

Scan
Me

Seasonal malaria chemoprevention in northern Mozambique: A cost-effectiveness analysis

Neide Canana,¹ Ivan Alejandro Pulido Tarquino,¹ Sónia Enosse,¹ Chuks Nnaji,² Kevin Baker,² Maria Rodrigues,¹ Christian Rassi,² Akashdeep Singh Chauhan,² Baltazar Candrinho,³ Elisa M Maffioli⁴

¹ Malaria Consortium, Mozambique

² Malaria Consortium, United Kingdom

³ National Malaria Control Program, Ministry of Health, Mozambique

⁴ University of Michigan, United States

Seasonal malaria chemoprevention is a cost-effective intervention in northern Mozambique

Introduction

Malaria is one of the leading causes of death among children under five in Mozambique. In 2020, Mozambique adopted seasonal malaria chemoprevention (SMC) as a strategy to accelerate malaria elimination in the highest burden areas. Between January and April 2023, SMC was implemented across all 23 districts in Nampula province, targeting 1.4 million children 3–59 months. This study estimated the cost-effectiveness of SMC in Nampula province, Mozambique.

Methods

- The financial cost of SMC was estimated from a healthcare provider perspective using 2023 United States dollars (USD).
- Data on resource use during SMC implementation were collected from Malaria Consortium records.
- The reduction in the hazard of clinical malaria confirmed by rapid diagnostic test was used as a measure of the protective effectiveness of SMC against malaria.^[1]
- The number of eligible children who received SMC medicines was collected from the survey conducted after the end of the SMC round.
- The number of malaria cases, deaths and disability adjusted life-years (DALYs) averted was estimated using data from Global Burden of Disease 2019, Malaria Indicator Survey 2018 and the National Malaria Control Programme (NMCP).
- Incremental cost-effectiveness ratios (ICERs) were estimated and sensitivity analyses were used to test the robustness of the ICERs.

Results

- The total financial cost of SMC implementation in Nampula province in 2023 was \$7,871,362.
- The cost per malaria case averted was \$93.50, the cost per malaria death averted was \$3,287 and the cost per DALY averted was \$153.
- The ICER remained robust when adjusted to the lower and higher 95 percent confidence intervals of the cost per child visited and the cost per child treated.
- It was estimated that \$1,726,190 would have been saved if the programme prevented the administration of SMC medicines to children outside of the age eligibility range.

Figure 1. Costs of SMC in 2023

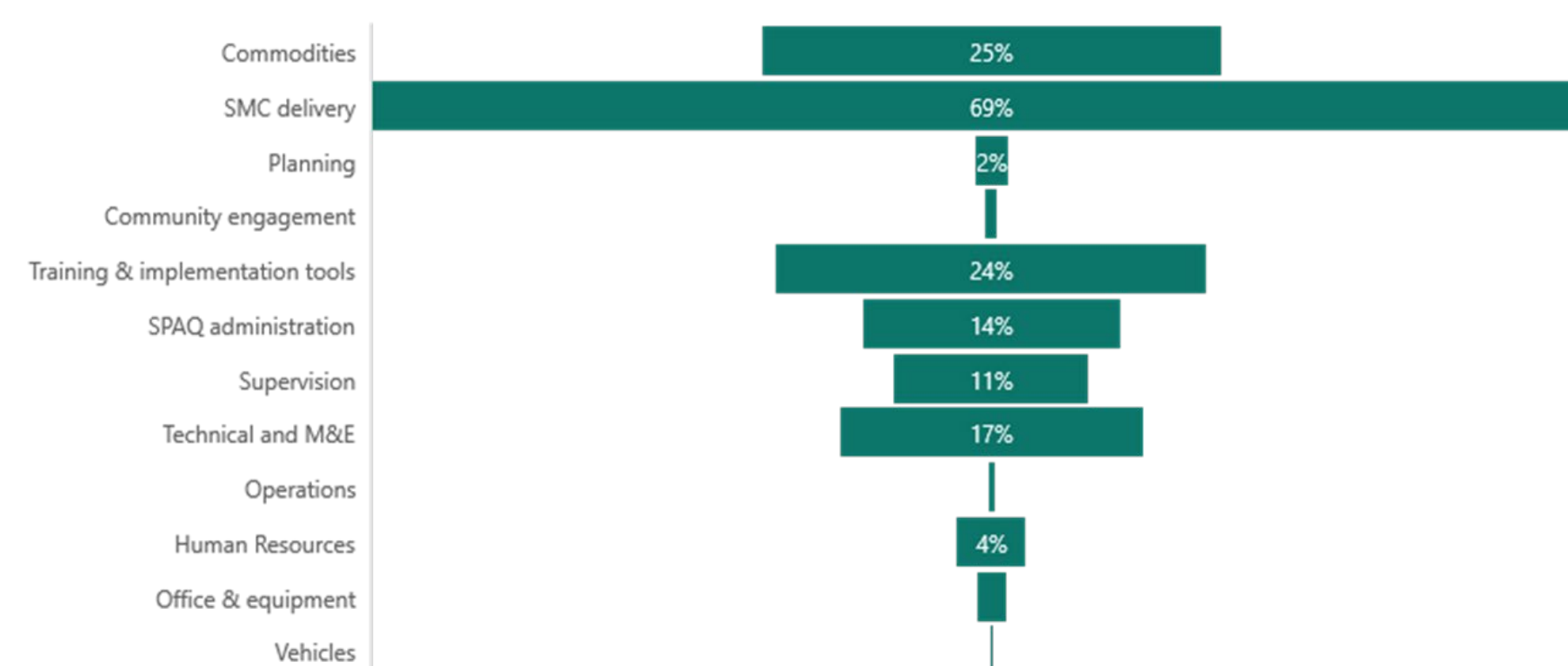


Table 1. Measurements and results of the cost-effectiveness analysis

Costs (USD)	
Costs	7,871,362
Benefits	
Total children targeted (3–59 months)	1,300,000
Households with eligible children (3–59 months) visited by a community distributor	1,029,600
Eligible children (3–59 months) who received day 1 sulfadoxine-pyrimethamine together with amodiaquine (SPAQ)	1,003,210
Eligible children (3–59 months) who received day 1 SPAQ by community distributors adhering to directly observed treatment (DOT), among those who received day 1 SPAQ	925,963
Eligible children (3–59 months) who received a full three-day course of SPAQ, among those who received day 1 SPAQ	993,980
Malaria cases averted	84,190
Malaria deaths averted	2,395
DALYs	60,476
Cost-effectiveness	
Cost per targeted child	6.05
Cost per household with eligible children visited by a community distributor	7.65
Cost per child who received day 1 SPAQ	7.85
Cost per child who received day 1 SPAQ by community distributors adhering to DOT, among those who received day 1 SPAQ	8.50
Cost per child who received full three-day course of SPAQ, among those who received day 1 SPAQ	7.92
Cost per malaria case averted	93.50
Cost per malaria death averted	3,287
Cost per DALY averted	153
Estimated savings	
Proportion of ineligible children (60–119 months)	22%
Total ineligible children (60–119 months) who received day 1 SPAQ	220,004
Total spent on ineligible children as cost per child who received day 1 SPAQ	1,726,190

Conclusion

Consistent with studies from other African countries, SMC was found to be cost-effective in Nampula province, Mozambique.

Table 2. Results of sensitivity analyses

Including savings in case management	
Cost per targeted child	\$5.76
Cost per household with eligible children visited by a community distributor	\$7.27
Cost per child who received day 1 SPAQ	\$7.46
Cost per child who received day 1 SPAQ by community distributors adhering to DOT, among those who received day 1 SPAQ	\$8.09
Cost per child who received full three-day course SPAQ, among those who received day 1 SPAQ	\$7.53
Cost per malaria case averted	\$88.93
Cost per malaria death averted	\$3,126
Cost per DALY	\$124
Key benefits indicators (low range, 95% CI)	
Cost per household with eligible children visited by a community distributor	\$8.32
Cost per child who received day 1 SPAQ	\$8.55
Cost per child who received day 1 SPAQ by community distributors adhering to DOT, among those who received day 1 SPAQ	\$8.87
Cost per child who received full three-day course SPAQ, among those who received day 1 SPAQ	\$7.99
Key benefits indicators (high range, 95% CI)	
Cost per household with eligible children visited by a community distributor	\$7.17
Cost per child who received day 1 SPAQ	\$7.34
Cost per child who received day 1 SPAQ by community distributors adhering to DOT, among those who received day 1 SPAQ	\$8.27
Cost per child who received full three-day course SPAQ, among those who received day 1 SPAQ	\$7.88
Rate of reduction in malaria cases at 82 percent (round 3)	
Cost per malaria case averted	\$87.79
(Malaria prevalence at 35 percent)	
Cost per malaria case averted	\$29.38
Malaria prevalence at 47.9 percent	
Cost per malaria case averted	\$21.47
Mortality rate from malaria for children 3–59 months at 2.8 per 1,000	
Cost per malaria death averted	\$3,608
Rate of reduction in malaria deaths at 55 percent	
Cost per malaria death averted	\$4,721

Acknowledgements

National Malaria Elimination Programme, Ondo State Malaria Elimination Programme, Anambra State Malaria Elimination Programme. The study was funded by Open Philanthropy based on GiveWell's recommendation.

References

- Candrinho, B. SMC effectiveness in northern Mozambique: Results from a cluster randomised controlled trial, 2023; American Society of Tropical Medicine and Hygiene: Presentation 7240.