How long do LLIN last in the field?

Some thoughts on concept & methodology and preliminary results

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Why do we need to know?

- Procurement: which net to buy
- Replacement: continuous distribution
- Improvement: better products

Only the physical condition of net considered here
Net survival is highly variable

Two nets of same material & strength, regularly used, same place, same time (three years)
Stress on net varies

- Between regions (environment)
- Between households (socio-economic)
- Between nets within household
- Over the lifespan of the net
Two major aspects of “life of net”

- The net is there or not (retention-loss)
- Physical condition of surviving nets
Are the nets still there?

- HH has net
- Net is gone
- Retention Rate Proportion Retained
- Loss Rate Proportion Lost
- Time

Loss function
Two major aspects of “life of net”
And how to measure them

- The net is there or not (retention-loss)
  - Post distribution net tracking surveys
  - Problem with longitudinal studies (Hawthorn effect)
Retention of nets as a function of time

Proportion of nets still present in %

Years

- Lindblade et al.
- Kilian et al.
- Tami et al.
- Maxwell et al.

Legend:
- Red: Type 1 data
- Blue: Type 2 data
- Gray: indirect data

Types:
- Type 1
- Type 2
Two major aspects of “life of net”

And how to measure them

• The net is there or not (retention-loss)
  - Post distribution net tracking surveys
  - Problem with longitudinal studies (Hawthorn effect)
  - Mean age of net from cross-sectional survey can be used for “tale” but depends on “steady state”
Variation of “age distribution” of nets with level of input
Two major aspects of “life of net”

And how to measure them

• The net is there or not (retention-loss)
  - Post distribution net tracking surveys
  - Problem with longitudinal studies (Hawthorn effect)
  - Mean age of net from cross-sectional survey can be used for “tale” but depends on “steady state”
  - Retrospectively from “net history” in cross-sectional surveys (MIS, post campaign)
Obtaining information from net history

- Loss from net history
- Identify nets that "expired"
- Distribution of age when "expired"
- Post-campaign
- Non-retention
- Survey
- Input from "time of possession"
- 12 months
Obtaining information from net history


61% of lost nets discarded
39% given away to others
21% of all nets 12 m before campaign lost, 15% “expired”

12 months

58 nets

53 nets

12.3%

10.4%
Two major aspects of “life of net”

And how to measure them

• Physical condition of surviving nets
  - Best examination on frame in lab (tedious)
  - Problem if various categories of “good”, “poor” etc (not yet well defined)
  - Describe damage with hole index from three categories of hole size (seems robust)
Measuring physical condition in longitudinal LLIN studies in Uganda
Comparison of physical condition over time of polyester nets of various denier during field studies in Uganda
Comparison of 75 Denier Polyester vs 150 Denier Polyethylene 5-7 months after distribution in Uganda

N=1905

Odds Ratio

Coefficient

-3
-2.4
-1.8
-1.2
-0.6
0
0.6
1.2
1.8
2.4

any holes
hole index >2
hole index >10
hole index >20
hole index

Coefficient
OR

N=1905
Conclusions

- Need to agree on standard methodologies to capture “life” of LLIN
- This needs to comprise both “survival” and physical condition
- Mixture of cross-sectional surveys with retrospective “net history” and prospective assessment of physical condition and perception