ITN Access and Use

Mapping net culture in sub-Saharan Africa

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Use:Access Ratio

• Use: the proportion of the population that slept under an ITN the night before the survey.
• Access: proportion of the population with access to an ITN within their household.
• The result of dividing use by access.
• Gives an estimate of the proportion of the population using nets, among those who have access to a net.
• Shows the behavioral gap for net use, rather than a use gap because not enough nets are available.
Methods

• Use:access ratios were calculated for each cluster in the most recent available MIS and DHS datasets.

• Results were mapped in ArcGIS and interpolated across the country to create national maps.
Observations across PMI countries

Four PMI countries, Mozambique, Nigeria, Senegal and Guinea, have a mix of regions at the red, yellow, and green categories, with specific regions showing that low use of available nets is likely due to dry season, higher altitude, and/or lower prevalence. Four PMI countries appear to have below target use:access ratios over most of the country: Ghana, Nigeria, Senegal, and Zimbabwe. Senegal’s use:access appears, however, to be highly seasonally driven. ITN access remains well below target for the majority of countries, indicating more nets are needed to fill gaps within households.
Angola

• **Observations**
  While the use:access ratio has been generally high in Angola, the 2011 survey saw all nearly all regions, wealth quintiles, and residences increase their ratio above 0.80. Ownership and access to ITNs tend to increase as wealth increases (peaking in the middle quintile), however, the ratio of use:access declines with wealth in 2006 and 2011, and is relatively similar among wealth quintiles in 2015-16. Overall, access to ITNs remains very low.

• **Implications for programming**
  While access to ITNs is quite low, use of these ITNs is high across most of Angola. There may be seasonal patterns to ITN use particularly in the instable mesoendemic areas. ITN distribution should be increased, and SBCC should be continued throughout the country to maintain the very high use:access ratio here.
• **Observations**

The trend of excellent ITN use given access in Benin has persisted since 2006. The ratio between ITN access and ITN use is excellent in most of Benin, indicating that those who have nets available are using them. However, in Donga region, the ratio has been lower compared to other regions since 2011-12. Other regions with relatively lower use given access include Atacora and Collines. The use given access ratio remained stable between wealth quintiles and residence since 2011-12. On the other hand, the ratio is higher in households with IRS compared to households without IRS. Of note, the rates of ITN ownership and use have risen in 2017-18 compared with 2014 but appears similar with the 2011-12 DHS.

• **Implications for programming**

Overall improvements in ownership and access appear to reduce disparities among wealth quintiles in Benin, and between urban and rural residents. There is may be a need to prioritize SBCC messages in Donga; the only region with a use:access ratio persistently lower than 0.80. Similar SBCC messaging may be beneficial in some parts of Atacora and Collines regions. Additional work may be helpful to determine whether dry-season net use and transmission patterns warrant increased SBCC during lower-net use seasons.
Burkina Faso

- **Observations**
  Burkina Faso has excellent use of available nets, reflected in use:access ratios that are nearly always above 0.80, with exceptions in 2010 for the richest wealth quintiles, urban areas, and the Centre region (which houses Ouagadougou). However, by 2014 following the country’s second mass ITN campaign, use rates are uniformly good during the high transmission season, across the country. Ownership and access to ITNs are lower among the poorest wealth quintiles in both surveys, indicating a potential failure of ITN campaigns to reach these vulnerable groups.

- **Implications for programming**
  Program planners should maintain the net use promotion activities currently underway, and explore methods to ensure that ITNs are accessible by the poorest wealth quintiles.
Burundi

• **Observations**
  The capital of Burundi, Bujumbura, and the South region have the highest level of ITN ownership, individual access to an ITN, and ITN use. In other regions in 2016-17, population access to and use of ITNs are below 40%. The level of ITN access and use is lower in 2016-2017 than in 2012 in all regions. However, Burundi has maintained excellent use of available nets. Ownership and access are significantly lower among the poorest wealth quintile, and among rural populations.

• **Implications for programming**
  Additional focus on ensuring that ITNs reach the poorest wealth quintile is needed.
Cambodia

- **Observations**
  Cambodia had an excellent ratio of use:access in 2005, with lower rates in specific regions.

- **Implications for programming**
  Given the time elapsed since this survey, no programming implications are noted here.

- **No malaria module in the 2014 DHS**
Cameroon

- No GIS data are available in the 2014 MICS

- **Observations**
  
  ITN access improved significantly in the 2014 MICS, reflecting the mass campaign. Use:access ratios improved from 2011 to 2014, possibly influenced by seasonal variations in fieldwork. In 2011 ITN use given access was lowest in the north and extreme-north of the country, potentially reflecting dry season net use habits. Both surveys demonstrate lower use:access ratios among the poorest quintile, possibly correlated with residence in the north.
  
  Note that as of this report, the final MICS report has incorrect calculations for ITN access.

- **Implications for programming**
  
  Use:access ratios as of 2014 are encouraging; additional data and a seasonal-regional analysis would help to further interpret these findings.
Central African Republic

• Observations
CAR shows high rates of use among those with access to a net, across the country. There are no major differences by socioeconomic quintile or by residence.

• Implications for programming
Increasing access to ITNs by the population as a whole will be important.

• No GIS data are available in the 2010 MICS
Chad

• **Observations**

Chad’s has very low use:access ratios across most of the country, with exceptions in the capital, Ndjamena, Sila, Chani Begirumi, and Moyen Chani, for whom data collection occurred in November/December, during transmission season. Ownership of any ITN and access to ITNs increased across much of the country from 2010 to 2015. Disparities in ownership, access, and use in rural and urban areas decreased from 2010 to 2014-15. Use:access ratio is much higher in urban areas, particularly Ndjamena, and use is highest in that region. There is a strong pro-rich trend for ownership, access, use, and use:access ratio, which may reflect geographic conditions for these populations.

• **Implications for programming**

Additional data is needed to confirm whether use:access ratios systematically improve during rainy season. Increasing access to nets, particularly among poorer and rural populations, is key.
Comoros

• **Observations**
Comoros has good use:access ratios, indicating a strong culture of net use. Ownership and access to ITNs is higher among wealthier socioeconomic quintiles.

• **Implications for programming**
There is no particular need for targeted BCC messaging to specific regions or groups based on these results.
No GIS data are available in the 2011-12 DHS

- **Observations**
  Congo-Brazzaville’s use:access ratios are extremely high, reflecting an average number of users per net higher than 2. It is highest among the poorest wealth quintiles. Access to ITNs is higher in rural areas, and regional differences in ITN access reflect timing of the survey vs the mass campaign in 2011-12.

- **Implications for programming**
  Additional efforts should be made to ensure access to ITNs, and to maintain BCC messaging for net use, but the use culture in Congo-Brazzaville appears excellent country-wide.
• **Observations**

Use:access ratios are below target in much of the country, and this may reflect survey fieldwork being conducted in the drier season. There is a pro-poor trend in use:access, also reflected in higher use:access among rural populations, and a very low use:access ratio in Abidjan itself.

• **Implications for programming**

Additional seasonal analysis would help to pinpoint BCC messaging to promote ITN use at specific times of year and among specific target groups.
Democratic Republic of Congo

• **Observations**
The MICS and DHS data show that there are no particular provinces where ITN use among those with access is worrisome. Nor is ITN use:access ratio related to socio-economic status, or residence. Overall, rates of ITN use are extremely good throughout DRC, assuming nets are available.

• **Implications for programming**
There is a need for additional nets to fill gaps at the household level in population access to ITNs; SBCC programming for net use does not appear to need to be targeted to certain areas over others.
Ethiopia

• Data not available in 2016 DHS

• Observations
Use:access ratios are variable in Ethiopia, with lower UAR in Diredawa, Tigray, Harari, SNNPR, and Amhara than in other regions. Use:access ratios increase with increasing wealth, but are not very different between urban and rural zones. Wealth trends may reflect regional differences rather than socioeconomic ones. ITN access is lowest in Harari and Diredawa.

• Implications for programming
In much of Ethiopia, strong ITN use behaviors are present, as evidenced by UARs over 0.80 in five regions. There may be a need for additional focus in the other five regions on SBCC activities to boost use of nets among those with access. There is also a need for additional nets to fill gaps at the household level in population access to ITNs. As malaria transmission is heterogenous in Ethiopia, additional analyses would be useful to discern use:access trends for subpopulations, or seasonal patterns.
Gabon

- **Observations**
  Gabon has a strong culture of net use despite low levels of ITN access in 2012.

- **Implications for programming**
  Increasing access among populations at risk should contribute directly to higher use of ITNs generally.
GAMBIA

• No GIS data available in the 2013 DHS

• Observations
  Despite survey timing in full dry season, use:access ratios are relatively high, reflecting the extensive net use culture in the Gambia. Access to ITNs shows a pro-poor trend, also demonstrated in the higher access among rural populations. We also observe higher access to ITNs but a lower use:access ratio among households reporting IRS. Basse region has a particularly poor use of available nets; fieldwork for Basse, furthest inland and drier than other regions, was done in March-April, which is hot season.

• Implications for programming
  While it is unlikely that Gambians would benefit from additional BCC messaging about ITN use, given the strong culture of net use in the country, additional seasonal analysis may illuminate trends in use of the course of the year. Further attention may need to be paid in Basse.
• **Observations**

In 2016, use given access remains extremely low in Greater Accra (0.34), and appears otherwise fairly consistent across regions. Urban households have had consistently lower use:access ratios compared to rural households over the past 9 years. Likewise, in all surveys, use:access ratios decline with increasing wealth. Although each survey was done at generally the same time of year, more work is needed to confirm that rainfall and survey timing were equivalent in all years, particularly by region.

• **Implications for programming**

It seems likely that low use given access among wealthy and urban households may reflect lower risk perception of malaria. Further investigation into the causes or rationale for low use of nets among these groups is needed. The poorest households are using the nets they have. Seasonal trends, particularly by region, should be examined.
Regional variations in household ownership were present in 2012, with Conakry having the lowest rates of ownership. However, DHS data was collected prior to the 2014 mass campaign, which undoubtedly increased coverage. Conakry, Kindia, and most especially Labe and Mamou regions had lower-than-targeted ratios of ITN use:access. Mamou and Labe are in the Fouta Djallon area, which have higher altitudes and cooler temperatures. These low ratios are contributing to the <0.80 ratios observed when looking at SES and at residence. There is a slight pro-poor trend towards better ITN use:access ratio. There was no difference in ITN ownership, access, or use among households having received IRS and those who did not, although households not receiving IRS had a lower use:access ratio (0.76 compared to 0.90). However, only 119 of 7,109 households reported being sprayed, mostly by private companies.

**Implications for programming**

Given the very low ITN use:access ratio in Mamou and Labe, further investigation would be useful to determine whether this is a result of seasonality or altitude (it would have been raining in Mamou at the time of data collection, usually contributing to better use rates) and/or behavioral barriers to net use.
Guinea- Bissau

• No GIS data available in the 2014 MICS

• Observations
Use:access ratios are good throughout the country. There are no major differences in use:access ratios among wealth quintiles or urban/rural residence. ITN access is quite high, reflecting the recent mass campaign. Despite minimal rainfall during the first months of the survey, use:access ratios were still high. With an average of over 7 people per household, it is likely that more than 2 people are sharing nets, on average, contributing to increased UAR.

• Implications for programming
Based on these data, ITN use behaviors are very strong throughout Guinea-Bissau, and may only need minimal reinforcing.
Guyana

- **Observations**
  Use:access ratios are good throughout the country with the exception of regions 9 and 10. There are no major differences in use:access ratios among wealth quintiles or urban/rural residence, although there is a very slight pro-poor trend to ITN ownership and access.

- **Implications for programming**
  Increased messaging on net use may be useful in regions 9 and 10, depending on seasonality analysis and malaria risk in these areas.
Haiti

• Observations
We observe quite low ITN ownership and access across Haiti, and mediocre culture of net use, although the available data was collected just prior to transmission season.

• Implications for programming
Further data will be helpful to interpret seasonal trends in the indicators.
Kenya

- **Observations**
  Kenya has a relatively high use:access ratio throughout the country and across wealth quintiles and residences, with improvement over the last three available surveys which may be due in part to survey timing. Both access and use increase with increasing wealth, however, use:access ratio is similar across all wealth quintiles. Prior to 2015, urban residents had higher access and use than those in rural areas, but this has evened out in the 2015 survey. In both DHS surveys, households receiving IRS had a higher proportion of ITN ownership, but use:access ratio was the same in both groups.

- **Implications for programming**
  Kenya is doing well in terms of the proportion of the population using nets when they have access to them. Continued net distributions and SBCC campaigns in areas targeted for ITNs will help in maintaining these high numbers.
Lao PDR

• No GIS data available in the 2011-12 MICS

• Observations
  Lao PDR has excellent use:access ratios indicating a strong culture of net use. There is a marked decline in ownership, access, and use among wealthier quintiles, but use of nets by those with access remains high in all socioeconomic quintiles. Urban households have lower rates of ownership, use, and access to ITNs, but similar use:access ratios those in rural areas.

• Implications for programming
  Messaging around net use does not appear to need to be targeted to specific groups based on this analysis, but further analysis by high-risk group would be useful.
Liberia

- **Observations**
  Liberia has consistently had a very high net use:access ratio across the country. The only region in which this ratio is less than 0.80 is South Eastern B in 2008-2009 and 2013, whose ratio is 0.78. All wealth quintiles with the exception of the wealthiest in the 2013 survey (0.76) were above 0.80. Net access seems to be highest in the poorer wealth quintiles. Use is relatively similar among each category. In 2013, households receiving IRS had a higher proportion of ITN ownership and access. There was no difference in proportion using an ITN nor in the use:access ratio between those receiving IRS and those without.

- **Implications for programming**
  Liberia is doing a very good job both in terms of access and use when compared to other countries. Continued net distributions and SBCC campaigns nationwide will help in maintaining these high numbers.
Observations
Madagascar is the PMI country with the highest observed ITN use:access ratios, lowest in Analamanga with 0.90 in 2016. Madagascar also has a high average number of users per net, driving up their ratio of ITN use:access, in part due to relatively small houses where it is difficult to hang multiple ITNs for a 1:2 net-to-user ratio. There is a consistent trend towards poorer households having higher use:access ratios, perhaps due to smaller house size, as well as the general phenomenon of wealthier households having lower numbers of people per sleeping space. Even in the High Plateau/High Central Lands, where ownership and access to ITNs is quite low, use of ITNs given access is close to 1.0.

Implications for programming
ITN use among those with access to a net within their household is excellent in Madagascar, indicating an extremely strong net culture, even in lower risk areas.
Malawi

• **Observations**
Malawi continues to have a very high use to access ratio across all categories and regions. Except for 2010, all surveys have been conducted during the rainy season, when people tend to report using their nets more consistently. Net ownership and access still tend to be higher in higher wealth quintiles; however, use of nets, given access, has been consistently strong since 2012. In the DHS surveys, households having received IRS had higher ITN ownership, access, and use, while in MIS surveys these differences are not observed.

• **Implications for programming**
Malawi is doing a very good job both in terms of access and use. Continued net distributions and SBCC campaigns nationwide will help in maintaining these high numbers.
Mali

• **Observations**

After the universal coverage campaigns in 2011-13 and 2015, household ownership of ITN has been high at around 90%, except in Tombouctou and Gao region. Between 2006 and 2010, the use:access ratio for almost all regions increased to above .80, and this was maintained through the 2015 survey. This pattern was the same for both wealth quintiles (when measured) as well as rural and urban sites. ITN ownership, use, and access tended to be higher as wealth increased, although this did not affect the use:access ratio, which was similar among all regions, wealth quintiles, and residencies. Households having received IRS had a marginally higher proportion of all three variables in the 2010 and 2012-2013 surveys, although this pattern reversed in 2015. The use:access ratio was very similar across IRS strata and surveys.

• **Implications for programming**

Mali continues to have a very strong culture of net use, and access has been sustained at relatively high levels since 2010. Net distribution and SBCC nationally should be continued throughout the country to maintain the very high use:access ratio here.
Mauritania

- No GIS data available in the 2011 MICS

- Observations
  Like other very dry countries (Niger; Chad), use:access ratios are poor to fair.

- Implications for programming
  Additional data and a seasonal analysis would help to interpret these results. Improved access to ITNs is needed.
Observations
Generally, the use:access ratios in 2015 has improved across all regions, wealth quintiles, residence, and IRS status; except in Tete and Manica. In 2015, the use:access ratio in Inhambane has improved to 0.77 from 0.45 in 2011; while in Gaza the ratio is still very low at 0.41 (0.25 in 2011).

Implications for programming
Population access in Gaza is not lower than that of the other regions, so additional, targeted net distribution is not necessary. However, SBCC campaigns encouraging net use may be needed in Gaza, Manica, and Tete where the level of use given access is lowest. Gaza (and Inhambane) experience lower transmission and have historically been targeted for IRS spraying; further investigation of the data may prove helpful.
• **Observations**

While ownership and access of any type of net is nearly universal across most regions of Myanmar, ITN ownership and access lag behind. Regional variations in household ownership of ITNs were present in 2015-16, with Kia having the highest rates (85%) and Yangon and Naypyitaw with the lowest rates of 6 and 7 respectively. Population ITN access and use of ITNs demonstrated the same regional, wealth and residential variations seen with household ownership of nets. Use:access ratios for ITNs are below target in many regions and poor in Bago and Kayah regions. Use:access ratios for ITNs were generally higher in each region than for any nets with the exception of Bago, Ayeyarwaddy, and Naypyitaw; this may indicate preferential use of untreated nets in these three regions, and preferential use of ITNs in the other regions.

• **Implications for programming**

Use of available ITNs is lowest in the Bago and Kayah regions; additional focus may be needed there to boost rates. Additional data and a seasonal analysis would help to further interpret these findings.
Namibia

• **Observations**

Namibia has low ownership and access, with the exception of Caprivi region, near Angola and Zambia, and very low use:access ratios across the rest of the country. ITN distributions are targeted to particular regions.

• **Implications for programming**

Namibia’s low culture of net use would benefit from additional SBCC activities and ITN distributions in malaria prone areas.
Niger

• Observations
Niger has good levels of ITN ownership and fair levels of ITN access as of 2012, although dry season fieldwork reveals that nets are used very rarely in the hotter months when available. Additional data collected during rainy/high transmission season would be useful to confirm that households make use of nets at some point in the year.

• Implications for programming
Additional efforts to encourage ITN use throughout the year would help to reduce malaria transmission in drier seasons; more data is needed to assess net use culture during transmission season.

• No GIS data available in the 2012 DHS
**Nigeria**

- **Observations**
  While the use:access ratio started off relatively high in the 2008 and 2010 surveys in the majority of regions, the 2011 and 2013 results dropped below 0.50. In the 2015 survey, some regions and categories have again improved their use:access ratio. North West region had the highest ratio at 0.80, with North Central and North East both above 0.70. ITN access has increased steadily from 2008 to 2015 in all geographic zones, and net use likewise reached its highest levels in 2015. In 2015, households in rural regions have improved their use:access ratio since the 2013 survey.

- **Implications for programming**
  The surveys thus far indicate that Nigeria has an overall ITN ‘use gap’ of 20-60 percentage points, depending on the region and the season in which fieldwork was done. While net access should be improved by nation-wide distributions, SBCC is urgently needed to increase net use throughout the country, as recent studies indicate that multi-channel BCC efforts do improve net use in the country (Kilian et al 2016). Further analysis of recent data is crucial to identify specific reasons for non-use among certain demographics and geographic zones.
• No GIS data are available in the 2016-17 MIS

• Observations
The national distribution campaign has reached the majority of the households in PNG, except in the Highlands region – which is not a malaria endemic region - where only 60% of the households had at least one LLIN. The use:access ratios were good in Southern and Momase region. In Islands region, net use was still low despite the high population access to an LLIN. The difference between urban and rural areas is small, but rural residents had used the LLIN slightly more than their urban counterparts.

• Implications for programming
The nets coverage in the endemic regions is already good; but the significant gap between net availability and use in the Islands suggests that a behavior change campaign may be needed to increase LLIN use
Rwanda

• **Observations**
Rwanda has consistently had a very high net use:access ratio across the country. All wealth quintiles and residence types were above 0.80. Both net access and use are extremely high. There was no difference in net use or the use:access ratio between groups though the IRS question was not included in the 2015 survey.

• **Implications for programming**
Rwanda is doing an excellent job both in terms of net access and use when compared to other countries. Continued net distributions and SBCC campaigns nationwide will help in maintaining these high numbers.
Sao Tome and Principe

- No GIS data are available in the 2014 MICS

- **Observations**
  Sao Tome & Principe demonstrate good levels of use: access ratio, and fair levels of ITN ownership and access. There is a strong pro-rich and pro-urban trend to ownership, access, and use.

- **Implications for programming**
  The poorest and rural households may need specific targeting with BCC messages to improve net use, particularly on Principe.
**Observations**

The mean use:access rates across the surveys are mediocre, especially for a Sahelian country with an entrenched culture of net use. Analysis by rainy season shows a pattern of net use that increases during the early rains and peaks during the late rains (September/October), indicating that net use is likely driven by perceived nuisance biting, and diminishes when mosquitoes are less present. In 2016, we observe high rates of ownership and access, attributable to the mass campaign, and an overall increase in dry season use:access ratios.

**Implications for programming**

Even before the 2016 mass campaign, ITN ownership and access were high in Senegal. While reduced rainfall in 2014 may have contributed to lower use of ITNs for those with access, this problem seems to have resolved in the 2015 data, where use:access ratios are nearly all above 0.90 by early rainy season. The 2016 data indicate that dry season use behaviors have largely improved in all regions, although this may have partially due to increased rainfall in many areas of Senegal in 2016. SBCC campaigns to increase net use in the dry season may still be needed.
Observations

We observe excellent use:access ratios in Sierra Leone across the three surveys. The wealthiest quintile appear to use available nets to a lesser degree than poorer quintiles, and similarly, rural populations have higher rates of use and of use:access ratios than urban populations, a pattern consistent across the three surveys.

Sufficient access to ITNs within the household remains below target as of the 2016 MIS, two years after the mass campaign of 2014.

Implications for programming

Many use:access ratios are greater than 1.0, indicating high levels of ITN use among households with access. Increasing access to ITNs in all households will be key to sustaining the use:access ratios observed.
Suriname

- **Observations**
  Only two regions of Suriname own nets, with fair ITN ownership and access rates. Ownership and access are highest among the poorest wealth quintile, reflecting targeted distributions, but use of available nets is good for most subgroups.

- **Implications for programming**
  Distribution of nets to these targeted populations will result in their use.
Swaziland

• No GIS data available in the 2010 MICS

• Observations
Swaziland has very low use:access ratios, reflecting low malaria risk across most of the country. The Lubombo region has higher ITN ownership and access due to malaria control interventions there, but net use and use:access ratio are still very low.

• Implications for programming
Net use messages need to be carefully targeted to specific at-risk populations. These subnational analyses are not precise enough to illuminate habits of those at risk for malaria.
Tanzania

- **Observations**
  Tanzania has some of the highest rates of ITN use among those with access to an ITN of all PMI countries, and the ratio of use:access has improved since 2007, averaging over 0.90 in 2010-11 and in 2011-12, 0.88 in 2015-16, and a slight decrease in 2017 at 0.83. The regions with the lowest use:access ratios are Njombe (0.42 in 2016 and 0.31 in 2017), which is over 2000m elevation with little malaria, Mbeya and Sangwe which are also in mountainous region, and Dodoma with use:access ratios below 0.6. While in 2017 all regions have over 65% of households owning at least an ITN and over 40% of population with access to an ITN, in some regions the use:access ratios have decreased to be between 0.60 and 0.80.

- **Implications for programming**
  Use:access ratios are good in many regions (between 0.80 and 1.00), even in low-transmission regions (Zanzibar and Pemba) in 2017. Tanzania has implemented significant SBCC for ITN use over the years, in particular on mainland, which may be one of the reasons behind the high use:access ratios. However, additional SBCC appears to be needed in the regions where the use:access ratios have decreased to be below 0.80 after maintaining high user:access ratios in the previous years.
**Observations**

Despite relatively low ownership and access of ITNs, Timor Leste has excellent net use culture. The middle three wealth quintiles have the highest ownership, access, and use, although use:access ratios are all similar among quintiles.

**Implications for programming**

There is no particular area or group that would benefit from increased SBCC on net use.
• **Observations**

Togo’s three surveys reveal high use of available nets during high transmission season, and reductions in net use during dry season, typical for its geography. The 2017 MIS was conducted right after the mass distribution campaign, and it was reflected on the survey’s findings. In 2017, the rates of ITN household ownership, population access, and use dramatically increased in the five regions (except in Agglomération de Lomé). There is a pro-poor trend in ITN ownership, reflective of Togo’s repeated mass campaigns, and slight pro-poor trends in use:access ratio. The use:access ratio is slightly better in Plateaux and Savanes.

• **Implications for programming**

Additional BCC messaging to promote ITN use during drier times of the year would be helpful, but overall Togo has a relatively strong culture of net use.
Uganda

• **Observations**

Due to the 2013 universal coverage campaign, the 2014 results are vastly improved in all indicators, and the use:access ratio increased from 2011 to 2014, sustained through 2016. The percent of the population with access to a net is one of the highest observed among PMI countries. The Southwest region continues to be an under-performer for net use, however. Net access and use both increased between surveys in the majority of regions, wealth quintiles, and residence types. Earlier trends of wealthier households having better ownership, access, and use of ITNs was reversed in 2014. Urban residences had lower ownership, likely reflecting challenges with campaign implementation in urban areas, but access and use were similar among residences. Ownership, access, and use of ITNs was similar whether or not households reported being sprayed with IRS in the previous 12 months. However in 2016, urban and richer population were slightly more likely to have access to and use an ITN.

• **Implications for programming**

Uganda is doing a good job both in terms of access and use when compared to other countries. Continued net distributions nationwide will help in maintaining the high proportion of households with access to nets. Additional focus on net use throughout the year may be useful to boost rates in the drier seasons.
Vietnam

- No ITN module in DHS/MICS

- Vietnam’s last available DHS is from 2002 and does not contain a malaria module. Its MICS surveys from 2006, 2011, and 2013-14 do not contain the ITN module.
**Observations**

On the whole, the net use:access ratio in Zambia was average in 2007, with the exception of Luapula and Northern provinces who have a ratio $\geq 0.80$, and Lusaka and Southern whose ratios are around 0.50. There was improvement in use:access ratios throughout the country in 2013-14, except in Central, Copperbelt, and Eastern provinces. The greatest gains were seen in Lusaka, Southern, and Western. As in many other countries, the poorer wealth quintiles have higher use:access ratios than richer ones. There is no programmatic difference in use or access for urban vs rural households. Households receiving IRS reported significantly higher ITN ownership, access, and use; this did not affect the use:access ratio, which programmatically equivalent in all three surveys. We see an improvement in 2015 use:access ratios likely attributable to the survey timing in high transmission season, indicating that there may be strong seasonal patterns to ITN use in Zambia.

**Implications for programming**

Net distribution and SBCC campaigns should be targeted to the regions with the lowest proportions, in an effort to increase both net access and use. Specifically, SBCC campaigns would be useful to improve net use in times and areas of lower transmission and throughout the year.
• **Observations**

Net use and access is below target across the country, and there were only slight improvements between 2010 and 2015. ITN ownership, access, and use were significantly higher in households receiving IRS; however the use:access ratio was similar among both groups. The 2014 MICS shows improvements, likely related to being fielded during high transmission season, but use:access ratios are still under target for the most part – although highest in the higher transmission regions. The 2015 DHS was fielded in dry and early rainy season and shows low use generally, with higher use:access ratios in Bulewayo. While fieldwork was conducted in each region across several months, the of ITNs used the previous night increased steadily over time (data not shown) from 17 in July to 32 in December.

• **Implications for programming**

With an overall use gap of 20-80 percentage points depending on the season, SBCC campaigns encouraging net use must accompany ITN distribution, as the proportion of people using nets across the country is below target. Given that the majority of cases occur in Manicaland (51%), Mashonaland East (16%), and Mashonaland Central (19%), special attention to boosting the ratio of use:access should be given in those provinces. Further work to assess trends in seasonality would be useful.