



Improving severe malaria outcomes in Nigeria

Key messages

- Proper and adequate record taking and keeping ensures availability of information for decision making for severe malaria management.
- Training and supervision of health workers on use of injectable artesunate (Inj AS) for severe malaria ensures knowledge and skills are gained, retained and used for severe malaria management.
- It is important that Inj AS is available at all times at the facilities, otherwise clinicians may resort to less effective antimalarials for treatment.
- For definitive treatment of severe malaria, equipment must be available at health facilities to manage complications and provide post-admission care.

Background

In line with the World Health Organization's revised recommendations on the management of severe malaria, the Nigerian national guidelines for diagnosis and treatment of severe malaria recommend the use of injectable artesunate (Inj AS) over quinine as the drug of choice for the management of severe malaria.

To support this policy change, UNITAID in 2013 funded a three-year project, Improving Severe Malaria Outcomes (ISMO), that aimed to reduce mortality from severe malaria through the accelerated global adoption of Inj AS. The initiative involved catalytic supply and demand management of Inj AS in six countries in sub-Saharan Africa, namely Cameroon, Ethiopia, Kenya, Malawi, Nigeria and Uganda. In Nigeria, Malaria Consortium implemented ISMO in Oyo, Enugu and Cross-River states.

A major outcome of the project was to increase adoption of appropriately used Inj AS in supported countries. To achieve this, a mix of strategies were deployed, including a) advocating for an enabling policy environment through policy and treatment guideline reviews, b) training of health workers, c) stocking of hospitals with Inj AS, d) conducting supportive supervision for health workers and e) monitoring and evaluation.

Advocacy has ensured government buy-in, training was conducted to provide the requisite knowledge and skills for treatment, and adequate supply of Inj AS ensured sufficient antimalarials were available. Supportive supervision was provided to ensure knowledge and skill retention and promotion of best practices.

Advocacy for buy-in of health sector gatekeepers and clinicians

Through advocacy, an enabling environment was created for roll-out of Inj AS to health facilities. Policy and treatment guidelines were updated in line with WHO recommendations. The project states included Inj AS in the essential drug lists for drug revolving funds (DRFs) and public-private partnership options, as applicable. Training on use of Inj AS for severe malaria management was made more attractive by attaching continuous medical education (CME) points to the trainings, particularly for doctors.

Training clinicians on use of Inj AS for appropriate severe malaria management

Trainings on use of Inj AS were conducted for clinical health workers in the three states. The approach used involved a cascade model which delivered training through layers of trainers until reaching the final target group at the facility level.

Master trainers from Malaria Consortium trained 24 national trainers, who in turn trained 440 health workers selected from 115 health facilities in the three states. These health workers were expected to train and mentor the rest of the health workers in their respective health facilities. In addition, supportive supervision was conducted by state-level trainers for health workers that have been trained. This model of training offered a cost-effective way to train a large number of health workers in health facilities which were scattered, isolated and with limited resources.

Immediate assessment of the trainings indicated a significant leap in the knowledge of the health workers on use of Inj AS for severe malaria treatment with average difference between pre- and post-test at 40 percent.



Advocacy meeting with health sector gatekeepers



Practical session on Inj AS administration during training



Stock of Inj AS at a State Central Medical Store

Table 1: Trainings in states

State	National trainers	Health workers trained	Health facilities with trained workers
Oyo	24	120	34
Enugu		170	56
Cross-River		150	25
Total	24	440	115

Maintaining zero-stock level for Inj AS

Maintenance of zero-stock level was achieved, based on procurement decisions and informed by demand-based quantification, distribution, monitoring and procurement planning. Since October 2014, a total of 138,000 vials of Inj AS were procured to satisfy the demand for Inj AS in the three states up to June 2016.

Supportive supervision and feedback sessions for clinicians on use of Inj AS for appropriate severe malaria management

Supportive supervision was carried out quarterly by state-based trainers to all health facilities managing severe malaria in the project states. The supervisory activities focused mainly on health records, commodity management and clinical procedures for severe malaria management, including diagnosis and treatment. At the records department, filling of patient cards and Health Management Information System (HMIS) forms were assessed for availability and proper filling. The supervisors provided hands-on support for completion of forms and processing of severe malaria data, to provide feedback information for system and project improvements.

The commodity management activities focused on strengthening the Logistics Management Information Systems (LMIS) and Malaria Commodity Logistic System (MCLS), as applicable in each state for the purpose of minimising stock-outs and having proper documentation for the Inj AS rollout. Points of intervention for MCLS included the central medical stores and Pharmacy stores of health facilities. Clinical supervision involved observation of clinical procedures and processes



Observation of Inj AS administration during supportive supervision

performed by health workers. Supervisors were able to assess and provide feedback on the competencies of the health workers as it related to provision of safe, appropriate and high-quality care for severe malaria patients using Inj AS. Supportive supervision was designed to be a continuous exercise, particularly using the internal platforms of clinical meetings, ward rounds etc. However, visits by external supervisors were carried out quarterly. Supervisors spent an average of four hours at each visit. In addition to immediate feedback to clinicians at the facility level, quarterly feedback sessions were also held with Ministry of Health management on the key findings and recommendations of the supervision.

Table 2: Supportive supervision outcomes

Health system issues before supervision	Status after supportive supervision	Remarks
Health records <ul style="list-style-type: none"> Lack of HMIS forms Improper filling of forms Late submission of reports 	All facilities were provided with HMIS forms and record officers trained on how to complete the forms.	Secondary/tertiary institutions need to align with the NHMIS reporting structure which presently is domiciled at local government level.
Commodity management <ul style="list-style-type: none"> Lack of stock control forms Non-conducive storage conditions Incessant stock-out of Inj AS and other antimalarials 	Inventory control cards were provided and basic sanitation and ventilation practices were encouraged.	States' supply chain systems need to work better to ensure constant supply of commodities from central medical stores. ISMO could only temporarily replenish stocks during quarterly supervisions.
Clinical procedures <ul style="list-style-type: none"> Presumptive treatment Improper filling of case files to reflect diagnosis and treatment given Disproportionate caseload and Inj AS consumption Inadequate skilled personnel Wrong dosage calculations 	Diagnosis before treatment and filling of case files improved. Gap between case load and drug use reduced. Available skilled workers were encouraged to multi-task and use of intramuscular route encouraged where doctors were inadequate. Wrong dosage was still widespread.	More health workers should be exposed to direct training. More dosing charts should be distributed in addition to continuous supervision and medical education on severe malaria management.
Infrastructure <ul style="list-style-type: none"> Lack of basic equipment like weighing scales, oxygen, functional microscope 	Clinicians resorted to malaria rapid diagnostic tests where microscopes were not functional.	There is need for infrastructural investments in most hospitals to provide support equipment for severe malaria management.

Case study

Clinical training on management of severe malaria



Dr Ibijoke Oluyomi Campbell, the Consultant Paediatrician in charge of Oni Memorial Children's Hospital, Ibadan, Oyo State, Nigeria, is a national trainer and supervisor on the ISMO project. In this interview, Dr Campbell explains the capacity building approach

used by ISMO for appropriate use of Inj AS by health workers in Oyo state.

Appropriate use of a drug by health workers is key to its efficacy. What is your role to ensure Inj AS is appropriately used?

The state government is supported by the ISMO project to develop the capacity of health workers and implement other related plans to roll out the use of Inj AS. My role in operationalising the capacity building plan is to ensure that the trainings are not only adult-friendly and interactive, but to also ensure that trainees are able to make proper diagnosis and treatment of severe malaria. We used to treat malaria on presumption, but now part of the training is that a health worker must confirm the diagnosis. For treatment of severe malaria, our participants were taken through the process of calculating doses, reconstituting and administering Inj AS. These are part of the treatment procedures I impress on the participants, to ensure we are using Inj AS appropriately to manage severe malaria.

How will you compare the capacity of health workers in the state to manage severe malaria before and after the ISMO intervention with Inj AS?

Before the ISMO intervention, we managed severe malaria cases majorly with intravenous quinine, and in some semi-urban and rural areas of the state, we managed it with injection artemether or quinine.

Challenges faced during the use of injection quinine included the cumbersome dosing pattern - it has to be delivered every 8 hours - and the need for intravenous (IV) fluid as a medium of its administration. A patient on IV fluids needs close monitoring because of risk of fluid overload, heart failure and even under-dosage, amongst others. Quinine also has some side effects that could terminate the patient's life, such as the cardiac side effect and others. One really needed staff to pay close attention to those who are being managed with intravenous quinine. The hospital stay of children with severe malaria is longer which is burdensome on the parents because it is out of pocket expenses.

Since the ISMO intervention, things have changed. We have seen the need for the use of Inj AS in the treatment of severe malaria. After the ISMO training, health workers started using Inj AS, which is very fast-acting. The patient comes out of the condition faster. Mortality is greatly reduced to the barest minimum, although there are other associated conditions. Our patients are no longer dying from severe malaria. The overall cost of their hospital stay is reduced, and everybody is happier for it because the patient survives. The relatives are happy and the physician and health professionals attending to the patient are also happy.

You have been involved in health workers' trainings as a facilitator. What is unique in ISMO training that differentiates it from other trainings/capacity building activities?

The training was quite practical in the sense that to use Inj AS, the health workers have to follow a standard operating procedure in preparing and administering the injection. What ISMO has done is not just to train the end users of the product, but also followed up from time to time, around once in a quarter. The supervisors go to check on the trained health workers, to know if they are doing well, if they have any problems, which is not common in other trainings.

Monitoring and evaluation of use of Inj AS for appropriate severe malaria management

Monitoring and evaluation (M&E) is a continuous internal process to check progress of interventions, assess whether a project will achieve its objectives and

highlight the benefits or value of the project in a wider context. To routinely monitor and evaluate ISMO, a number of activities, indicators and data sources were identified and articulated into an M&E plan. This enabled the project to understand on a regular basis 'to what extent the planned activities and project aims are being realised'. This also allowed for on-going learning and feedback throughout the project implementation.

ISMO worked within the Nigerian health system, strengthening existing structures as opposed to setting up parallel systems. Routine data were collected through the existing HMIS and LMIS for service and commodity use respectively. Recognizing the limitations of these systems in terms of quality, completeness and timely submission of data, a quality assurance mechanism was put in place. Data collection ‘best practices’ were included and taught during training workshop for health workers, with follow-up hands-on coaching during the quarterly supportive supervision.

Initial assessment of the HMIS showed that some of the information required to track the progress of severe malaria intervention were not in the HMIS forms. Therefore, using the HMIS template, a few more

variables were added, particularly the prescription pattern and stock out of antimalarial for severe malaria treatment. These additions have been proposed in the new revisions of the HMIS forms.

Key treatment outcomes tracked included:

1. Prescription pattern of Inj AS (Figure 2). In line with the national treatment policy for severe malaria, the trend in prescription of Inj AS is expected to outstrip other antimalarials.
2. Treatment outcomes for severe malaria cases.

Mean stock-out days for Inj AS and quinine. Monthly average stock out days of antimalarial drugs assessed the effectiveness of the supply chain.

Table 3: Average reporting rates for hospitals in Cross River, Enugu and Oyo States

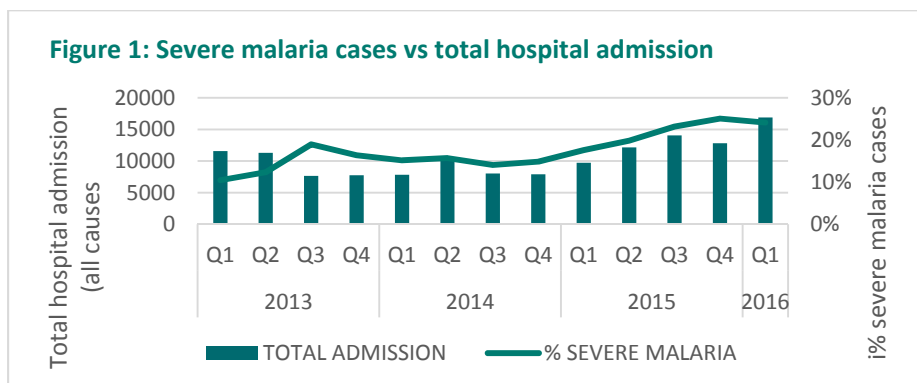
Period	2013				2014				2015				2016
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Reporting	62%	57%	59%	58%	62%	63%	63%	62%	92%	92%	92%	92%	96%

Health workers’ strike actions, construction and security challenges caused low reporting rates in 2014

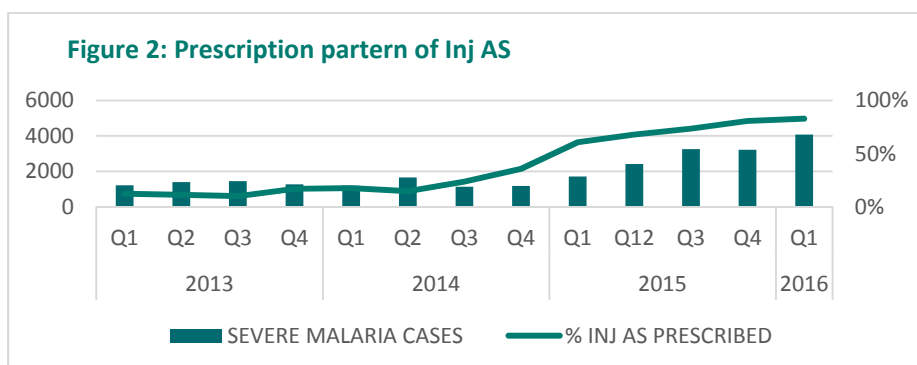
Data for 2013 were collected retrospectively

Training on Inj AS was completed Q4 2014

Inj AS was introduced Q4 2014

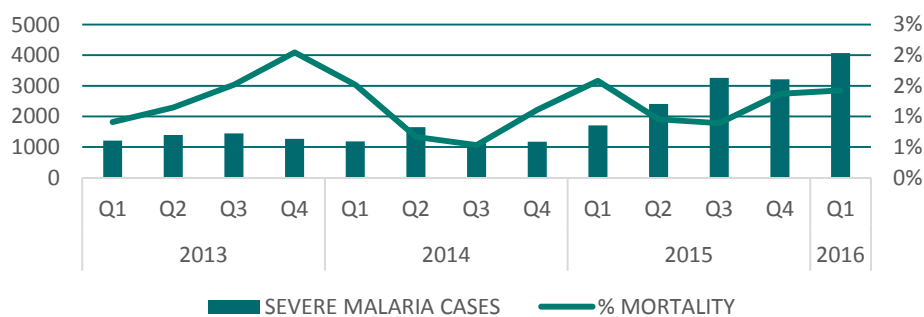


- Severe malaria is 10-25% hospital admissions
- Increase in severe malaria cases from 2015 may be due to improved documentation of severe malaria cases after training of health workers



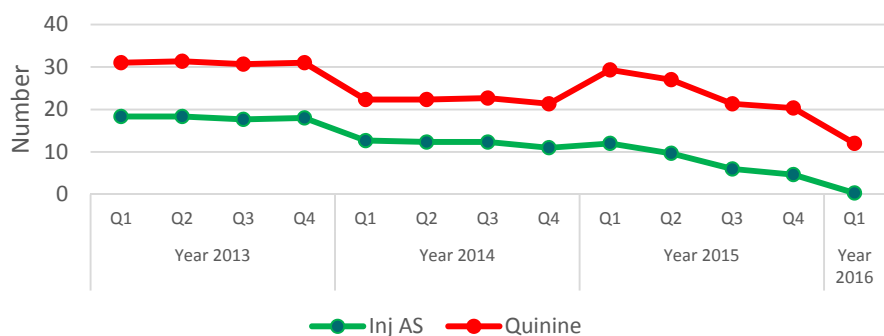
- Steady increase in prescription of Inj AS
- About 20 percent of severe malaria cases are still being treated with other injectables (quinine and artemeter). This is expected because of quinine stock before the project

Figure 3: Mortality rate of severe malaria cases



- Mortality rate reduced from 2 percent to 1 percent as Inj AS was being introduced from Q4 2014

Figure 4: Mean stock out days of antimalarials



- Mean stock out days reduces below targeted seven days from Q4 2014 when Inj AS was introduced
- State Logistic Management System should be used to keep stock-out days as low as possible

Recommendations

As much as possible, ISMO activities were integrated into existing state health systems. For instance, supportive supervision was aligned with integrated supportive supervision (ISS); M&E with HMIS and commodity management with the supply chain as being operated by LMIS and MCLS.

The HMIS and LMIS reporting rates for hospitals improved significantly with ISMO support; deliberate

efforts should still be made for hospitals to align with the national data flow system for the NHMIS.

Procurement of Inj AS and training of health workers on its use should be a continuous exercise. These should be incorporated into the annual operational plans of malaria control units and budgetary allocations made for implementation.

UNITAID/Malaria Consortium Improving Severe Malaria Outcomes project.

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