

Modeling ITN coverage for continuous distribution planning in Zanzibar using NetCALC



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# Background and rationale

VectorWorks is supporting the Zanzibar Malaria Elimination Program (ZaMEP) in planning continuous distribution of ITNs in Unguja and Pemba. In 2013, planning for CD was done through NetWorks and the COMMIT project, and implementation of CD began in June 2014. ZaMEP and other stakeholders require estimates of coverage that will be attained following the Zanzibar universal coverage campaign in April 2016, and estimates for numbers of ITNs needed for continuous distribution following the campaign.

Using NetCALC modeling to obtain coverage estimates can help the NMCP and partners with the following three questions:

* What is the estimated ITN coverage after the April 2016 distribution in Zanzibar?
* How many nets would be needed to reach and sustain an 80% population access to ITN within the household up through June 2017?

This information will help make informed decisions in the planning of continuous distribution in the short term for Zanzibar.

The NetCALC tool, developed under the NetWorks project, is an Excel-based tool for modeling ITN coverage that can be achieved using a variety of campaign and continuous ITN distribution channels. The tool, instruction manual, and an online training course are freely available [online](https://www.k4health.org/toolkits/continuous-distribution-malaria/netcalc-tool-planning-cd). This report describes the data sources used and the resulting output of this NetCALC modeling.

# NetCALC parameterization and assumptions

## Demography

Modeling was conducted using NetCALC version 2.1 using the “free model” module. The source of the demographic data for Zanzibar (Table 1) was taken from the 2012 census data obtained from the National Bureau of Statistics website <http://www.nbs.go.tz>.

Table : Demographic data used for NetCALC modelling (source 2012 census and 2014 MOE report)

|  |  |
| --- | --- |
| Variable |  |
|  |  |
| Census year | 2012 |
| Population | 1,303,569 |
| Household size | 5.2 |
| Annual growth rate | 2.8% |

## Past ITN distributions

Distributions in Zanzibar were obtained for the years 2012-2016 from ZaMEP. The numbers of ITNS distributed are shown in Table 2. The Tanzania Red Cross Report on the Zanzibar Universal Coverage Campaign (ZUCC) in 2012 was used. From June 2014-January 2016, ZaMEP reported that 289,661 ITNs were distributed through continuous distribution. From June 2014 to June 2015 216,310 ITNs were distributed (43,048 through ANC, 40,271 through EPI, and 132,991 through Community). From July to December 2015 a total of 73,351 nets were distributed (22,277 via ANC, 20,236 through EPI, and 30,838 through Community). To make estimates for ITNs distributed fall into calendar years, the June 2014-June 2015 quantity was divided in half, such that 108,155 ITNs were assumed to have been delivered in 2014, leaving the other 108,155 going out in 2015, in addition to the 73,351, for a total of 181,506 ITNs delivered in 2015 through the CD channels. A hot spot campaign was implemented in June 2015 in 81 Shehias; these Shehias will be excluded during the 2016 ZUCC.

Table : ITNs distributed through TNVS (targeting pregnant women and infants). Source: MEDA TNVS redemptions database.

|  |  |  |
| --- | --- | --- |
| Year | # of ITNs | Mode |
| 2012 | 651,365 | Universal coverage campaign |
| 2013 | 0 |  |
| 2014 | 108,155 | Continuous distribution (6 months) |
| 2015 | 85,946181,506 | Hot spot campaignContinuous distribution (12 months) |
| 2016 | 787,205 (planned) | Universal coverage campaign |

However, when the numbers of nets distributed through these campaigns were entered into NetCALC, an excess of nets beyond 100% coverage (i.e., “spill over”) was detected (Figure 1). This suggests that the census and campaign distributions figures do not match. Since NetCALC does not “disregard” these excess nets, but rather applies them towards coverage in the following years, leaving such a large spill over in the model will lead to unrealistic estimates.

Figure : Estimated coverage in Zanzibar including all ITNs since 2012



Such a significant spillover begs the question of whether the population estimates are incorrect, or whether the planning for the 2016 ZUCC did not take into account any of the CD nets. Figure 2 models coverage for just the 2012 and 2016 ZUCCs, and is somewhat more reasonable in its amount of spillover. It may be that program planners did not account for the CD nets when quantifying nets needed for the 2016 mass campaign.

Figure : Estimated coverage in Zanzibar including only the 2012 and 2016 UCC



To simulate a situation in which the 2016 UCC will achieve 90% population access, and assuming that the quantification of 787,205 nets is the real need based on population figures, the amount of nets distributed in the 2016 UCC was adjusted by hand in NetCALC so that the population access indicator reached 90%. This required reducing the 2016 UCC to a total of 300,000 nets, a reduction of 487,205 nets.

In this scenario, in order to maintain coverage through 2017 of 85% population access, 170,000 ITNs are needed in 2017 (Figure 3).

Figure : Estimates of population access in Zanzibar, adjusting 2016 UCC distribution to reach 85% population access, and delivering 170,000 ITNs via CD in 2017



# Results

Using the final method described above, Table 3 and Figure 4 present the estimated population access to ITNs at the end of 2016.

Table : Estimated population access to ITNs at the end of 2016, based on previous distributions

|  |  |  |  |
| --- | --- | --- | --- |
| ITN median survival in years | Adjusted UCC (to reach 90% population access) | # of ITNs needed in 2017 to maintain 85% population access | # of ITNs needed in 2018 to maintain 85% population access |
|  |  |  |  |
| 2.0 | 495,000 | 205,000 | 325,000 |
| 2.5 | 395,000 | 190,000 | 260,000 |
| 3.0 | 300,000 | 170,000 | 235,000 |
| 3.5 | 205,000 | 160,000 | 210,000 |
| 4.0 | 130,000 | 140,000 | 200,000 |

Figure : Sensitivity analysis for population access in Zanzibar based on varying ITN median lifespans. This model includes the CD and hotspot nets, and adjusts the 2016 UCC in each case to reach 90% population access, and the 2017 CD net inputs to reach 85% population access, per Table 3.

Important note on survey estimates in Figure 3:

Survey points in 2012 reflects the mean population access to ITN from the 2011-2012 THMIS for households surveyed in the month of April, which likely reflects coverage after the 2012 ZUCC (but may not entirely reflect it, due to the schedule of the THMIS fieldwork and the ZUCC). The population access estimate shown for 2014 is taken from data from the 2014 Zanzibar KAPB survey, conducted by ZaMEP, where ownership of any net was 76%, and 46% of households had one net for every two people. From these two datapoints, we interpolate a population access estimate of approximately 61%, based on the relationship between these two indicators in the previous DHS and THMIS surveys.