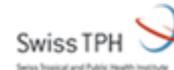




Reaching and maintaining universal access to ITNs – key questions for the future

Hannah Koenker & Ato Selby
Jan 28, 2019

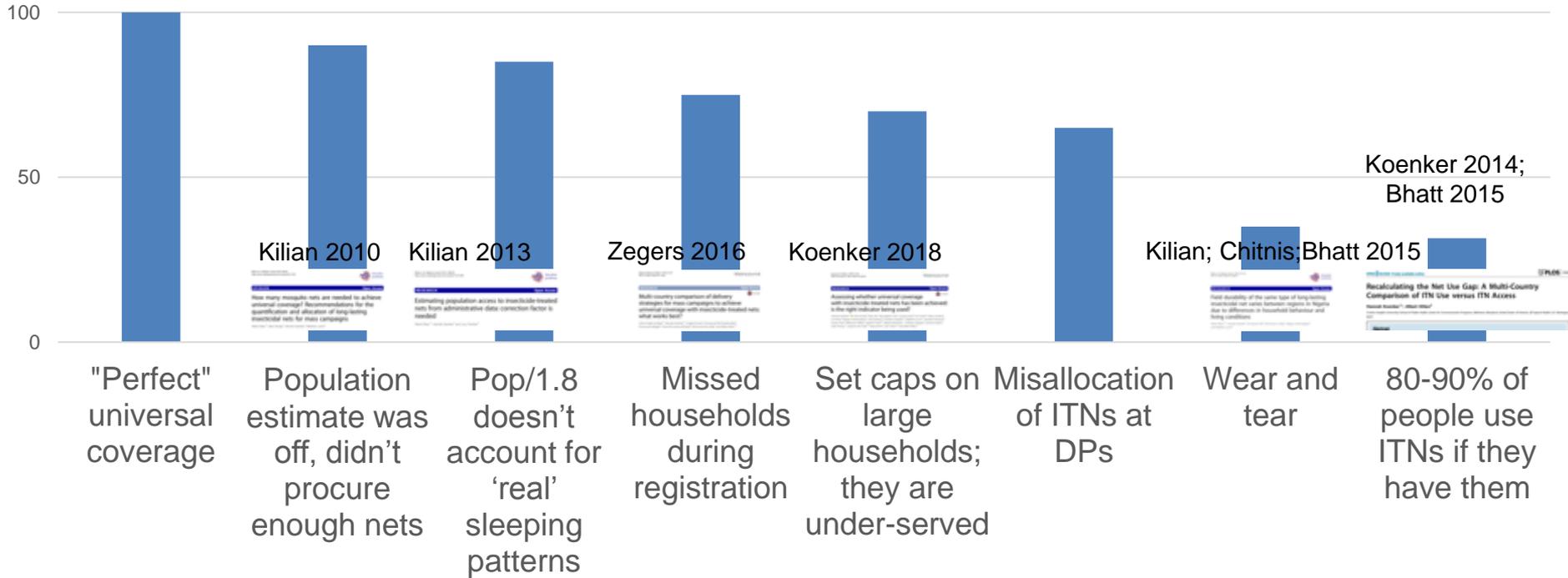


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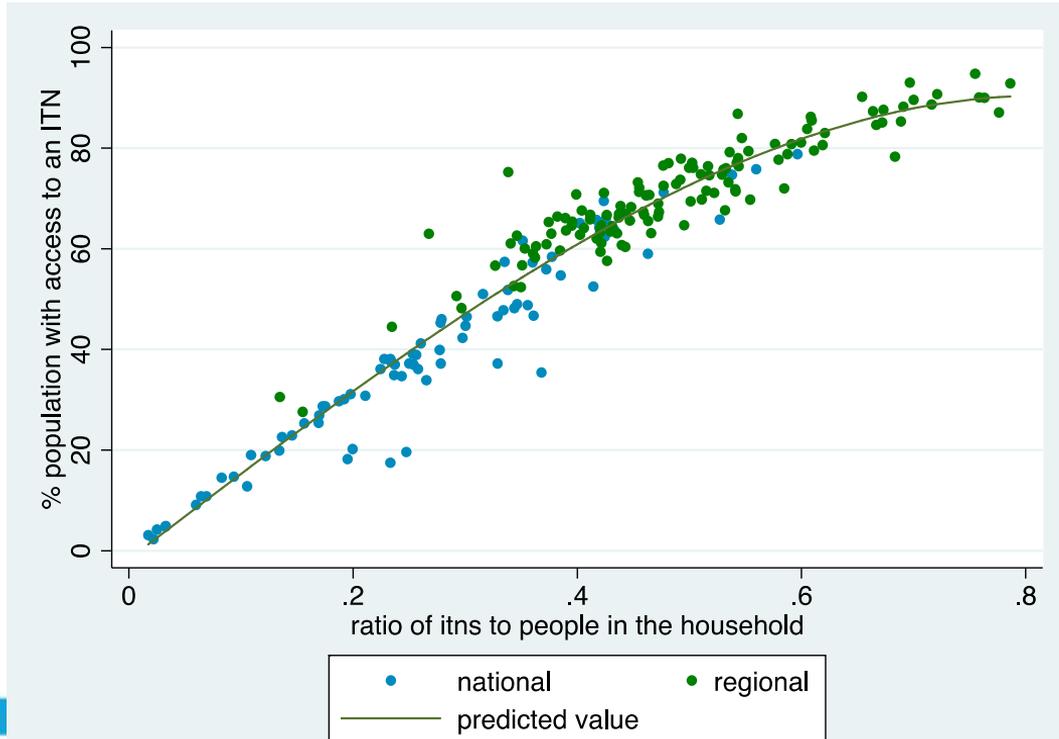
The contents do not necessarily reflect the views of PMI of the United States Government.

REACHING

Barriers to reaching universal access



High ITN access has inherent inefficiencies: nearly 1 ITN per person required



1.8 was a compromise

- 12 DHS and 6 other household surveys
- Simulating ITN distribution to households using various allocation strategies (fixed; 1 ITN for 2 people rounding down, 1 for 2 people rounding up)
- 1 ITN for 2 people rounding up was best, with a median quantification factor of 1.78 (range 1.64-1.85)
- (justification for not counting sleeping spaces also in this paper)
- Bale rounding at distribution points and other logistical factors - +5-15% buffer
- **Based on all these considerations, the authors recommend that programme managers divide their population by a factor of 1.60 to calculate the number of LLIN that they need to procure to achieve universal coverage of one net for every two people**
- These results also suggest allocating ITNs based on household size, **without an upper limit**, rather than using fixed nets per household

Kilian et al. *Malaria Journal* 2010, **9**:330
<http://www.malariajournal.com/content/9/1/330>



OPINION

Open Access

How many mosquito nets are needed to achieve universal coverage? Recommendations for the quantification and allocation of long-lasting insecticidal nets for mass campaigns

Albert Kilian^{1*}, Marc Boulay², Hannah Koenker³, Matthew Lynch³

WHO

- WHO recommendations call for a 1.8 quantification factor
- Plus a 10% buffer if census data is more than 5 years old

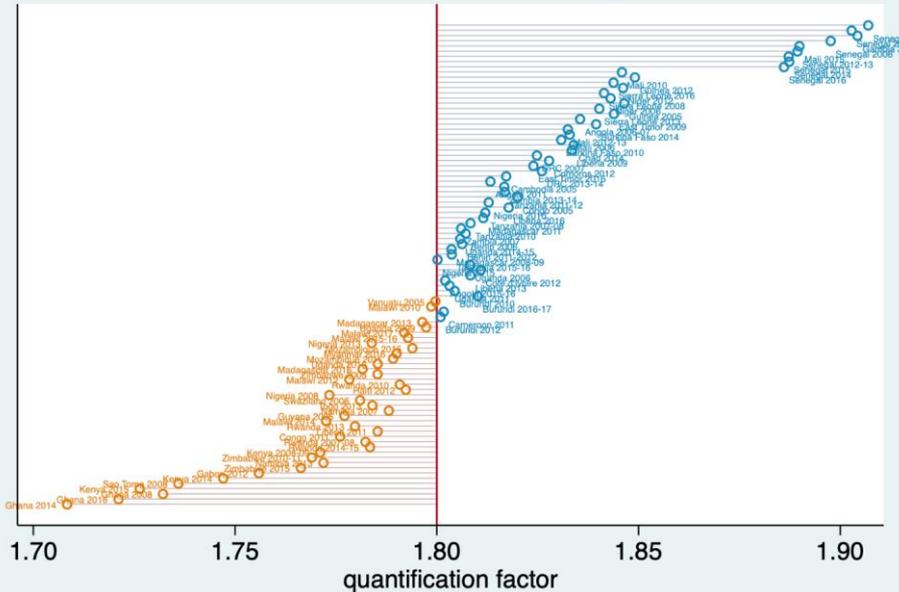


Does 1.8 need updating?

- 93 DHS/MIS datasets, 2006-2017
- Using survey weights, calculate what proportion of households are 1-person, 2-person....53-person households
- Assign ITNs to these households using 1-for-2-people- rounding-up algorithm
- Then divide total population in dataset by total ITNs 'assigned'
- This gives a country-specific quantification factor

Results

Mass Campaign Quantification Factor
93 MIS and DHS surveys



- the more smaller households you have – particularly single and three-person households – the lower the quantification factor will be (Ghana; Kenya)
- Where there are lots of larger households (Senegal, Mali) the quantification factor gets larger.
- Depends on both:
 - the mean household size
 - % of odd-numbered households (ranges from 47-59%)

Implications

- There are potential efficiencies to be gained in quantification using country-specific demographic data, particularly for countries with larger mean household size, but these need to be explored further
- A buffer for outdated population estimates is still needed – on top of revised quantification factor

CAPPING

What are the right caps to use?

- National and sub-national variations in average household size also mean that a cap of 4 in one place will result in a lot of households missing universal coverage
- In another locations a cap of 4 may work well.
- Full spreadsheet available with this paper -->

Koenker et al. *Malar J* (2018) 17:355
<https://doi.org/10.1186/s12936-018-2505-0>

Malaria Journal

RESEARCH

Open Access



Assessing whether universal coverage with insecticide-treated nets has been achieved: is the right indicator being used?

Hannah Koenker^{1*}, Fred Arnold², Fatou Ba³, Moustapha Cisse³, Lamine Diouf³, Erin Eckert⁴, Marcy Erskine⁵, Lia Florey⁴, Megan Fotheringham⁴, Lilia Gerberg⁴, Christian Lengeler^{6,7}, Matthew Lynch¹, Abraham Mnzava⁸, Susann Nasr⁹, Médoune Ndiop³, Stephen Poyer¹⁰, Melanie Renshaw¹¹, Estifanos Shargie⁹, Cameron Taylor², Julie Thwing¹², Suzanne Van Hulle¹³, Yazoumé Ye², Josh Yukich¹⁴ and Albert Kilian¹⁵

Abstract

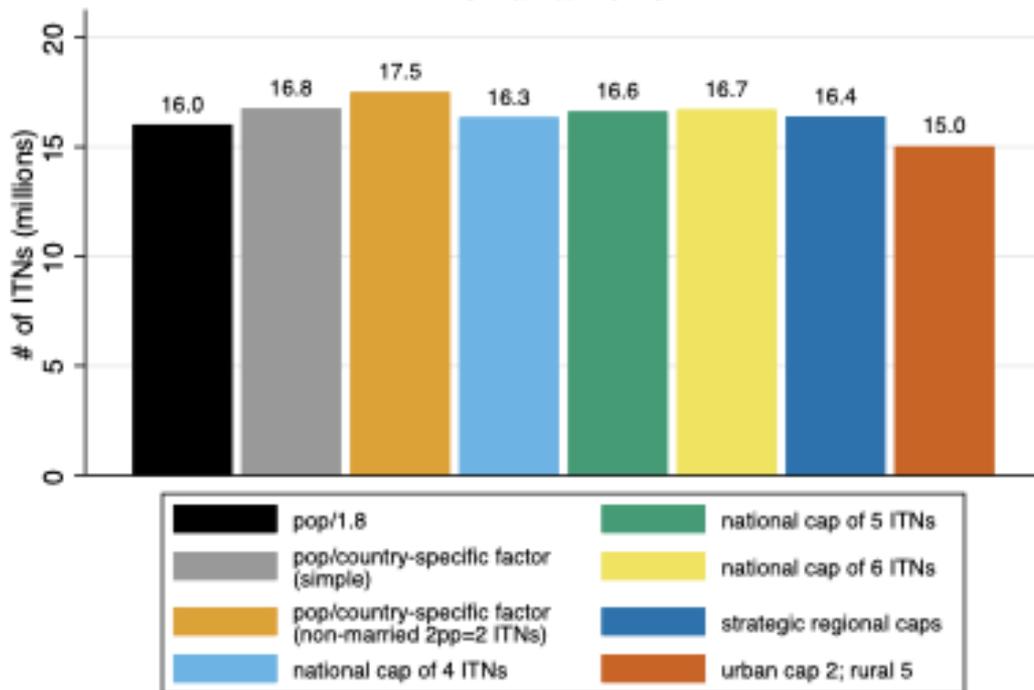
Background/methods: Insecticide-treated nets (ITNs) are the primary tool for malaria vector control in sub-Saharan Africa, and have been responsible for an estimated two-thirds of the reduction in the global burden of malaria in recent years. While the ultimate goal is high levels of ITN use to confer protection against infected mosquitoes, it is widely accepted that ITN use must be understood in the context of ITN availability. However, despite nearly a decade

‘Urban’ areas...?

- Sometimes people don’t want our nets
- Frequently malaria risk is very low in these areas
- Option to cap at lower rate, or provide alternate means to access ITNs (retail, CD, etc)

Example

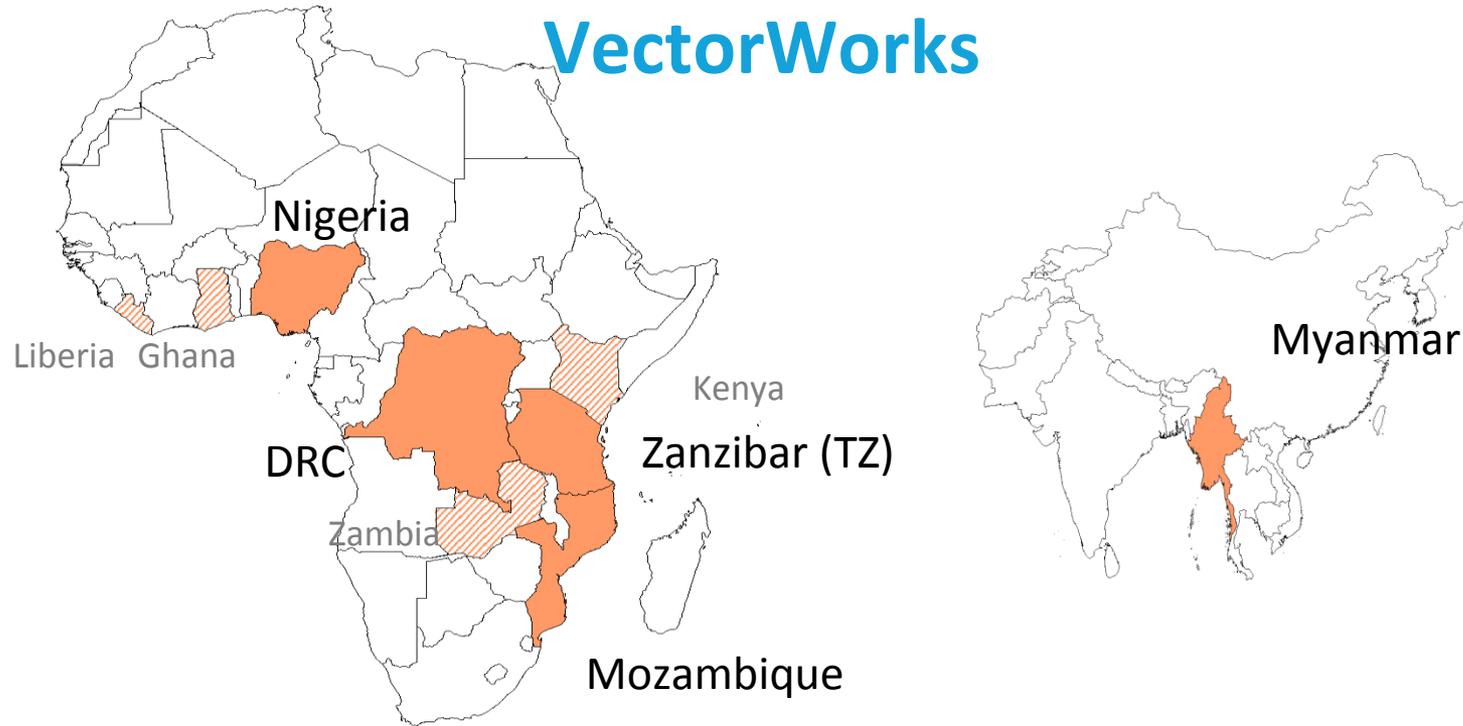
Ghana 2016



MAINTAINING

ITN DURABILITY AND ACCESS

LLIN Durability Monitoring supported by VectorWorks



Isolating where the problem is located

The way the net is **manufactured**

Not manufactured according to specification

Specification is inherently less durable

The way the net was **stored** prior to distribution

The way the net is **handled** (household behaviors, house/bed structure/environment)

The way the net is **measured** (lab/data collector consistency)

Durability take home points

- **Most of the variation** in ITN lifespan is **due to human behaviors** - not product specs
- **Same product** has median lifespan of **5.6 years** in **Zamfara (Nigeria)** and **1.4 years** in **DRC**
- ITN durability can be a threat to maintaining access

SUSTAINING ACCESS BEYOND MASS CAMPAIGNS

Impact on malaria incidence

- 2018 article analyzes data from 5 sentinel sites and weekly cases in Madagascar
- Comparison of 'campaign only' and 'campaign + continuous distribution'

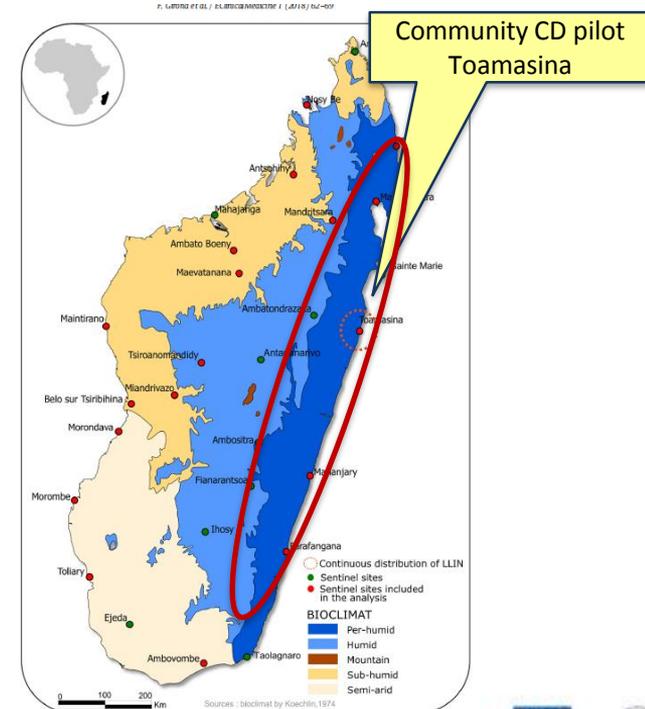


Research Paper

Evaluating Effectiveness of Mass and Continuous Long-lasting Insecticidal Net Distributions Over Time in Madagascar: A Sentinel Surveillance Based Epidemiological Study

Florian Girond ^{a,b,c,*}, Yoann Madec ^d, Thomas Kesteman ^{e,f}, Milijaona Randrianarivojosia ^g, Rindra Randremanana ^a, Lea Randriamampionona ^{a,d}, Laurence Randrianasolo ^a, Maherisoa Ratsitorahina ^{a,g}, Vincent Herbreteau ^h, Judith Hedje ^{h,j}, Christophe Rogier ^{i,k,l}, Patrice Piola ^{a,m}

<https://doi.org/10.1016/j.eclim.2018.07.003>

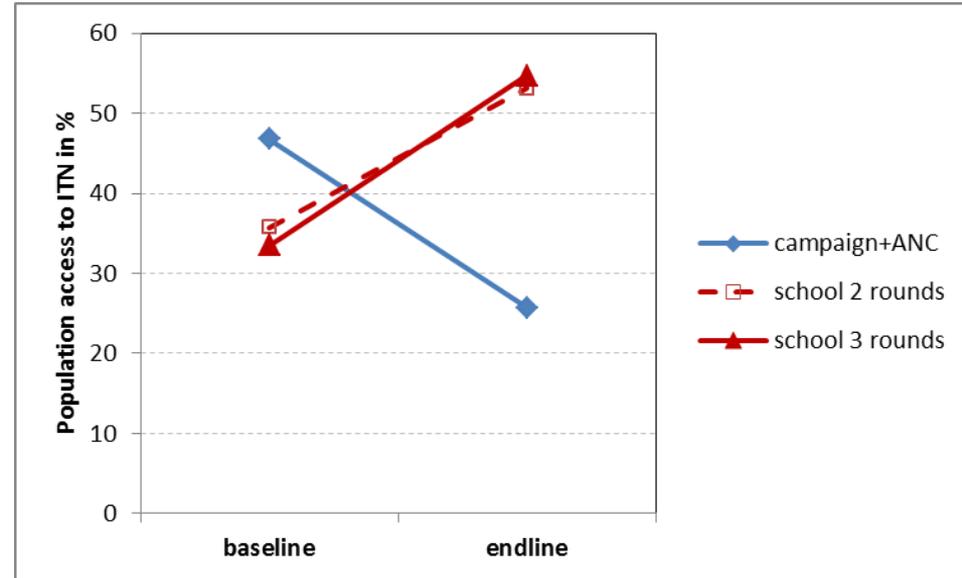


Impact on malaria incidence

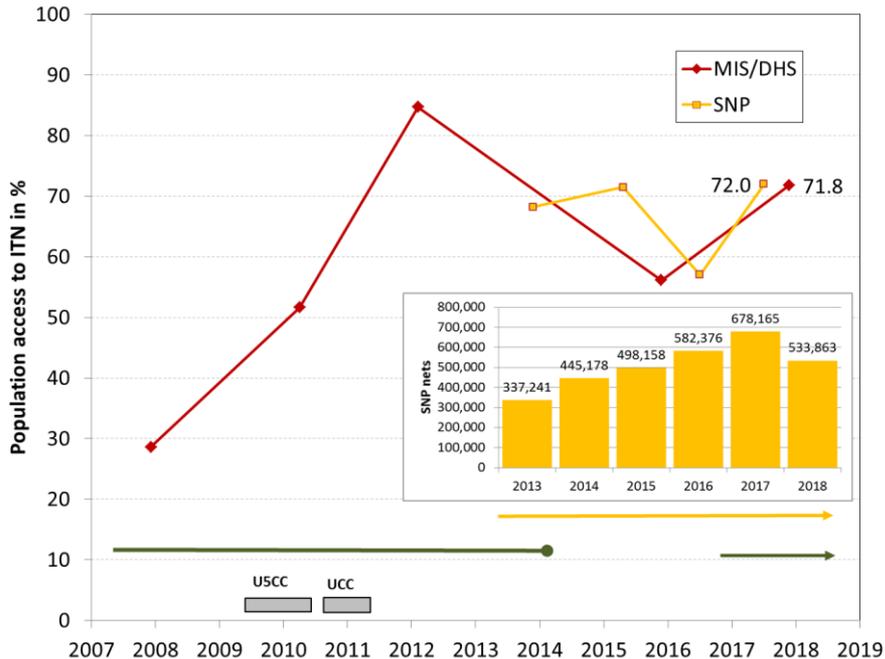
- Number of **weekly malaria cases decreased by 14% during the CD** in Toamasina District. Sites without CD had a 12% increase in cases.
- Percentage of alert-free sentinel sites was **98.2%** during the 1st year after the mass campaign, **56.7%** during second year, and **31.5%** during third year.
- Authors' conclusions: **the duration of protection from the campaigns is estimated to be limited to a single transmission season**, if the campaign is not reinforced with continuous distribution

School-based CD

- Cross River State, Nigeria
- 2 primary and 2 secondary classes
- **School CD achieved 47% to 50% increase in ITN access**
- Similar results in Eastern Region of Ghana



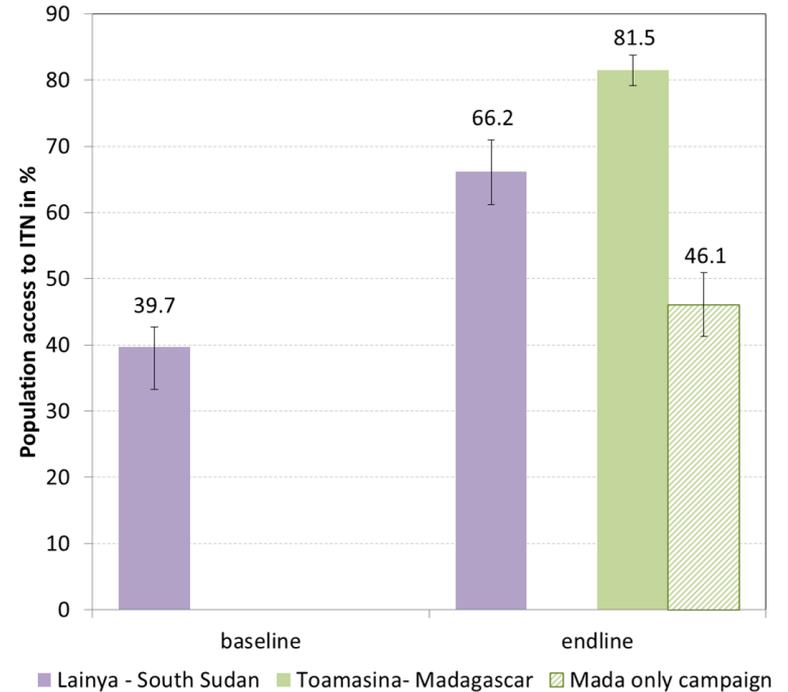
Long-term ITN coverage outcomes



- In 7 years without campaign access was sustained at 57-72%
- Avoided access decline seen after campaigns only

Community-based CD

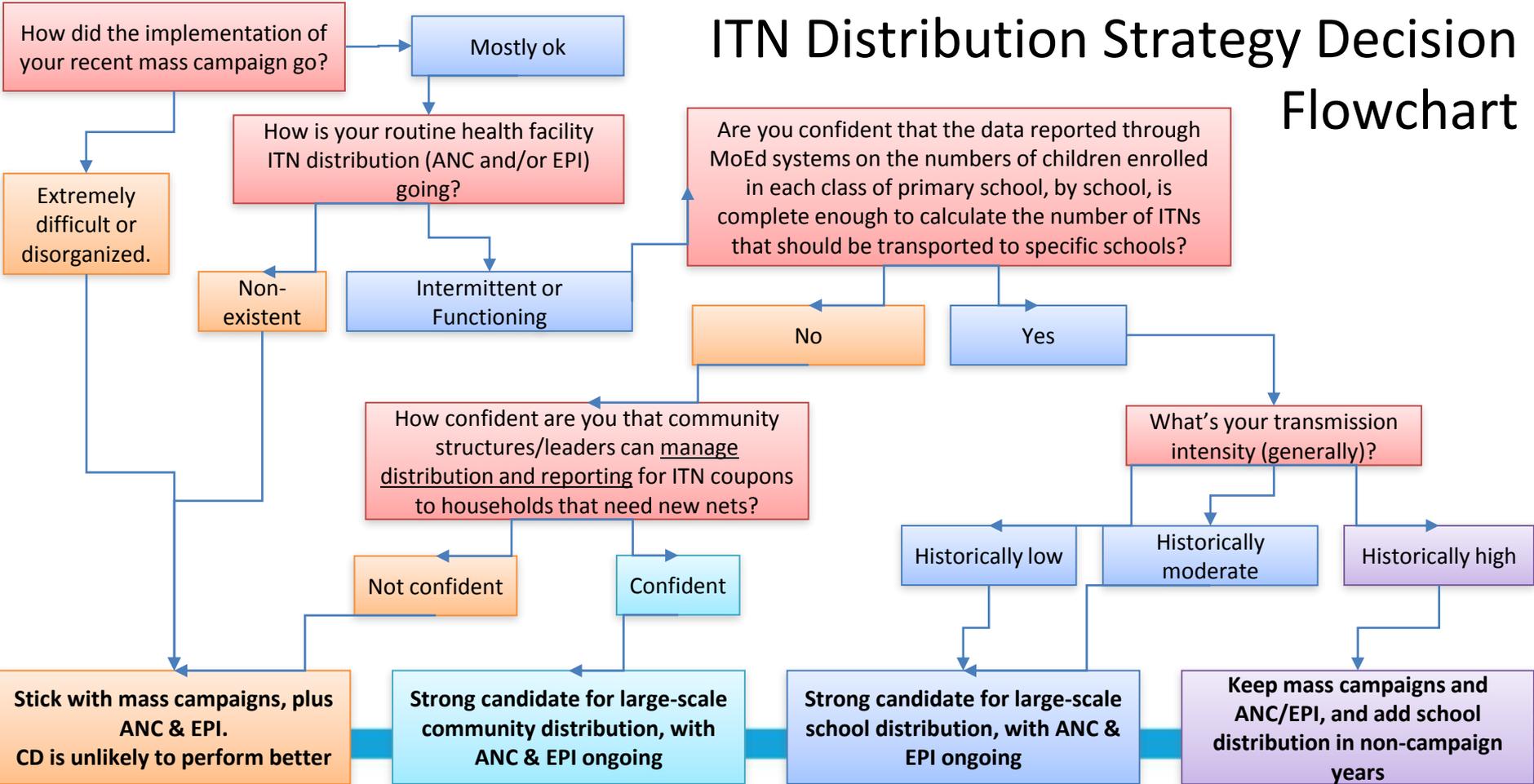
- High redemption rates of coupons in both pilots (>90%)
- **Not only sustained, but increased coverage in S. Sudan**
- Achieved good population access in both sites



What have we learned?

- Cost of implementing CD (per net) is not significantly different from campaigns
- Field assessment is key for determining most viable channels for your context
- Better to start CD earlier than later (preferably within 1 year after campaign)

ITN Distribution Strategy Decision Flowchart



Comprehensive Resources for Planning CD

www.continuousdistribution.org

- Choosing a CD channel
- Step-by-step CD implementation
- Country examples
- Guides & other tools - NetCALC etc.

In Summary

- More ITNs are needed to reach UC than we are currently quantifying
- Sub-national level variations should be considered during capping
- ITN durability - influenced by local attitudes, environment, and potentially preferences - is a threat to maintaining access
- Per WHO guidance, all available and feasible ITN distribution channels should be considered for maintaining access

Questions for the future

1. What is the right strategy/ stratification for urban areas/lower risk/lower net use areas?
2. Are preferences acting more at the net retention level, making access decline?
3. What is the impact on incidence of maintaining ITN access in other settings?
4. What quantities of ITNs are needed to maintain access with CD?
5. What is the cost of optimizing ITN access - more is more, but how much?