Malaria prevention and ITN distribution systems:

the role of economic evaluation in determining how the product will reach consumers

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Background

- Taking us back to early 2000s
- ITNs shown to be highly effective at prevention of ACCM, able to reduce incidence of clinical malaria and lead to reductions in prevalence of parasitemia (Cochrane Review)
- Should be scaled up
- But how

How to scale up ITNs (now LLINs)

- Various models proposed for delivery
  - Classic social marketing
  - NetMark Model
  - PSI – Malawi model (mix of classic social marketing + targeted subsidies with direct product delivery)
  - Mass single item campaign
  - Mass integrated campaigns
  - Maybe we should just use IRS instead
  - And what about re-treatment?
  - Vouchers with private sector sale

Lead to all kinds of sub-questions?

- Acceptability – Shape, color, size
- Uptake through various methods
- WTP
- Potential for cost recovery
- Usage once owned (will what people pay for these affect it?)
- Economies of Scale in delivery?
- What kind of delivery is scalable
- What about re-treatment

Case study and CE approach

- Looked at various national scale distribution systems
  - Malawi
  - Togo
  - Eritrea
  - Senegal
  - Tanzania
- Estimated costs, cost per net, costs per treated net year cost per person year of protection – down chain to health impact
- Used standardized costing methods across all programs – attempted as much as possible to standardize line items and assumptions in costing models

Results

Main findings were that ITN distribution was generally slightly more Cost effective than IRS

Shift to LLIN would almost certainly improve CE (in absence of a nearly perfect retreatment strategy)

Distribution strategy generally mattered little in CE differences

Coverage achieved drove decisions

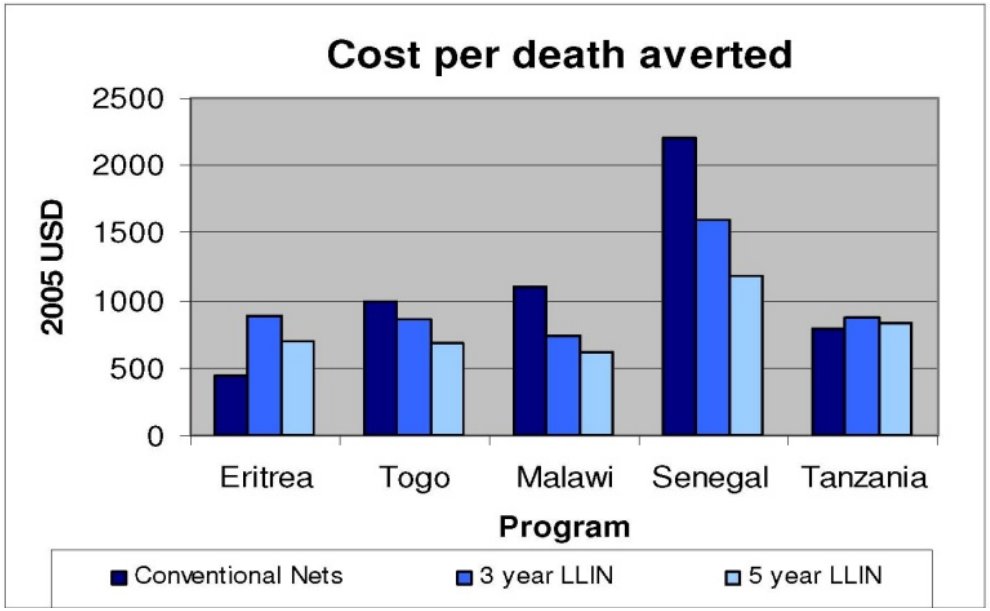


Table 3: Average annual economic costs for ITN and IRS programmes.

ITN programmes	Average annual cost per ITN distributed	Average annual cost per TNY	Cost per death averted**	Cost per DALY averted**
Eritrea	3.98	1.21	438/1,449	13/44
Togo	3.23	3.23	1,174	36
Togo*	2.75	2.75	998	30
Malawi	3.36	3.04	1,105/1,222	33/37
Senegal	8.05	6.05	2,199/2,926	67/89
Tanzania	4.80	2.17	788/1,745	24/53
IRS programmes	**Cost per person protected (whole population)**	**Cost per under-five child protected**	**Cost per death averted**	**Cost per DALY averted**
KwaZulu-Natal	3.27	23.96	4,357	132
Mozambique	3.90	21.63	3,933	119

*Assuming an average net cost of USD 3 instead of USD 4.33 (the actual cost incurred for LLINs by the campaign).
**In paired numbers the left value includes protection from re-treatment kits

Current context

- Catch up vs. keep up
  - Many countries conducted mass campaigns with large impacts on net ownership and use.
  - Targeting has been largely abandoned in favor of 'universal coverage'
  - What to do to maintain coverage where we've been successful
  - Technological innovation (LLIN) and its widespread adoption – eliminates need for retreatment

Leads to another series of questions

- How often do nets need replacing?
  - Do people hold onto nets? Do they resell them?
  - How and how fast does physical deterioration happen
  - What about chemical deterioration and epidemiological effects
- Do you replace every net when you go back out? Or only nets which aren't viable anymore
- How would you identify these?
- Do we just repeat campaigns or could other different keep-up strategies work?
  - What will this cost and what will be most efficient?
- How do fluctuations in coverage levels affect the epidemiology of malaria.

Keep-up planning in TZ

Situation:

TZ had longstanding Infant and PW voucher systems with private sector net sales

Conducted two mass catch up campaigns one targeting U5 children and one for 'universal coverage'

Documenting high >80% ownership in many areas

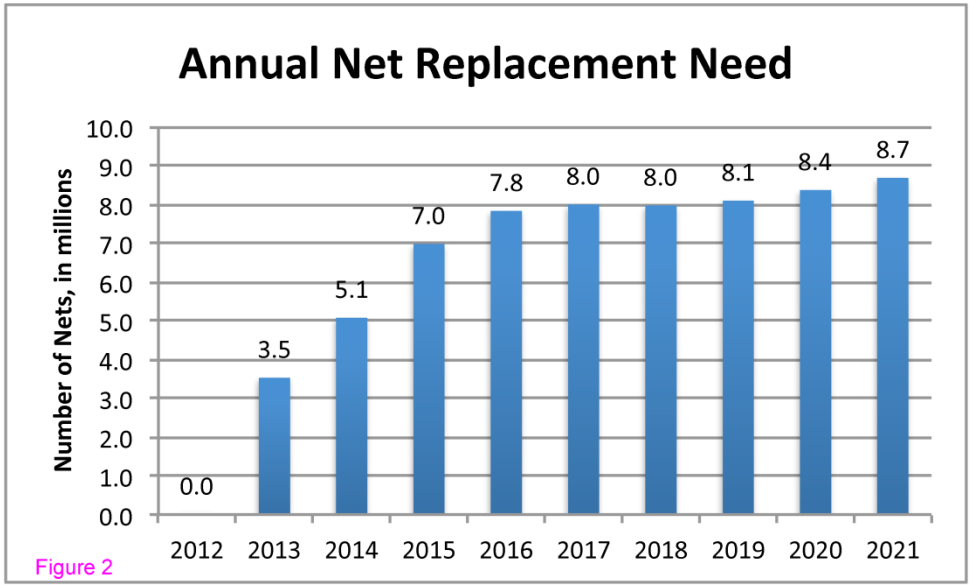


Figure 2

Methods

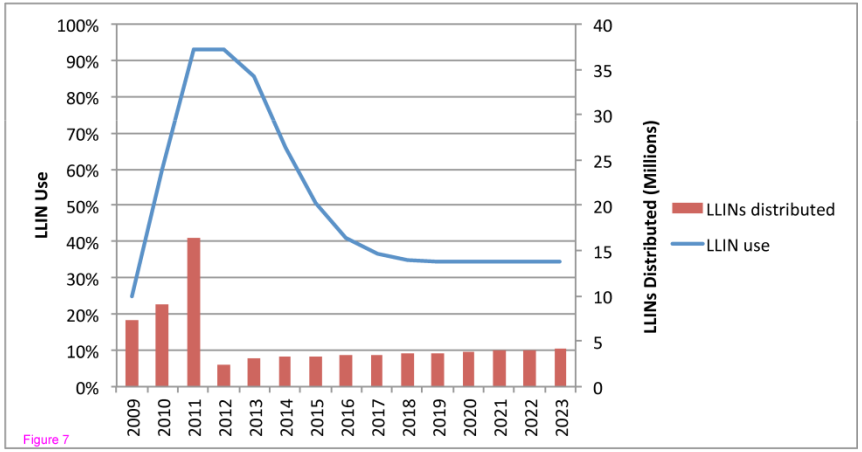
- Stakeholder input
- Net need and coverage modeling with NetCalc 2.0 Developed by Albert Killian
- Cost modeling based on literature, local data
  - Used financial costs, nominal dollars and only provider perspective

Results

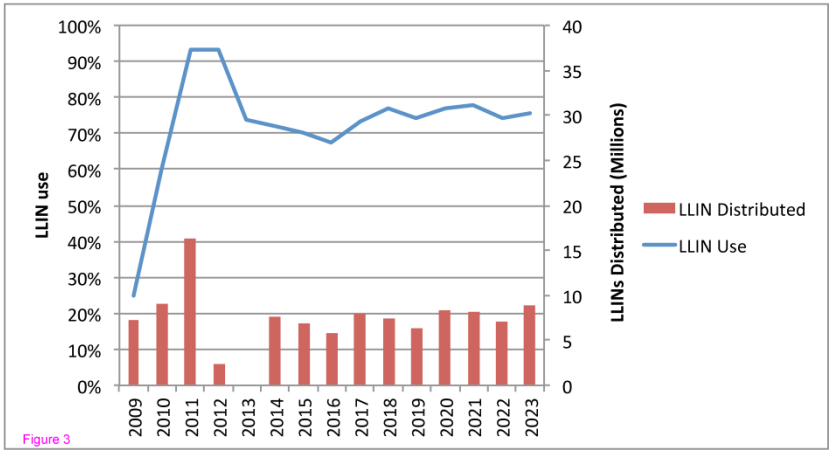
- Costs (As we could best project) fairly similar for different distribution systems (though differences not meaningless in total cost terms)
- Most of the cost dominated by nets, so systems which minimize the number of nets needed will likely be the most efficient even if the distribution component is slightly more costly.

Results

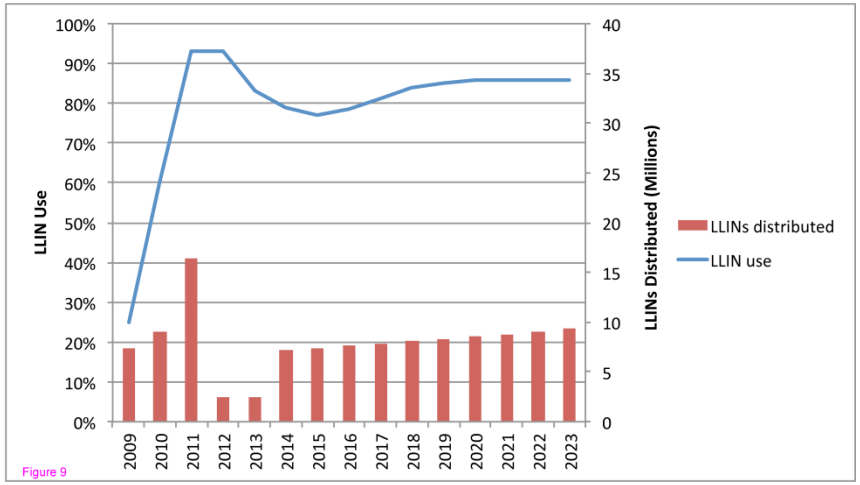
Status Quo



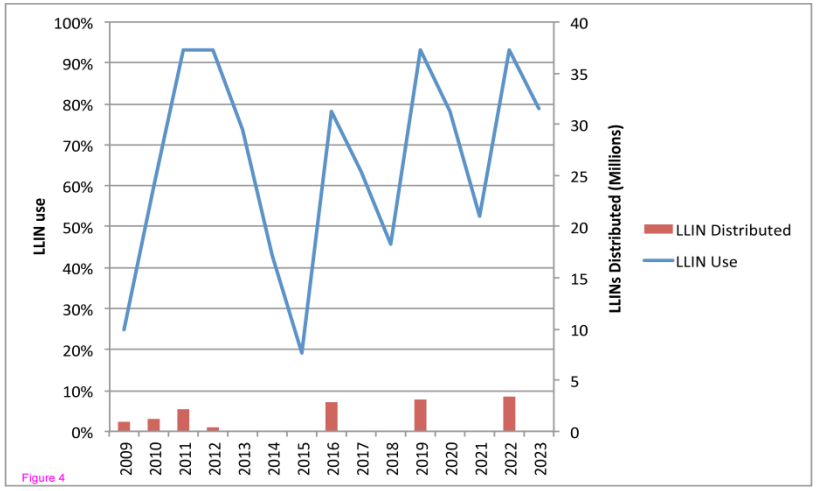
Repeated Mass Campaigns



Schools and Status Quo



Repeated mass campaigns locally

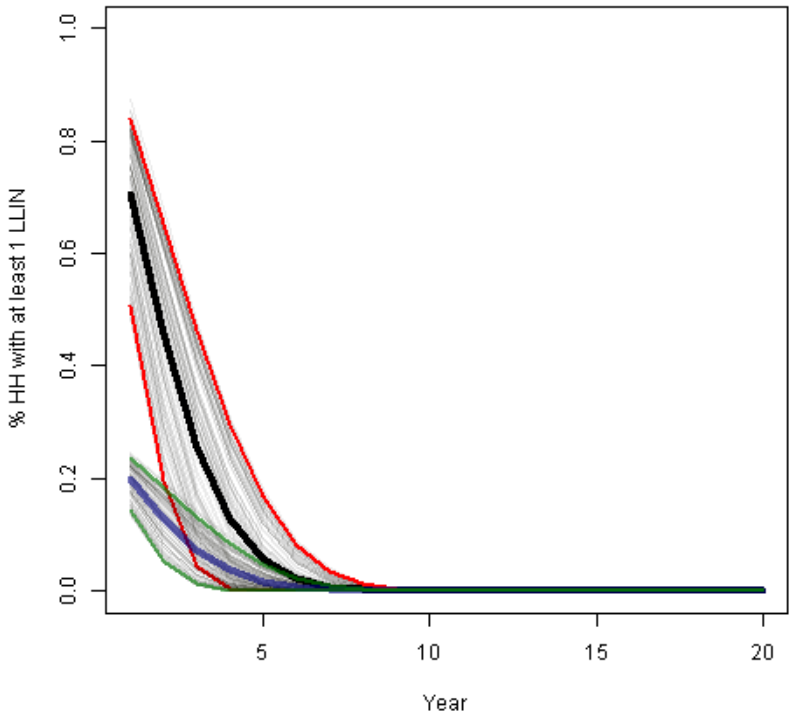


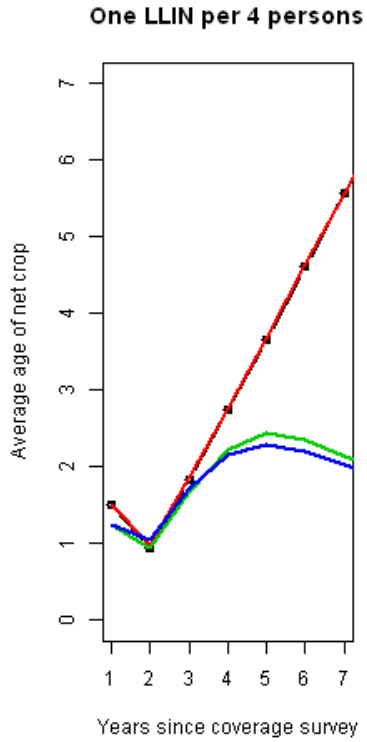
Repeated campaigns

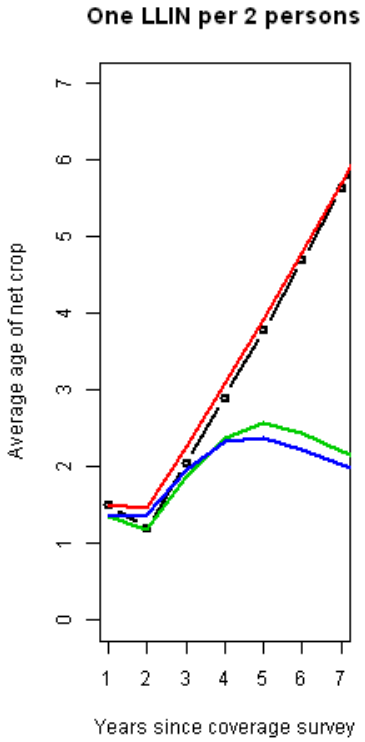
- Guidance on accounting for existing nets
  - When nets already exist how do you fill the gap without essentially replacing every single net regardless of its condition
  - Methods: Used NetCALC algorithm but incorporated stochastic simulation to incorporate uncertainty from survey estimates of coverage
  - Costs: Used deterministic formula to show the point at which the ratio of a cost of accounting for nets vs. not accounting (doing a blanket distribution) would

Illustrative results

Simulated coverage levels over time under multiple scenarios, and average age of 'net crop' as well as relative costs and potential for cost savings

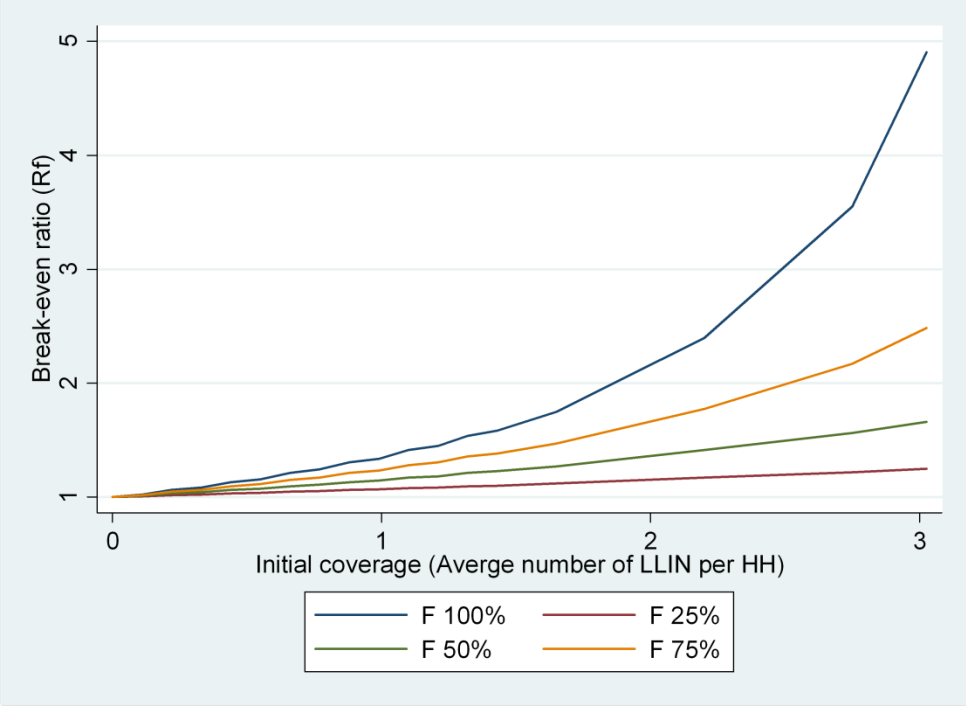






Cost savings

Established formula for determining the chance that a strategy of accounting for nets would be cost saving compared to blanket distributions



Conclusions

- Econ evaluation should consider the methods that are going to be used to reach ‘consumers’
- This in some instances can even feedback into directions for product development
- Life times and durability of capital goods (under field conditions) are key drivers of cost, and cost effectiveness.
- Program managers do consider these kind of results for decision making though CE often a justification rather than a component of rational decision making.