

NetCALC 3.2 User Instructions

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Introduction

This document provides a step by step support in the use of the NetCALC tool for the major functions. The tool can be used without understanding the details of how it works and how it is constructed, but if you are interested in knowing more about what is going on behind the surface, you should first read the “background” document.

Although each of the four NetCALC modules works independently, you should always first read the “Getting started” section as here general aspects of the use of NetCALC are explained.

Getting started

NetCALC is an MS-Excel-based tool written for Excel version 2007 or higher. In order to use NetCALC you must first enable macros. For windows OS this is usually done in the "trust center". When opening NetCALC on a PC you may see a yellow bar on the top of your screen asking whether you want to enable the content. Click "Enable content" and NetCALC will work properly. In Mac OS you will be prompted with a pop-up window when opening the document. Click on "Enable Macros" in order to use NetCALC.

Moving around

There are two principle ways of moving around within NetCALC:

1. Using the **buttons**: each page has buttons which - when clicked - will lead to the indicated page and each page has a "go to menu" button that will lead you back to the menu page. On the menu page you will see four main buttons corresponding to each of the modules with a detailed description of the function. On the other pages the first module is referred to as "coverage estimation", the second "sustain UC", the third as "continuous distribution", and the fourth "free modelling". Additional buttons are clearly marked and lead to additional input pages for population data and advanced settings for the continuous distributions module.
2. Using the **tabs**: as in any Excel spread sheet you can click on the tabs for each page to move around. The **green** tabs are the main modules and input pages. The **purple** tabs are the pages where the actual calculations take place and are only of interest if you want to see and understand the details of the procedures and the **orange** tabs refer to support pages.

Describing and saving your work

NetCALC is a "read only" file in order to protect its integrity and ensure that you get an empty and functioning version each time you open NetCALC.

In order to save your work you must always first save the file under a new name which is done using the "**save as**" button. It is also recommended to insert a brief description of the work you are doing in this particular session that you are saving in the designated space at the bottom of the menu page (this description will also be saved in the "settings"). Once you have saved under a new name you can use the "save and exit" button.

Alternatively, you can only save the settings and outputs using the buttons on the menu page. This will open a new Excel document called "NetCALC output" which can be updated at any time during your session. This is also a "read only" file so you need to save it under a different name. Once you have completed your work and saved all settings and outputs you can exit NetCALC without saving. This will lose all entries into NetCALC but you can reconstruct the model at any time using the saved settings.

Each module has a "reset to default" button which can be used to clear any entries into that module and restore the settings as they were when you opened NetCALC.

Basic data inputs

Before you can run any of the NetCALC modules the core population information on the menu page must be filled, namely:

1. The year of the last census
2. The population size at that census
3. The average household size of the population
4. The average population growth rate

These data can be from the national level, a region or province, a district or even smaller as long as reliable estimates for these indicators are available. Most of the time census data will be used and NetCALC will accept any census date that is 15 years before the current year or less. If you want to use a subpopulation such as several provinces or the “at risk of malaria” population, then you have two options: you can either enter the demographic indicators for that population and make sure that the “at risk” field is set to 100% or use the national level data and define the sub-population as a proportion of the national population using the “at risk” field to the left of the population data entry fields. This can, but does not have to be the population at risk of malaria as any other sub-division will also work. It will, however, assume that the national mean household size and growth rate does also apply to the sub-population. If this is not the case the first option is the better choice.

What should you do if the census data is not available or too unreliable? In this case you can use the best estimates you have as long as you have data for all four fields and the data you use are acceptable to those who are to use your results.

Understanding the two major output variables of NetCALC

Throughout NetCALC the following definitions for categories of mosquito nets are being used:

LLIN-Long-Lasting Insecticidal Net: one of the WHO Pesticide Evaluation Scheme recommended products with optimal field performance of the insecticidal protection of at least three years. In NetCALC this type of net remains functional ITN as long as it is in the system as defined by the loss-function selected. This category also includes any untreated net once it has been treated with a “long-lasting treatment kit” (insecticide plus binding agent), e.g. the **bundled LL-kit ITN** or a previously untreated net treated with an **LL-kit**. Such nets also are counted as LLIN until they are “lost”.

ITN- Insecticide Treated Net: this category comprises **all currently treated nets**, i.e. **LLIN** as well as any net conventionally treated with insecticide within the last 12 months, either distributed as a **bundled conventional ITN** where the treatment is done by the user or a net dipped before distribution by the provider . A net treated with such conventional insecticide treatment (no binding agent) will remain an ITN for the year it is treated in but return to being an untreated net the following year. The same applies for a net re-treated with a **conventional re-treatment kit**.

Untreated net: this comprises any net that has never been treated with insecticide or was treated with a conventional insecticide kit the previous year.

There are two indicators for the outcome of the ITN distributions which represent the core of the RBM recommended four indicators for “universal coverage with ITN”:

Proportion of households with at least one ITN: this defines the minimal spatial household ownership coverage with any ITN (or net). However, it must be kept in mind that this indicator does not mean ownership of “just one ITN” and that the number of ITN per net owning household gradually increases with increasing coverage and at 100% is equivalent to “one ITN for every two people” or at population level full “universal coverage” as defined by WHO as $ITN \text{ equal to } population/1.8$. (For more details of the calculations see document on NetCALC background).

Proportion of population with access to ITN within household: this assumes that each ITN in a household is used by two people and describes the maximum proportion of people who could use an ITN if they chose to do so.

The other two RBM indicators for “universal coverage with ITN” are a) the proportion of households with one ITN for every two people or “enough” ITN for all household members which together with the indicator “at least one ITN” defines the ownership gap; and b) the proportion of population using an ITN the previous night which in comparison to the “access” indicator defines the use gap. Unfortunately, these additional indicators cannot be estimated by NetCALC. (For more details of the calculations see document on NetCALC background).

The loss or decay functions

The loss or decay function defines the rates at which each annual cohort of nets is reduced in a specific year by nets being destroyed, thrown away or used for other purposes other than sleeping under until the cohort is completely gone. Nets that only change owner, i.e. those given away to others or stolen, but are still used are for malaria prevention by somebody, are not defined as lost. Loss functions are negative-cumulative distributions of remaining nets that are S-shaped and are named after the median survival time of nets in years, i.e. a “three year” net has 50% of originally distributed nets remaining after three years, 12% surviving up to 5 and 1% up to 7 years. Although there is increasing evidence that the survival function of nets in the field is indeed S-shaped with a median of around three years (see background document for details) these functions, especially those for a 5-7 year median survival, are hypothetical at this point and may have to be corrected once more field data on net durability becomes available.

Net survival (durability) in NetCALC can be varied between a median of two and seven years and the value selected will significantly impact on the output of NetCALC (e.g. the number of nets needed to achieve and sustain a certain coverage target) but is set as a default to three years which is the most likely true value in most settings based on currently available, scarce data. Nonetheless, if data for a specific product in a given setting suggests a longer or shorter survival or is the objective of the modelling is to test the need for nets under different survival assumption, then this can be applied in NetCALC.

Via the “view decay functions” button on the main menu page of NetCALC (upper right side) the different loss or decay function can be seen with a detailed “survival” table per year that allows a detailed understanding how many nets of each annual distribution cohort are still assumed to be present in the NetCALC calculations.

Copy-pasting data within NetCALC

Input as well as output data can easily be copy-pasted within NetCALC, e.g. from module 1 “coverage estimation” or module 3 “continuous distribution” to module 4 “free modelling”, or to an external file (in addition to the automated export functions described above). However, it is strongly recommended to always use ***paste special: values only*** in order to avoid changes in the formatting.

Error messages

Throughout NetCALC error messages will alert you if necessary data input is missing, certain entries implausible or out of the range of legal values for NetCALC in order to minimize errors. In case of “strange” or unexpected results you should, however, always crosscheck all settings or entries.

Module 1 - Coverage estimation

Purpose

The objective of this module is the estimation of ITN ownership and ITN access coverage based on the most recent survey results and the number of nets distributed between that survey and the current date.

This is of interest to control program managers when the last survey is some time ago and since then significant distributions have taken place so that the available data does not really reflect the achievements of the program. In this case the results from this module can be used to report a projected coverage rate (for the accuracy of the estimations see the background paper). Similarly, this module can provide a realistic idea to which level coverage rates have dropped if a mass distribution is already some time ago and little or no distributions have taken place since.

This module only estimates coverage up to the current year but not beyond, i.e. into the future. Such estimations have to be done using the “free model” in module 4.

Settings and input

Three steps are needed to obtain any outputs:

1. Enter details of the last survey results
2. Set the net durability for the different type of nets distributed
3. Enter the number of nets and/or net treatments distributed by type and year

Step 1

Survey data are entered in the upper left box on the “coverage” page and includes the following:

Year of survey: this can be as far back as 10 years before the current year but NetCALC will not accept anything before. Once the year is entered, the data input box below titled “nets distributed or sold” will change to display the survey year as the first column and continue across up to the current year. Since NetCALC will assume that the survey data will apply to the full year of the survey and accordingly apply a full year’s loss of nets, irrespective of the month of the data collection, it is recommended to use the next year as the survey date if the survey was done at the end of the year, e.g. November or December.

Net and ITN coverage: two coverage rates have to be entered that are found in almost all household surveys: the “proportion of households with any net” and the “proportion of households with any ITN”. Since ITN are a subset of nets, the ITN coverage rate always has to be smaller than the net coverage and NetCALC will issue an error message if it is not.

Proportion of LLIN among ITN: here NetCALC offers two entry possibilities “LLIN 1” and “LLIN 2”. The second LLIN is intended for a situation where two different types of LLIN have been distributed in the country or area of interest for which there are local data to suggest that one has a significantly higher durability (survival) than the other. You can add a name describing the brand or distribution channel “LLIN 1” and LLIN 2” refer to. In most cases this will not be the case and the “LLIN 2” field can be left at the default of 0%. The required figure for this entry, i.e. the “proportion of all ITN found in the survey that were LLIN” is not usually presented in any of the standard tables of a Malaria Indicator Survey (MIS) or Demographic and Health Survey (DHS) but can be calculated from the composition by net brand usually presented in the report. If this data is not available, however, a rough estimate can be made.

Proportion of bundled nets treated: this entry is only needed if nets with a conventional insecticide treatment kit inside have been distributed or sold during the timeframe of interest. It describes the proportion actually treated by the users.

What if I don't have survey data or it is unreliable?

Use the best estimate you have available.

Step 2

LLIN1, LLIN2 etc: Set the median net survival for each type of LLIN. The default is 3 years; half-year increments are available in NetCALC 3.0 and above.

Step 3

Enter the number of nets distributed since the survey in the “Nets Distributed or Sold” box. You will not be able to input nets beyond the current year (NetCALC uses your computer’s date function to implement this).

Output

Output will show in graph form in the “Quick view of coverage”, showing both ITN ownership and ITN access, and any spillover. You may click on “see detailed outputs” button to see the table showing the percent coverage projected after the date of the last survey, and a larger coverage graph.

Module 2 - Sustain UC (replacement need)

Purpose

The objective of this module is the estimation of the numbers of nets needed to ensure universal coverage is sustained, based on current levels of ITN ownership and access.

This is of interest to control program managers when preparing, for example, gap analyses and projecting how many nets will need to be procured over the course of the coming years. It does not take into account the channel(s) through which the nets may be distributed, only the total number of nets required, annually and cumulatively.

Settings and input

There are three steps:

1. Select your starting point of coverage
2. Select the target coverage you want to achieve
3. Select the median LLIN survival in years

Step 1

You may select the actual data entered in the coverage section (if you are using results from a recent survey), or you may begin from a hypothetical coverage. The latter is useful if planning out how many nets will be needed following a planned mass campaign, in which you expect to reach a certain level of coverage.

Step 2

Select target level at the start. If you have selected “start from a hypothetical LLIN coverage”, this sets your starting coverage level. Next, set the target to be sustained. Options range from 80-100%.

Step 3

Select the expected median survival of the LLINs, as usual, the default is three years.

Output

Three graphs are shown:

1. Annual net replacement need – the amount of nets needed on a yearly basis
2. Cumulative net replacement need – the total nets needed over time
3. Replacement need related to annual population – a line graph indicating how many nets are needed per year per 100 people.

The Results table shows several outputs:

1. Net gap if no replacement – the total gap, cumulative, if no distributions occur
2. Annual and cumulative net replacement need, in numbers of nets
3. Replacement need related to population at baseline, and to annual population. These figures are not very important.

Module 3 - Continuous distributions

Purpose

The continuous distribution module allows program planners to select combinations of channels for ITN distribution, assess how many nets would be deliverable, and how this may or may not sustain universal coverage in the absence of mass campaigns.

This is useful for program planners devising a comprehensive continuous distribution strategy.

Settings and input

There are two steps

1. Set target levels at the start and those to be sustained
2. Set up each of the routine (push) and other (pull) channels

Step 1

Select the target level at the start (top left). This automatically pulls the information entered into the “Sustain Universal Coverage” module, but can be adjusted. Target level at the start means current level of coverage (or expected level prior to beginning continuous distribution activities).

Next, select target coverage to be sustained, and the median LLIN survival in years.

Step 2

Routine Service (Push) Options:

Ante Natal Care Services –

1. Set the contact rate. This is normally the proportion of women who get at least 1 ANC visit.
2. Set the efficiency rate. This is the proportion of women coming for ANC that the program expects would get a net. If there are major stockouts expected, this value may be quite low. Efficiency may also increase over time (adjustable using the Advanced settings).
3. Set the start year.

Immunization Program (EPI)

1. Set the age group. For ITN distribution at the measles vaccination (9 months), select <1 year. If <2 or <5 years options are selected, this will indicate that each child under 2 (or 5) would receive a net every year.
2. Set the contact rate. This is normally done using the proportion of children receiving measles vaccinations.
3. Set the efficiency rate (see above)
4. Set the start year

Curative Care

1. Set the % of total population reached through curative care. This can be estimated from OPD attendance rates. This channel assumes that a net is given to each person attending curative services for malaria, regardless of their diagnosis.
2. Set the efficiency rate (see ANC)
3. Set the start year

Schools

1. Click the education set up button
2. You will need information on gross attendance ratios and cumulative dropout rates from a recent report; the United Nations Statistics Division, data.un.org, is a good resource.
3. Set the ages of primary school – normally 6-11, in 6 classes, but may vary by country.
4. Set the ages for secondary school – normally 12-17, in 6 classes, but may vary by country.
5. Set program efficiency for both primary and secondary. This is the expected proportion of children in schools who would receive a net through the system. Current school pilots are reaching around 90%.
6. Set the Gross Attendance Ratio for primary and secondary school. Be careful to look up and use only this indicator for the school module to work properly.
7. Set the cumulative dropout rate (% of first year students not finishing the last year) for both primary and secondary.
8. Tick the boxes to include classes; use “select all” and “unselect all” as needed.

Other continuous systems (Pull)

These channels include community schemes, where community groups, community leaders, or other community entities stock and distribute nets to those requesting them. Subsidized retail markets and full retail markets are self-explanatory.

For each of the Pull channels, the same parameters can be set.

1. Set % of households reached. This is estimated based on current reach of other community outreach activities, or data from existing subsidized or retail sales. These can also be back-calculated, for example, if a subsidized channel is expected to fill the final gap in a continuous distribution strategy, program planners can adjust this setting to see what percentage of households would need to be reached. For a community-only CD system, roughly 50% of households usually need to be reached each year with 1 net per household.
2. Set the average number of nets to be distributed per household.
3. Set the start year.

Output

The graph at top right will show the rise and fall of ITN coverage as channels are added and adjusted. The table below shows the total number of LLIN distributed per year (first line), as well as the cumulative LLIN.

Programmatic Considerations

1. Selecting <2 or <5 in the EPI will distribute nets to all children of that age range each year; selecting <5 is equivalent to conducting an under-five mass campaign every year
2. Program efficiency setting is most useful as a rough estimate of coverage. However, when planning for procurement, enough nets should be purchased to reach 100% of your target group(s). Procurement based on the NetCALC outputs when program efficiency is less than 100% creates an artificial ceiling for the success of the program and you will not be able to reach all pregnant women even if the system is working perfectly.

Module 4 - Free modelling

Purpose

The free model module provides more flexibility in combining net distributions, for example, looking historically at a series of mass campaigns and continuous distribution channels, or combining the two looking forward.

Settings and input

There are two steps in this module.

1. Set up median net survival
2. Input numbers of ITNs distributed or projected to be distributed

Step 1

Set up the median survival in years for each type of net. The default is three, but must be set up for LLIN 2 and LLIN3.

Step 2

Input various types of nets into the table. You may combine mass campaigns and continuous distribution using outputs from the continuous module, by using the line for LLIN 1 for campaign nets, and LLIN 2 for CD nets, as one example. You can enter the description of each row in the "name" field.

Output

Output of ITN coverage shows in the graph as well as in the bottom two lines of the table (in blue outline).

Total numbers of nets and spillover are shown in the green-lined portions of the table.