Impact of mass distribution of long-lasting insecticidal nets (LLINs) in Mozambique, 2011 to 2025: Retrospective and prospective modelling of child mortality and lives saved

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Impact of mass distribution of long-lasting insecticidal nets (LLINs) in Mozambique, 2011 to 2025: Retrospective and prospective modelling of child mortality and lives saved


Introduction

- In 2017, malaria was the leading cause of post-neonatal deaths in Mozambique.
- Use of long-lasting insecticidal nets (LLINs) is one of the most effective ways to reduce malaria mortality in children.
- In 2011, Mozambique committed to expansion of LLIN coverage nationwide, culminating in the first countrywide campaign in 2017, reaching 95% of registered households.
- Vital registration data to measure changes in mortality are not available in Mozambique.
- No provincial or national level mortality estimates in Mozambique since 2011.
- No previous analyses have estimated changes in mortality attributable to the distribution and scale-up of LLINs in Mozambique, accounting for differences in disease and mortality patterns, and coverage of maternal and child health interventions between provinces.

Methods

- The NetCALC tool estimated provincial household LLIN coverage based upon actual LLINs distributed from 2012 to 2020.
- NetCALC also estimated net replacement needed to maintain universal coverage from 2021 to 2025.
- Using the estimates from NetCALC, along with key underlying demographic and mortality data, and changing intervention coverage estimates, the Lives Saved Tool (LiST) estimated child mortality and “lives saved” for children under-5 years of age.
- 3 sets of LiST models were created for each province:
  - Counterfactual, which assumed no distribution of LLINs after 2011 (decline in coverage).
  - Coverage based upon actual LLINs distributed through 2020.
  - LLIN coverage if universal coverage is maintained through 2023.
- Results from 3 models were summed to estimate the total lives saved attributable to LLIN distribution.
- Under-5 all-cause mortality rates were projected in the baseline model (no LLIN distribution) and in the LiST distribution model.

Results

- Between 2012 and 2019, 34,513,379 LLINs were distributed.
- In 2017 estimated LLIN coverage reached 100% in all ten provinces, after the mass countrywide LLIN distribution that year.
- 64,470 under-5 lives were saved due to ownership of LLINs between 2012 and 2019.
- Between 2020 and 2025, a total of 20,922,378 LLINs are needed to achieve and maintain universal coverage.
- If universal coverage is sustained, 68,695 US lives will be saved between 2021 and 2025.

Discussion

Our results show greater number of lives saved due to LLIN distribution than other studies that used the LiST to estimate lives saved attributable to LLIN ownership in Mozambique. Why?
- Coverage levels for other interventions remained static in our study.
- Coverage levels of LLINs ownership steadily increased starting in 2012, while previous studies focused on time periods when LLINs coverage had not yet been expanded.
- The counterfactual model did not keep LLIN coverage constant, but modelled reductions in coverage had no LLINs been distributed.

Conclusions

- The LiST and NetCALC tools used together are useful to estimate lives saved and mortality where vital registration data are not consistently available.
- Multiple analyses have shown that continued investment in LLINs can result in substantial reductions in child mortality and lives saved.
- Sustaining universal coverage of LLINs may be more feasible than scaling and maintaining coverage of other key child health interventions such as ACT treatment for malaria.
- Mass LLINs campaigns are last-mile solutions to help close the equity gap. In Mozambique, LLINs only need to be delivered every three years, reaching the most remote vulnerable areas.

Authors and Acknowledgements

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