging, borrowing, or sale of food aid or relief items	1 = Yes; 2 = No	[ ]
m2h	Cash transfer (NGO, UNO, government) State pension, social security, benefits, welfare program	1 = Yes; 2 = No	[ ]
m2i	Other	1 = Yes; 2 = No	

and are calculated as:



The grouped income sources (i.e. m2a, m2b, etc.) and individual income sources may vary between settings. The questionnaire component shown above has proved suitable for use in Ethiopia, South Sudan, and Tanzania.

### 2.1.13 Water, sanitation, and hygiene

Indicators relating to water, sanitation, and hygiene (WASH) are derived from this questionnaire component:

---

#### Water, Sanitation, Hygiene

---



---

w1      What is your main source of drinking water?

---

Piped water into dwelling	1	[ ]
Piped water into compound		
Public tap / Standpipe		
Tube-well / Borehole		
Protected dug well		
Protected spring		
Rainwater collection system		
Bottled water / sachet water		

- Unprotected dug well      2
  - Unprotected spring
  - Cart with small tank  
or drum
  - Tanker-truck
  - River, stream, dam,  
lake, pond, or puddle
  - Canal or irrigation  
channel
  - Other
- 

w2      What do you usually do to the water  
to make it safer to drink?

---

- |  |   |        |
|--|---|--------|
| Boil   | 1 | [    ] |
| Add bleach / chlorine<br>tablet                    |   |        |
| Use a water filter<br>(gravel / sand /<br>ceramic) |   |        |
| Solar disinfection                                 |   |        |
| Strain it through a<br>cloth only                  | 2 |        |
| Let it stand and settle<br>only                    |   |        |
| Nothing  |   |        |
| Other  |   |        |
| Don't know   |   |        |
- 

w3      What kind of toilet facility do  
members of your household usually  
use?

---

- |                         |   |        |
|-------------------------|---|--------|
| Flush or pour flush to: | 1 | [    ] |
| Piped sewer system      |   |        |
| Septic tank             |   |        |
| Pit latrine             |   |        |
| Don't know              |   |        |
| VIP latrine             |   |        |
| Pit latrine with slab   |   |        |
| Composting toilet       |   |        |

Flush or pour flush to: 2  
 Elsewhere (anywhere not specified above)  
 Pit latrine without slab  
 Bucket  
 Hanging latrine  
 Bush or field  
 No facilities

---

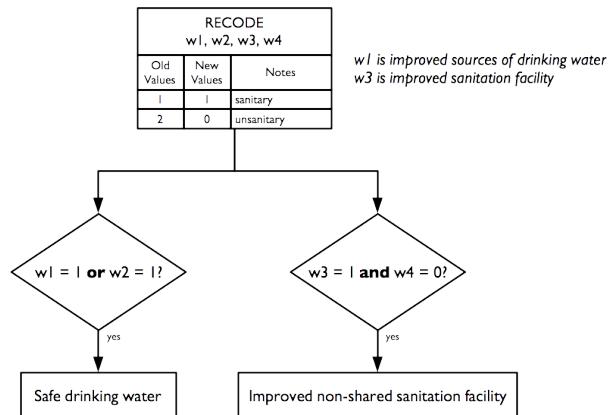
w4	Do you share this toilet facility with other households?	1 = Yes	[ ]
		2 = No	
		3 = NA (no facility)	

---

Indicators are calculated following:

- WHO / UNICEF, *Core Questions on Drinking-water and Sanitation for Household Surveys*, Geneva, WHO / UNICEF, 2006

Indicators relating to water, sanitation, and hygiene (WASH) are calculated as:



### 2.1.14 Anthropometry and screening coverage\*\*

Indicators relating to anthropometry and screening coverage are derived from this questionnaire component:

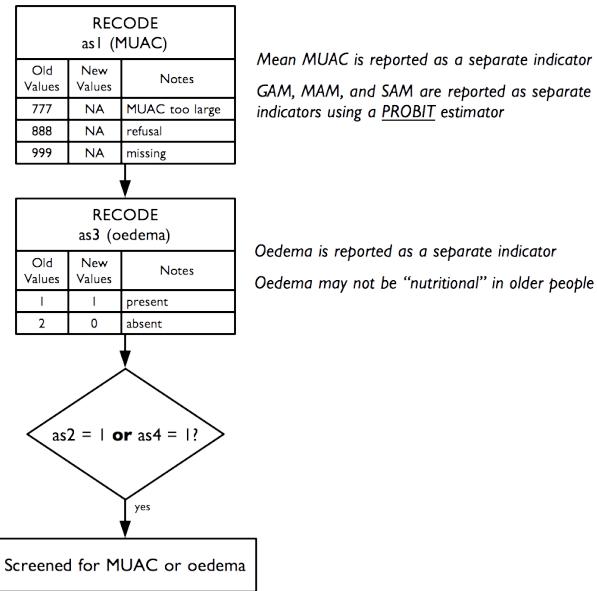
#### Anthropometry / Screening Coverage

---

as1	MUAC in mm	777 = Too large 888 = [ ] [ ] [ ] Refused
as2	Has someone measured your arm like this in the previous month?	1 = Yes; 2 = No [ ]
as3	Bilateral pitting oedema	1 = Yes; 2 = No [ ]
as4	Has someone examined your feet like this in the previous month?	1 = Yes; 2 = No [ ]

---

And are calculated as:



Raw MUAC data (i.e. not MUAC class) is collected, entered, and analysed. This requires that an adult MUAC tape (i.e. capable of measuring MUAC to 450 mm) is used.

The presence of bilateral oedema is assessed by pressing with your thumbs **both** feet of the older person for three seconds and checking whether this creates a lasting depression or “pit” on both feet. Bilateral pitting oedema in older people may not be “nutritional” oedema (as is almost always the case with children). Older people with bilateral pitting oedema should be advised to consult a doctor.

The prevalence of GAM, MAM, and SAM are estimated using a PROBIT estimator. This type of estimator provides better precision than a classic estimator at small sample sizes:

- World Health Organisation, *Physical Status: The use and interpretation of anthropometry. Report of a WHO expert committee*, WHO Technical Report Series 854, WHO, Geneva, 1995

Dale NM, Myatt M, Prudhon C, Briand, A, “Assessment of the PROBIT approach for estimating the prevalence of global, moderate and severe acute malnutrition from population surveys”, *Public Health Nutrition*, 1–6. doi:10.1017/S1368980012003345, 2012

Blanton CJ, Bilukha, OO, “The PROBIT approach in estimating the prevalence of wasting: revisiting bias and precision”, *Emerging Themes in Epidemiology*, 10(1), 2013, p. 8

The PROBIT estimator is described in Box 1.

MUAC-based case definitions for acute malnutrition are used:

\*\*GAM\*\* : MUAC < 210 mm  
 \*\*MAM\*\* : 185 mm MUAC < 210mm  
 \*\*SAM\*\* : MUAC < 185mm

These are standard case definitions for acute malnutrition in adults and recommended by HelpAge International for use in older people in humanitarian contexts.

**Note** : MUAC in adults should be measured on the non-dominant arm. This is usually the left arm. The importance of high levels of accuracy and precision at the individual level is of lesser importance in survey work compared to case-finding or diagnosis in clinical contexts, for

example. This means that a simple rule such as “Always measure MUAC on the left arm” may be used.

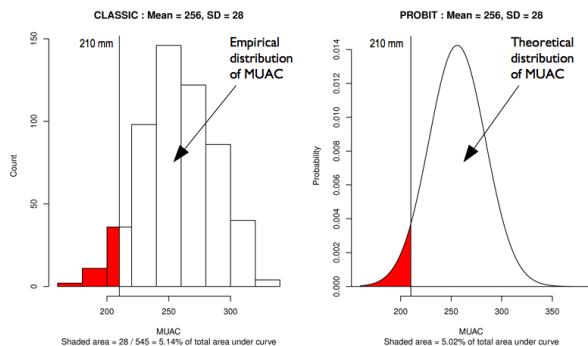
### Exercise

- ❑ An estimate of GAM prevalence can be made using a classic estimator:

$$\text{prevalence} = \frac{\text{number of respondents with MUAC} < 210 \text{ mm}}{\text{total number of respondents}}$$

The estimate of GAM prevalence made from the RAM-OP survey data is made using a PROBIT estimator. The PROBIT function is also known as the *inverse cumulative distribution* function. This function converts parameters of the distribution of an indicator (e.g. the mean and standard deviation of a *normally distributed* variable) into cumulative percentiles. This means that it is possible to use the normal PROBIT function with estimates of the mean and standard deviation of indicator values in a survey sample to predict (or estimate) the proportion of the population falling below a given threshold. For example, for data with a mean MUAC of 256 mm and a standard deviation of 28 mm the output of the normal PROBIT function for a threshold of 210 mm is 0.0502 meaning that 5.02% of the population are *predicted* (or *estimated*) to fall below the 210 mm threshold.

Both the classic and the PROBIT methods can be thought of as estimating area:



The principal advantage of the PROBIT approach is that the required sample size is usually smaller than that required to estimate prevalence with a given precision using the classic method.

The PROBIT method assumes that MUAC is a normally distributed variable. If this is not the case then the distribution of MUAC is transformed towards normality.

The prevalence of SAM is estimated in a similar way to GAM. The prevalence of MAM is estimated as the difference between the GAM and SAM prevalence estimates:

$$\widehat{\text{MAM prevalence}} = \widehat{\text{GAM prevalence}} - \widehat{\text{SAM prevalence}}$$

### 2.1.15 Visual impairment

An indicator of visual impairment is derived from this questionnaire component:

---

**Visual Acuity**

---

va1

Do you normally wear glasses?

*If the person wears glasses, ask if they are more comfortable wearing their glasses to look at your chart at 2 meters. Let the person decide.*

*Demonstrate (close to the person) how to do the ‘tumbling E’ test:*

- Show the direction the E is pointing.
  - Ask the person if they understand.
- REPEAT if needed.

Test with E at 2 meters:

- Use the string to measure 2 meters from the person.
  - Hold the card at eye level and 2 meters away from the person.
  - Turn the card in four different directions. Hide the card in your back before turning it each time.
- 

va2a

First time

1 = Correct

2 = Incorrect

3 = Refused

4 = Blind

va2b

Second time

1 = Correct

2 = Incorrect

3 = Refused

4 = Blind

va2c

Third time

1 = Correct

2 = Incorrect

3 = Refused

4 = Blind

va2d

Fourth time

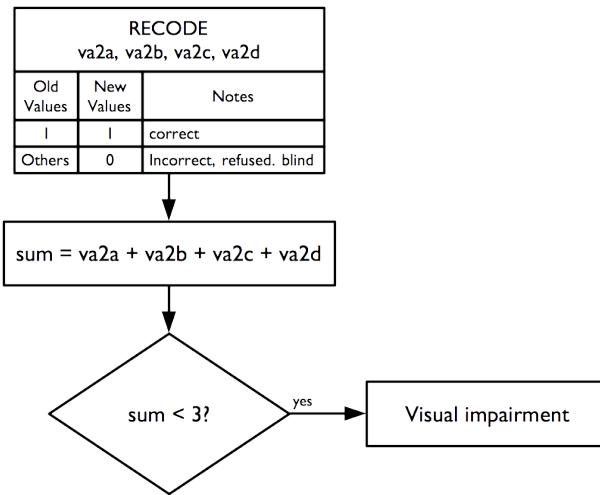
1 = Correct

2 = Incorrect

3 = Refused

4 = Blind

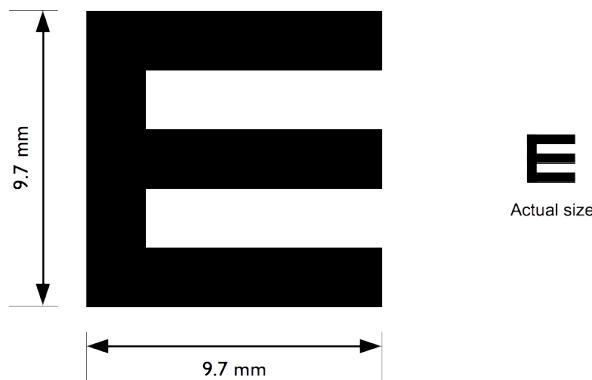
And is calculated as:



The “illiterate E” or “tumbling E” (the preferred term) is a validated and widely used method for measuring visual acuity:

- Taylor HR, “Applying new design principles to the construction of an illiterate E chart”, *American Journal of Optometry & Physiological Optics*, 55:348, 1978
- Kaiser PK, “Prospective Evaluation of Visual Acuity Assessment: A Comparison of Snellen Versus ETDRS Charts in Clinical Practice (An AOS Thesis)”, *Transactions of the American Ophthalmological Society*, 107: 311–324, 2009

The size of the “E” used:



as well as the distance used for the test (two metres) and the indicator calculation apply the WHO case definition of visual impairment (i.e. visual acuity  $< 6 / 18$ ).

The tumbling E card should be laminated (i.e. plastic coated and have a two metre cord attached which helps to ensure that the visual acuity test is performed at the correct distance (See Figure 2.1).

After demonstrating to the respondent what the test is about (i.e. the subject should indicate which direction the branches of the ‘E’ are pointing), the test is administered at a distance of two meters, turning the card in four different directions, and asking the person to indicate which direction the branches of the “E” is pointing. If the subject wears glasses, they are allowed to use them during the test if they want to.

**Note :** If the person is unable to correctly answer at least three times out of four, they have a visual impairment. A simple visual acuity test such as the ‘tumbling E’ test also does not indicate anything about an underlying disease such as glaucoma or the need for reading spectacles (presbyopia). These conditions are common in people aged 60 years or older. Subjects

failing the visual acuity test should be counselled to visit an ophthalmologist for a detailed eye examination.

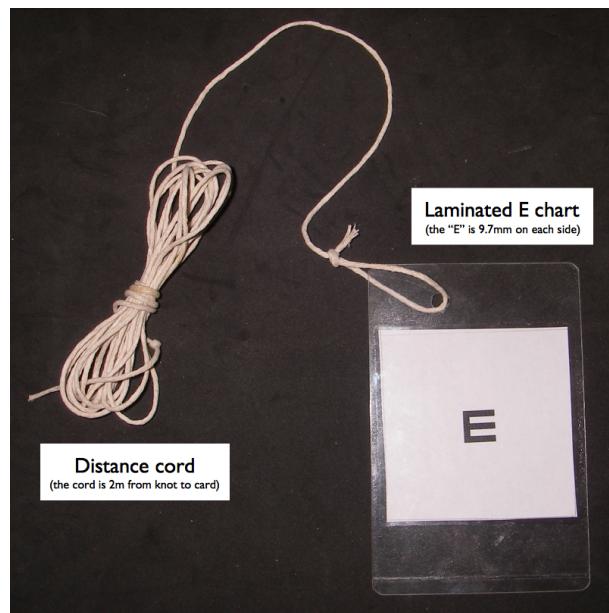


Figure 2.1: Equipment used to measure visual acuity

### 2.1.16 Miscellaneous indicators

Data for a small group of miscellaneous indicators are also collected and reported. These are derived from these questions:

---

#### Hunger – Ration - Relief

---

- |    |   |                 |                          |
|----|---|-----------------|--------------------------|
| f6 | Are you or anyone in your household receiving a food ration on a regular basis?   | 1 = Yes; 2 = No | <input type="checkbox"/> |
| f7 | Have you or another member of your household received non-food relief items such as soap, bucket, water container, bedding, mosquito net, clothes, or plastic sheet in the previous four weeks? | 1 = Yes; 2 = No | <input type="checkbox"/> |
- 

---

#### Activities of Daily Living

---

- |    |                                    |                 |                          |
|----|------------------------------------|-----------------|--------------------------|
| a8 | Do you have problems chewing food? | 1 = Yes; 2 = No | <input type="checkbox"/> |
|----|------------------------------------|-----------------|--------------------------|
- 

and are calculated as:

RECODE a8 (problem chewing food)			RECODE f6 (any ration)		
Old Values	New Values	Notes	Old Values	New Values	Notes
1	1	yes	1	1	yes
2	0	no	2	0	no

"Problems chewing food" is reported as a separate indicator

RECODE f7 (non-food relief items)		
Old Values	New Values	Notes
1	1	yes
2	0	no

"Received non-food relief items in previous month" is reported as a separate indicator

## 2.2 A note on data management and data analysis

This section has described how RAM-OP data is used to create a broad set of indicators. If you do not want to use the standard RAM-OP software to do this then you can use this information to create data entry systems and data management scripts for your favoured database or statistical analysis software. See the sections on **RAM-OP datasets** and **RAM-OP questionnaire** for more compact information on variable names and codes that you may find helpful.

It is important to note that data analysis procedures need to account for the sample design. All major statistical analysis software can do this (details vary). There are two things to note:

- The RAM-OP sample is a two-stage sample. Subjects are sampled from a small number of primary sampling units (PSUs).
- The RAM-OP sample is **not** prior weighted. This means that you will need to provide per-PSU sampling weights. These are usually the populations of the PSU.

You will need to specify this sample design to your statistical analysis software. If you fail to do this then your analysis may produce estimates that place undue weight to observations from smaller communities with confidence intervals with lower than nominal coverage (i.e. they will be too narrow).

The standard RAM-OP software uses *blocked weighted bootstrap* estimation approach:

- **Blocked** : The block corresponds to the PSU or cluster.
- **Weighted** : The RAM-OP sampling procedure does not use population proportional sampling to weight the sample prior to data collection as is done with SMART type surveys. This means that a posterior weighting procedure is required. The standard RAM-OP software uses a "roulette wheel" algorithm to weight (i.e. by population) the selection probability of PSUs in bootstrap replicates.

A total of  $m'$  PSUs are sampled *with-replacement* from the survey dataset where  $m'$  is the number of PSUs in the survey sample. Individual records within each PSU are then sampled *with-replacement*. A total of  $n'$  records are sampled *with-replacement* from each of the selected PSUs where  $n'$  is the number of individual records in a selected PSU. The resulting collection of records replicates the original survey in terms of both sample design and sample size. A large number of replicate surveys are taken (the standard RAM-OP software uses  $r = 399$  replicate surveys but this can be changed). The required statistic (e.g. the mean of an indicator value) is applied to each replicate survey. The reported estimate consists of the 50th (point estimate), 2.5th (lower 95% confidence limit), and the 97.5th (upper 95% confidence limit) percentiles

of the distribution of the statistic observed across all replicate surveys. The blocked weighted bootstrap procedure is outlined in Figure 2.2.

The principal advantages of using a bootstrap estimator are:

- Bootstrap estimators work well with small sample sizes.
- The method is *non-parametric* and uses empirical rather than theoretical distributions. There are no assumptions of things like normality to worry about.
- The method allows estimation of the sampling distribution of almost any statistic using only simple computational methods.

The standard RAM-OP data analysis software is described in the section **Standard RAM-OP software**.

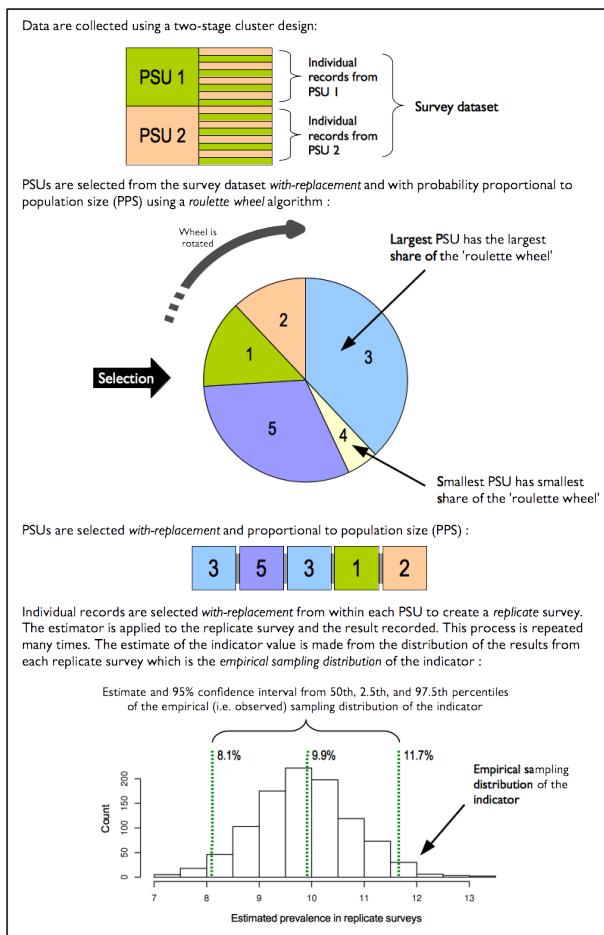


Figure 2.2: The blocked weighted bootstrap used by the standard RAM-OP software



# **Chapter 3**

## **The RAM-OP questionnaire**



# Chapter 4

## Datasets



# **Chapter 5**

## **Practical Fieldwork**



# Chapter 6

## RAM-OP Software

### 6.1 Data entry

### 6.2 Data analysis

This manual covers analysing your data using the **RAnalyticFlow** workflow. An **RAnalyticFlow** workflow may be thought of as an “*app*” that makes it easy to analyse your survey data.

To use the **RAnalyticFlow** workflow you must install:

- **The R Language for Data-Analysis and Graphics (R)** : This is the “*engine*” which does all the work of analysing your data. You can get the R installation program from: <http://cran.r-project.org>. Following are links to download operating software-specific versions of R:
  - Download R for Linux
  - Download R for (Mac) OS X
  - Download R for Windows
- **R packages** (libraries of functions needed to work with the **RAnalyticFlow** workflow) : You can install these from within **R** using the Package Installer function within R. The libraries needed are:

Package	Comments
<b>rJava</b>	Required: Used by <b>RAnalyticFlow</b>
<b>JavaGD</b>	Required: Used by <b>RAnalyticFlow</b>
<b>codetools</b>	Required: Used by <b>RAnalyticFlow</b>
<b>foreign</b>	Required: Opens <b>EpiData</b> (REC) files
<b>car</b>	Required: Used for PROBIT estimator
<b>ggplot2</b>	Desirable: Provides many plotting functions
<b>data.table</b>	Desirable: Speeds up working with large dataset

The Package Installer function can be called in R using the following command:

```
install.packages(c("rJava", "JavaGD", "codetools",
                  "foreign", "car", "ggplot2", "data.table"),
                  repos = "https://cloud.r-project.org/")
```

The `repos` argument in the R command above specifies the CRAN mirror from which you to download the package/s you want to install. Here we specify the cloud-based mirror for CRAN provided by RStudio. If unspecified, the installation process will prompt you to select a mirror from which to download packages from. If you already know the URL of the CRAN mirror you want to use, specify this in the `repos` argument.

Note that **RAnalyticFlow** may require you to have **Java** installed. Check the instructions on the **RAnalyticFlow** download page and on this [starter guide](#).

All of this software is open source and free to download, copy, and use. It will run on Windows, Mac OS X, and Linux (and other UNIX-like) operating systems. Your ICT department should be able to help you with installing this software.

In addition you will also need a copy of the **RAnalyticFlow** workflow and supporting files. These are available from:

<http://www.brixtonhealth.com/ramOP.rflow.zip>

You may need to extract the file from the ZIP archive before use if this is not done automatically.

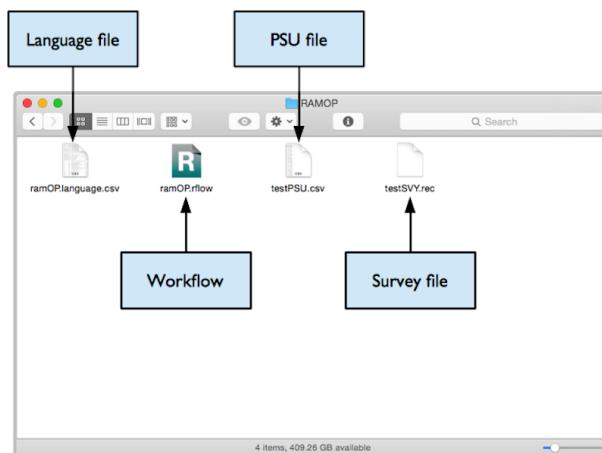


Figure 6.1: Directory structure of RAM-OP RAnalyticFlow package

Before starting to analyse your data you should create a project directory or project folder. This is just a normal folder or directory that can be created using your usual file manager (e.g. Windows Explorer™ in Windows™ or the Finder™ in Macintosh OS-X™). The project directory or project folder should contain:

1. Your PSU file (here we assume this file is called `testPSU.csv` but it could have any name). This file must be a comma-separated-value (CSV) file.
2. Your survey data file (here we assume this file is called `testSVY.rec` but it could have any name). This file can be an EpiData (REC) file or a comma-separated-value (CSV) file.
3. The language file (always called `ramOP.language.csv`). This file provides text that is used in reports and graphics. The purpose of this file is to make the data analysis software produce reports in any language. This file must be a comma-separated-value (CSV) file.

#### 4. A copy of the file ramOP.rflow.

When you have created the project directory or project folder with the required files you can start RAnalyticFlow.

Note: The **testSVY.rec** and **testPSU.csv** files are example data files and are distributed with the **RAnalyticFlow** workflow. You can use these files to practice analysing data using **RAnalyticFlow**, and as examples of RAM-OP survey data and PSU files.

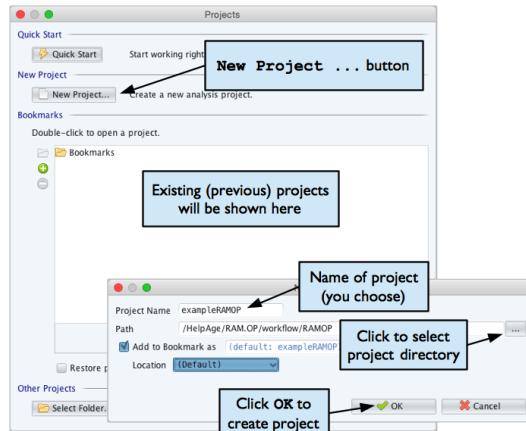


Figure 6.2: Creating an RAnalyticFlow project

Before you start work you will need to create a project for your survey:

1. Click the **New Project...** button
2. Give your project a useful (i.e. descriptive and memorable) name. This might be a name that describes the survey. For example, if the survey was done in the Kereinik locality of West Darfur in December 2015 you might use the name **WD.Kereinik.Dec2015.RAMOP**
3. Give the location of your project directory or project folder. This is the directory or folder which contains your survey data file, your PSU file, the RAM-OP language file, and a copy of **RAMOP.rflow** (see previous page). The location of the project directory or project folder (labeled “Path” by the software) that **RAnalyticFlow** selects automatically will almost always be wrong. You need to specify this manually.
4. Click the **OK** button

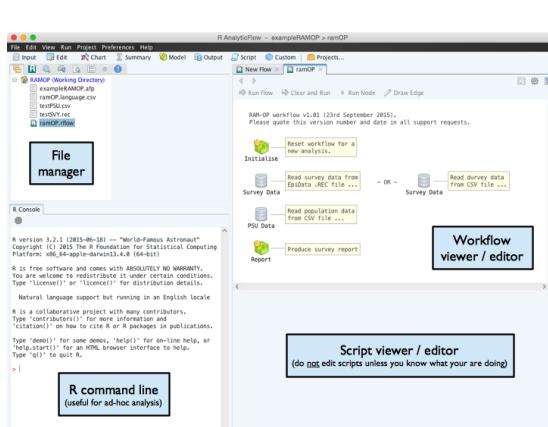


Figure 6.3: Open an RAnalyticFlow workflow

Double click the item named **ramOP.rflow** shown in the file manager pane of the **RAnalyticFlow** window. This will open the data-analysis workflow which will be shown in the workflow viewer / editor window of the **RAnalyticFlow** window.

Once you have opened the workflow you need to initialise it (i.e. load libraries, useful analysis function, and initialise the workspace for a new analysis):

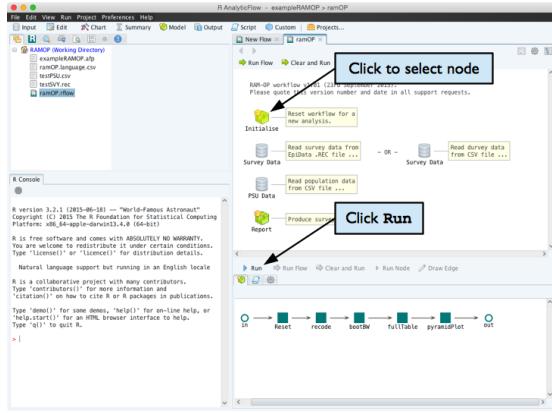


Figure 6.4: Run an RAnalyticFlow workflow

Once this is done, you should:

1. Retrieve your survey data. This can be in EpiDat (REC) format or CSV format. Select and run the appropriate **Survey Data** node and select the survey data file.
2. Retrieve the PSU date data. Select and run the **PSU Data** node and select your PSU file.
3. Produce the survey report and graphics. Select and run the **Report** node. This will take some time to complete because the analysis uses computer intensive techniques to make best use of the available data. The Report node/icon will have black lines around it has completed running the report.

# Chapter 7

## Conclusion

We live in an ageing world, where people aged 60 or over will be 2 billion or about 22% of the world's population by 2050.

Currently, two in three people aged 60 years or older live in developing countries. By 2050, nearly four in five older people will be living in the developing world.

The changing demographics of ageing combined with the increasing number of disasters will exert a disproportionate impact on the world's oldest and poorest.

In this context, identifying the needs of older people as accurately as possible is a necessity. More and more donors and UN agencies are now willing to include older people in their programmes. Age markers, to complement gender markers, will be disseminated very soon

RAM-OP is offering a fast, robust, reliable, tested and user-friendly way of assessing the needs of older people. It can be used in humanitarian situations as well as in development contexts. The modular structure of RAM-OP allows for adaptations, making it exhaustive or limited to essential indicators according to the immediate needs.

As more organisations start to use it, RAM-OP will evolve and improve. New versions of RAM-OP can be created (for example, RAM-OP for refugee or displaced people camps). We wish that a greater number of actors will start using RAM-OP and make it their own.