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SuNMaP 2
SUPPORT TO THE NATIONAL
MALARIA PROGRAMME

UNIVERSITY OF
OXFORD

Monitoring and improving inpatient malaria case management and health systems readiness in hospitals in Nigeria

AUGUST 2021

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Summary

Monitoring and improving the quality of severe malaria case management is one of the pillars of Malaria Consortium's Support to the National Malaria Programme in Nigeria 2 (SuNMaP2) programme (2019–2024) in six Nigerian states: Kano, Kaduna, Jigawa, Katsina, Yobe and Lagos. In this five-year period, annual quality improvement cycles at 62 government hospitals were planned. The collaborative project with the University of Oxford, and National Malaria Elimination Programme (NMEP) and the State Malaria Elimination Programme (SMEP) is based on the revised Kenyan monitoring model. This model extends annual hospital assessments to include post-assessment feedback to frontline health workers, the creation of hospital quality improvement teams to undertake local corrective measures, and supportive follow-up visits. This brief provides technical and implementation modalities of quality-of-care assessments conducted; highlights progress in health systems readiness and case-management performance; describes hospital feedback visits, the creation of quality improvement (QI) teams, and how follow-up visits were conducted; and shares lessons learnt during the first two years of the project, including next steps and recommendations.

The project populations at the 62 hospitals include key departments for severe malaria management and their in-charges, inpatient clinicians and nurses, and children and adult patients with suspected malaria admitted to paediatric and medical wards. The primary monitoring indicators reflect recommended standards for the broader management of suspected malaria admissions specified in the national malaria case-management guidelines, and a set of indicators that can identify major health systems readiness and health worker compliance gaps. We used three quality-of-care assessment methods for cross-sectional data collection: data extraction from the paediatric and medical ward case files; interviews and knowledge assessments of the paediatric and medical ward health workers; and assessments of relevant hospital departments. Two assessment rounds undertaken in 2019 and 2020 found that most of the health systems and case-management indicators improved in this period. The gaps in some of the basic readiness and clinical practice standards, often specific to individual states and hospitals, have remained. Post-assessment dissemination of the performance results and delivery of feedback to hospital health workers followed a process adapted for different levels of dissemination, specifically to the national, state and hospital levels. The findings were accepted in all project hospitals, which unanimously expressed a willingness for improvements and the creation of QI teams to address the areas where deficiencies had been identified. Members of the QI teams developed hospital-specific action plans to address these deficiencies. QI teams' follow-up visits to the hospital revealed high rates of locally initiated corrective measures and quality improvement processes.

In the next phase, the immediate programme priority is comprehensive quality-of-care assessments to establish 2021 performance levels. Over 2022 and 2023, carefully planned, annual cycles of timely hospital assessments, delivery of the feedback for quality improvement and supportive follow-up visits should be undertaken to monitor performance, identify gaps and adjust corrective measures accordingly. During this process, ongoing capacity development of NMEP/SMEP personnel to carry out quality-of-care assessments, deliver optimised post-assessment feedback and follow-up support should be an integral part of the programme, supported by reputable experts in this neglected field.

Introduction

Nigeria contributes 25 percent of the global burden of malaria mortality, with malaria comprising 30 percent of admissions in Nigerian hospitals. Evidence-based management is the cornerstone of malaria control countrywide. In 2012 the NMEP launched new guidelines for the management of severe malaria, recommending a change of treatment policy that shifted from using quinine to parenteral artesunate. The latter is promoted by the World Health Organization and has been shown to reduce malaria mortality in multicentre trials, including those undertaken in Nigeria. Following adoption of the new treatment policy, Malaria Consortium supported its implementation through health systems strengthening activities that included commodity procurement and distribution, training for health workers, quality assurance for diagnostics and supportive supervision. These activities relate to broader aspects of inpatient management for suspected malaria cases and are in line with standards specified in national guidelines and job aids, which are distributed to health workers countrywide.

Despite renewed interest in severe malaria and the importance of the quality of case management — and positive action taken to tackle severe malaria, including the 2012 change of treatment policy and the prior paradigm shift in 2010 to universal malaria testing of febrile illnesses — there is limited information in Nigeria about hospital readiness to implement recommended case management, and

about actual clinical practices for patients admitted with suspected malaria. Moreover, when such information is occasionally reported, low quality of data, inadequately prepared health systems and suboptimal quality of care are common issues. Importantly, the performance gaps are rarely fed back to frontline hospital health workers and their immediate managers to undertake corrective measures to improve clinical practices. Finally, monitoring of the quality of inpatient malaria management is practically non-existent. These deficiencies are not unique to Nigeria; neglect of the rather complex, but life-saving inpatient sector has been observed across Africa for several years. Recent experience from Kenya, however, has shown that large-scale monitoring of inpatient malaria case management is feasible.[1] Between 2016 and 2021, the Kenyan National Malaria Control Programme, with technical support from the KEMRI-WTRP-University of Oxford, implemented seven rounds of monitoring assessments at 90 government and faith-based hospitals countrywide.

In Nigeria, monitoring and improving the quality of severe malaria case management is a key pillar of Malaria Consortium's SuNMaP2 programme, set to run from 2019 to 2024 in six states. Over this five-year period, annual quality improvement cycles were planned at 62 hospitals. This collaborative programme with the University of Oxford, the NMEP and SMEPs is based on the Kenyan monitoring model but differs in a few important ways: it extends annual hospital assessments[2,3,4] to enable frontline health workers to implement post-assessment feedback, allows for the creation of hospital quality improvement teams to develop action plans, as well as supportive follow-up visits. This brief provides an overview of the technical and implementation modalities of quality-of-care assessments, highlights the progress in health systems' readiness and case-management performance, describes hospital feedback visits, creation of the quality improvement teams and shares lessons learnt during the first two years of the programme, including conclusions and recommendations.

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[1] Zurovac et al. Monitoring health systems readiness and inpatient malaria case management at Kenyan County Hospitals. Malaria Journal, 2018; 17: 213.
[2] Zurovac. Health systems readiness and inpatient malaria case-management at hospitals in six states in Nigeria. Baseline assessment April–May 2019.
[3] Ojo AA. Health systems readiness and quality of inpatient malaria case-management in Kano State, Nigeria. Malaria Journal, 2020; 19: 384
[4] Zurovac. Health systems readiness and inpatient malaria case-management at hospitals in six states in Nigeria. Progress report, October 2020.

Programme areas and populations

The programme has been implemented at 62 government hospitals in six SuNMAP2 states in Nigeria: Kano, Kaduna, Jigawa, Katsina, Yobe and Lagos (Figure 1). Five programme states are in high malaria-risk areas, with community prevalence of malaria infection in children 6–59 months ranging from 18.9 percent in Yobe to 36.7 percent in Kaduna, as measured by malaria microscopy.[5] Lagos, however, is an area of low malaria risk with uncertain prevalence of infection. In all public hospitals across programme states, a policy of free-of-charge diagnosis and treatment using donor- and government-procured malaria rapid diagnostic tests (RDTs) and medicines is in place. Over the years, programmatic interventions such as in-service malaria case management trainings for health workers, distribution of national guidelines and job aids, integrated supportive supervision and refresher trainings for malaria microscopists have been implemented at various scales.[6]

With respect to the monitoring and improving inpatient malaria case management, the programme populations included relevant hospital departments and their in-charges (i.e. pharmacy, laboratory, records, admission wards), clinicians and nurses from paediatric and medical wards, and children and adult patients with suspected malaria admitted to these wards.

Figure 1: Map of SuNMaP2 states in Nigeria and programme hospitals within the states

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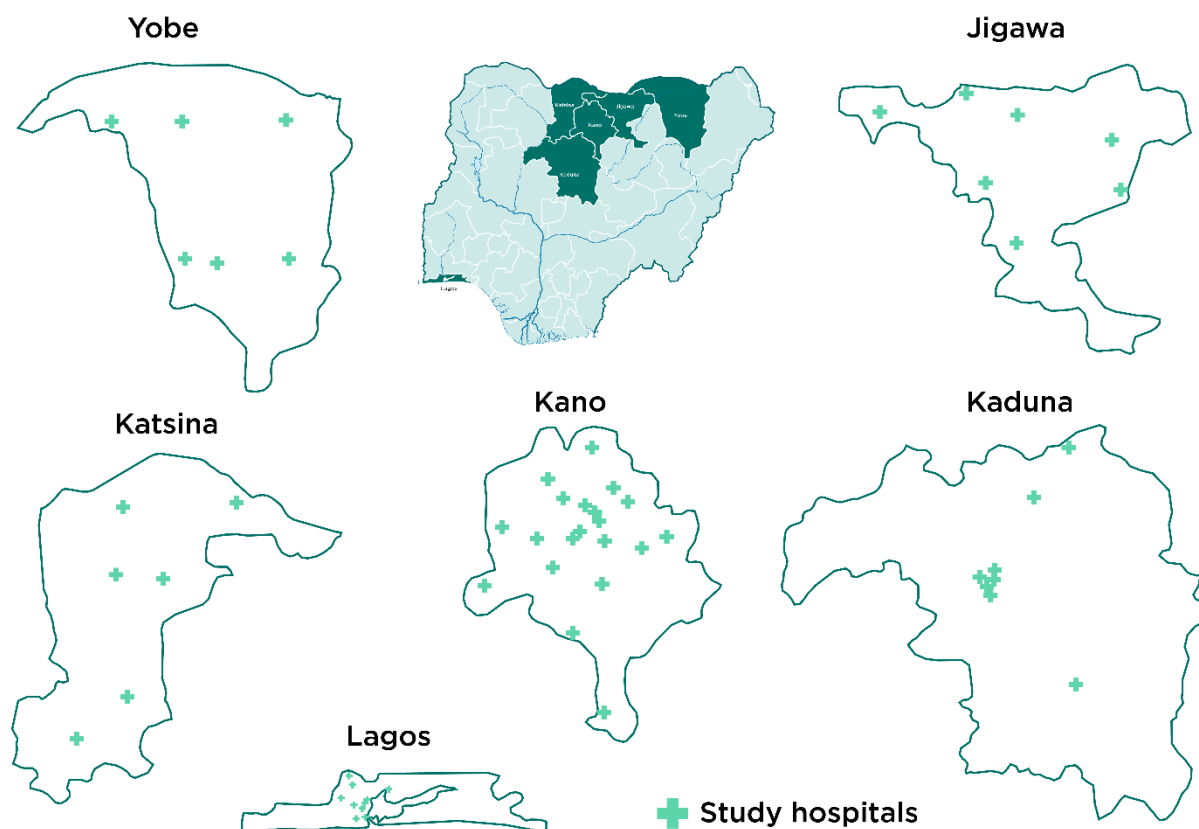
[5] NMEP, NPopC, NBS, and ICF International. Nigeria Malaria Indicator Survey 2015. Abuja and Rockville: NMEP, NPopC, NBS, and ICF International; 2016.

[6] Malaria Consortium. Support to National Malaria Programme (SuNMaP) contributions to malaria elimination efforts 2008–2016. Final report.

Quality of care assessments

Indicators

We used key data elements and indicators to highlight the requisite standards — as specified in the national malaria case management guidelines — for the management of suspected malaria admissions.[7] These indicators can be collected using a range of methods and can be used to identify substantial gaps in health systems readiness and health worker compliance that severely compromise quality of care and the implementation of test and treat malaria case management policies. At the health facility and health worker level, health systems readiness indicators refer to the coverage of hospitals and inpatient health workers with interventions that are important to manage malaria. Interventions include antimalarials, malaria diagnostics, laboratory support, basic equipment, medicines and items for emergency care, and health worker capacity development through relevant in-service trainings, guidelines and supportive supervision (including levels of knowledge about recommended standards for severe malaria management and artesunate use). For case management, the indicators reflect compliance with critical test-and-treat standards in Nigeria, which specify that patients admitted with suspected malaria should be tested for malaria. The following treatments should be prescribed based on the severity of a patient's case and their test result: parenteral artesunate for confirmed severe malaria, artemisinin-based combination therapy (ACT) for non-severe malaria or no antimalarial for patients who test negative (see Figure 2). Additional patient-level indicators are measured, including performance of the basic assessment and vital sign measurements, repeat testing, follow-up treatments and correctness of dosing. Key patient, health worker and hospital-level indicators (according to percentage) are shown in Box 1.

Figure 2: Algorithm for facility-based management of malaria at different healthcare levels in Nigeria

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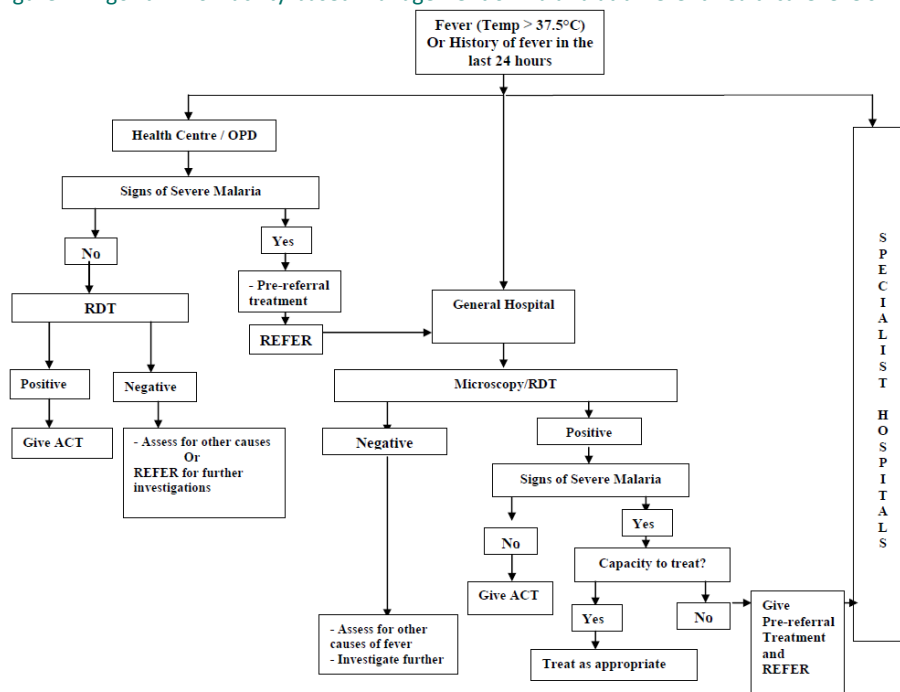
[7] NMEP. National guidelines for diagnosis and treatment of malaria. Abuja: Federal Republic of Nigeria; 2020.

Hospital level

Percentage of hospitals

- with non-expired artesunate/ACT/other antimalarials in stock
- with stock-out of artesunate/ACT/other antimalarials in the past three months
- with non-expired RDTs in stock/functional malaria microscopy on survey days
- without malaria diagnostic service (RDT and microscopy) in the past three months
- hospital laboratories participating in malaria external quality assurance (EQA) scheme
- having displayed artesunate administration poster, by ward
- having basic equipment (weighing scale, thermometer, blood pressure monitors) by ward
- having items for emergency care, by ward.

Health worker level (clinicians and nurses)

Percentage of health workers

- trained on severe malaria management
- who received supportive supervision visit in past 3 months
- having access to malaria case management guidelines
- who have correct knowledge on
  - malaria testing recommendation
  - severe malaria criteria
  - treatment policy for severe malaria (children/adults/pregnancy)
  - artesunate dose, interval and minimum duration
  - reconstitution and dilution of artesunate
- who recommended follow-on treatment.

Patient level (paediatric and medical wards)

Percentage of suspected malaria patients who

- had assessment and vital signs measured on admission
- were tested for malaria on admission
- had repeated malaria test
- tested positive for severe malaria and were prescribed artesunate
- tested positive for non-severe malaria and were prescribed ACT
- tested negative for malaria and were not prescribed antimalarials
- who were managed in accordance with guidelines (composite performance).

Percentage of:

- diagnosed cases, with specified severity of diagnosis on admission
- artesunate-treated patients prescribed the recommended dose
- artesunate-treated patients prescribed follow-up treatment.

Data collection tools

Three data-collection tools have been developed and used: hospital assessment forms, health worker interview forms and patient-level data extraction forms. Instruments were drafted by the University of Oxford, and reviewed and revised by, Malaria Consortium and the NMEP case-management team. Malaria Consortium and the NMEP/SMEP jointly oversaw subsequent hospital pretesting with further revisions and finalisation of the instruments in Kano state, working in collaboration with state-allocated external facilitators responsible for the training of data collectors. The pretesting of the tools in Kano state occurred prior to the baseline in May 2019 at Sheikh Jidda General Hospital and Sir Muhammad Sanusi Specialist Hospital. During pretesting at two sites, and with permission of hospital authorities, the copies of anonymised case files were produced for use during the training of data collectors. Similarly, prior to follow-up training and assessment, anonymised case files were produced at Randle General Hospital in Lagos, and thereafter used during the training of trainers (ToT) for state facilitators and hospital data collectors. Finally, during both rounds, Malaria Consortium and partners developed a guide with standard operating procedures (SOPs) on the use of the instruments, which was then refined and used to facilitate training and actual data collection at the study hospitals.

Assessment personnel and training

Data collection at the hospitals was undertaken by teams composed of one resident hospital records officer and one nurse. Training followed a two-step cascade approach: First, the University of Oxford conducted in-person training for six state facilitators over three days prior to baseline, followed by virtual training over two days ahead of the follow-up assessment. Two of the six state facilitators who led the baseline assessment participated at the follow-up training and assessment. Second, previously trained facilitators conducted in-person, state-level trainings for hospital data collection teams (nurses and records officers) over three days, supported remotely by the University of Oxford (Image 1). The content comprised highlights of the study objectives and data-collection procedures; theory of completing hospital assessment forms; theory, demonstration and role plays for health worker interviews and knowledge assessments (Image 2); theory, demonstration and practice of taking written informed consent for health worker interviews; and theory and practice of following screening criteria and performing data extraction from admission files. To facilitate practising data extraction, records officers brought case files, as well as anonymized files produced before the training.

Image 1: State- level data collectors' training, Kaduna

Image 2: Role play practice, Kano

Data collection procedures

At each hospital, data were collected cross-sectionally using three quality-of-care assessment methods: data extraction from the paediatric and medical ward case files archived at the hospital medical records office; interviews and knowledge assessments of paediatric and medical ward health workers, and assessments of relevant hospital departments.

Regarding data extraction procedures, records officers first counted from the admission registers all patients admitted to the paediatric and medical wards in a complete calendar month prior to the assessment; thereafter, they retrieved all case files corresponding to the same patients Record officers subsequently screened all case files to determine patients with suspected malaria — these were defined as documentation on admission of a complaint of fever/history of fever, temperature >37.5 °C, diagnosis of malaria or prescription of antimalarial treatment. From suspected malaria files, record officers extracted data elements from admission, continuation, laboratory, observation, treatment and discharge forms (Image 3). The primary data elements extracted included age, sex, weight, dates of admission and discharge, assessments and laboratory tests performed with results recorded, diagnoses made, and treatments prescribed during hospitalisation and upon discharge. The presence of clinical criteria of severe malaria on admission was established as documented either at the casualty/outpatient department (OPD) or within 24 hours upon ward admission. Where patients had had a malaria test ordered but no result had been recorded in the file, record officers used the laboratory register to trace these patients to establish whether a test was performed and, if so, what the result was.

The second data collection method included interviews and knowledge assessments of health workers conducted by a team of assessors. In each ward (paediatric and medical), all clinicians and qualified nurses on duty during the day shift on the first day of data collection were approached and, upon providing informed written consent, interviewed by assessors at a time convenient for the interviewees. Interviews took about 15 minutes, during which nurses collected information about health worker demographics, exposure to relevant in-service trainings, case-management guidelines, supportive supervision, and health workers knowledge about management of severe malaria and artesunate use. Knowledge was assessed using self-administered, multiple-choice questions with single correct responses, which were provided to the health workers after the assessments. Finally, on the first day of data collection, the following were established at all hospitals in the appropriate departments, such as paediatric and medical wards, pharmacy (Image 4), laboratory and casualty/emergency units: physical assessments of the availability of antimalarial medicines and RDTs, the presence of retrospective stock-outs, job aids displayed in the study wards, the availability of malaria-related laboratory services, and basic equipment including essential medicines and items for emergency care. Training facilitators, for whom the supervision check list was developed and used, supervised data collection. Following completion of data collection, hospital teams attended a meeting in their relevant state to hand over data collection forms to state supervisors who, having reviewed the forms, sent them to the Malaria Consortium offices for data entry.

Image 1: Data extraction, Gbagada general hospital, Lagos

Image 2: Pharmacy assessment, Yobe

Data management and analysis

Data entry and management was undertaken using Access (Microsoft, USA) while the analyses were performed in STATA, version 14 (StataCorp, USA). Descriptive analyses measuring levels and trends were performed based on the following analytic approach. First, to assess health facility readiness to implement recommended malaria case management, the analysis was undertaken at the hospital level. Second, to assess health worker readiness for policy implementation, coverage of the support intervention and knowledge about severe malaria were analysed at the health worker level. Third, to assess the quality of malaria case management in accordance with national guidelines, analysis was performed at the patient level. The accuracy of case management was analysed from the malaria perspective without considering comorbidities and instead focusing on antimalarial test and treat practices. The primary analyses, stratified by the programme states — and measuring changes in the indicators between assessment rounds — included all assessed hospitals, all interviewed health workers and all suspected malaria patients (or their subcategories), evaluating the quality of case management and compliance with national guidelines. Health worker cadres (clinicians vs nurses) and individual hospitals also carried out exploratory analyses on the selected set of indicators, stratified by admission ward (paediatric vs combined male and female medical. Descriptive statistics formed the basis of analysis through the frequencies, means and medians for non-normally distributed data. Malaria Consortium and the University of Oxford collaboratively conducted data entry, management and analysis.

Quality assurance procedures

Quality assurance procedures were applied throughout assessment preparations, training of personnel, data collection and management processes. First, all data collection tools were pretested and thereafter refined before being finalised. Second, during training, all data collectors underwent concordance testing: they were supported to practise using the tool until they met a minimum 90 percent concordance with the standards and knowledge expected of them. Third, given that changes in the assessment team can occur, the assessment ensured that a minimum of 50 percent of those who participated in the baseline also participated in the follow-up assessment. Fourth, SOPs for each data collection tool were developed and, during each assessment round, training facilitators supervised all data collectors using standardized supervision checklists. Fifth, following completion of the data collection at hospitals, supervisors reviewed, summarised and counted all data collection

prior to sending for central data entry. Sixth, customised data entry screens with in-built range, consistency checks and SOPs were used for data entry. Finally, upon completion of data entry, the forms were stored securely within the premises of Malaria Consortium. Password protection ensured that the computerised database was only accessible to programme collaborators.

Ethical considerations

Prior to the interviews, all health workers were provided with a consent information sheet and their informed written consent was obtained. During data extraction, no patient or health worker identifiers were recorded; all records were assigned a unique number. The ethical clearance for the programme was provided by the National Health Research Ethics Committee of Nigeria (NHREC/01/01/2007).

Assessment results: Highlights

Hospital readiness

Figures 3–6 show state-specific trends in key hospital readiness indicators in 2019–2020. In summary, artesunate availability increased in Kano, Kaduna, Jigawa and Lagos, with improvements ranging from 14 percent in Jigawa to 50 percent in Lagos. This resulted in 80–100 percent of hospitals in these states having artesunate in stock. However, in Katsina and Yobe, availability declined to 57 percent and 33 percent, respectively. Similarly, artesunate stock-outs prior to the assessments also declined in all states, except in Katsina. In 2020, availability of ACT was universal in Kaduna, Jigawa and Lagos — only one hospital in both Kano and Yobe had no ACTs, while the ACT availability declined only in Katsina. Hospital coverage with artesunate job aids increased in all states, ranging from a 10 percent increase in Lagos to 67 percent in Yobe. The 2020 assessment found universal availability of parasitological malaria diagnostic services in all states, except in Kano where, despite a 10 percent increase in coverage, 14 percent of hospitals had no diagnostic capacities. While malaria microscopy was optimised in 2020 across all states, availability of RDTs increased only in Kano (from 27 to 50 percent) and Lagos (from 70 to 100 percent); while in other states, either no change (71 percent in Jigawa; 67 percent in Yobe) or decreased availability (Kaduna 70 to 33 percent; Katsina 43 to 29 percent) was observed. Where malaria microscopy was provided, some improvements in practice were observed, though this varied across states. Apart from Kaduna, an increase in malaria EQA participation was observed in the remaining five states and 2020 coverage ranged from 50 percent in Kano to 83 percent in Jigawa. Similarly, an increase in the availability of microscopy SOPs was seen in five states, which resulted in SOP coverage ranging from 78 percent in Kano to 100 percent in Kaduna, Jigawa, Katsina and Yobe. Finally, the 2020 assessment saw an increase in the performance of triage in four states, resulting in 100 percent triage delivery in Katsina, Yobe and Lagos (Figure 6)

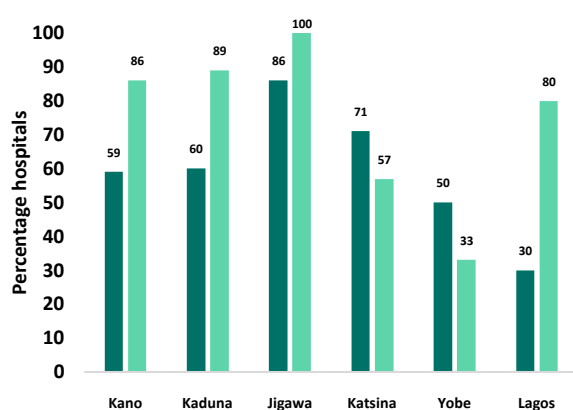Figure 3: Artesunate in stock, 2019–2020

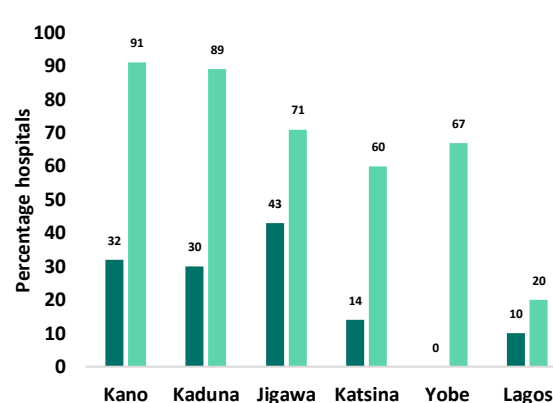Figure 4: Artesunate poster displayed, 2019–2020

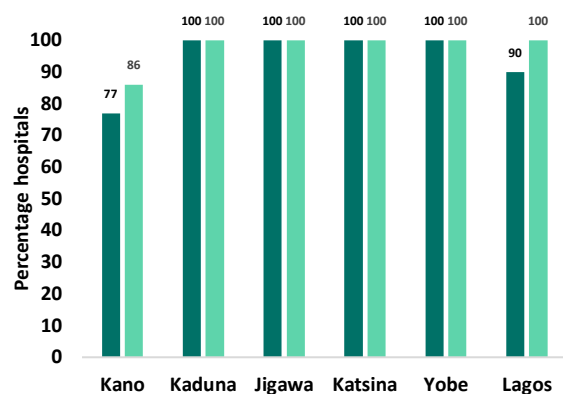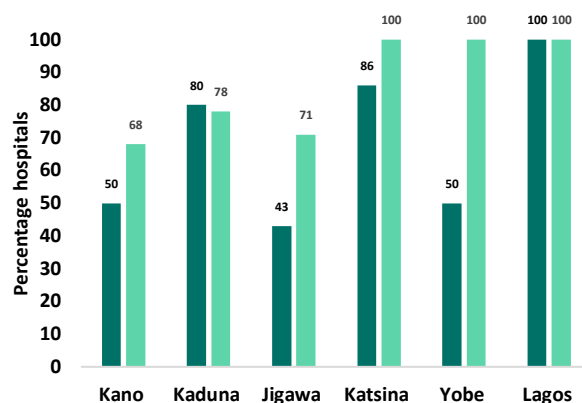Figure 5: Malaria diagnostic service available, 2019–2020

Figure 6: Triage performed, 2019–2020

Health worker readiness

Figures 7–10 show state-specific trends in key health worker readiness indicators in 2019–2020 among 515 health workers interviewed in 2019 [state range (SR): 43-154] and 589 in 2020 [SR: 60-173], respectively. In summary, despite increased training coverage in Kano, Kaduna and Yobe, health workers' exposure to training on severe malaria was low in 2020, ranging from 19 percent in Jigawa to 41 percent in Kano. A major increase in health workers' access to the latest malaria case-management guidelines was observed in all states. The increase in guideline coverage ranged from a modest six percent increase in Lagos to a considerable 38 percent improvement in Kano. In 2020, access to guidelines was lowest in Lagos (24 percent) and ranged from 45 to 59 percent in other states. The follow-up assessment confirmed that health workers' exposure to supportive supervision on severe malaria was very low [SR: 1–17 percent]. With respect to the knowledge of severe malaria features, a positive trend was most common in Kano, observed for 10 out of 12 severity features, and least common in Katsina, where an improved knowledge trend was observed for only one feature. Most health workers at the follow-up knew that all admitted patients with fever should be tested for malaria [SR: 68–80 percent]. Knowledge about artesunate treatment recommendations for severe malaria improved between assessment rounds in Kaduna, Jigawa and Lagos, reaching 2020 levels ranging from 71 percent in Lagos to 89 percent in Katsina. Similarly, knowledge about ACT follow-up recommendations increased, reaching between 80 and 88 percent across all study states. Important knowledge improvements were observed with respect to recommended artesunate dosing. At the follow-up, knowledge of artesunate dosing of 3.0mg/kg for children <20kg ranged from 40 percent in Lagos to 72 percent in Katsina, while knowledge of 2.4 mg/kg for patients >20kg was higher, showing the same pattern of the lowest levels seen in Lagos (56 percent) and the highest in Katsina (69 percent).

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Figure 7: In-service training on severe malaria, 2019–2020
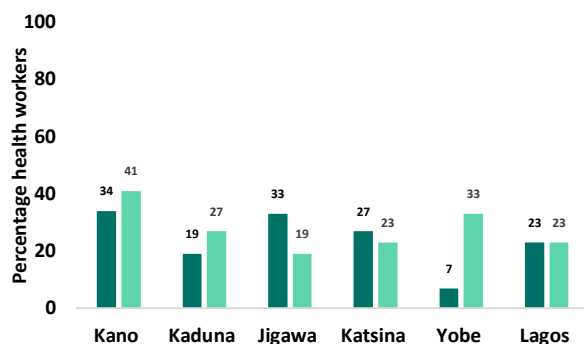

Figure 2: Malaria case-management guidelines, 2019–2020
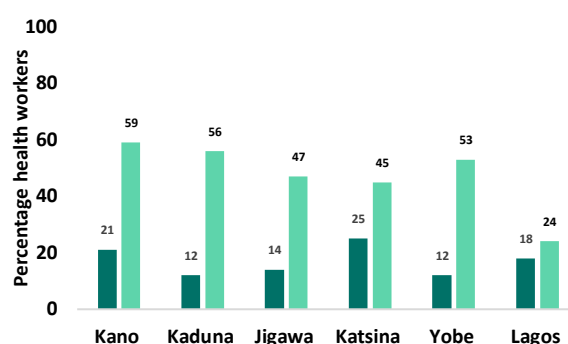

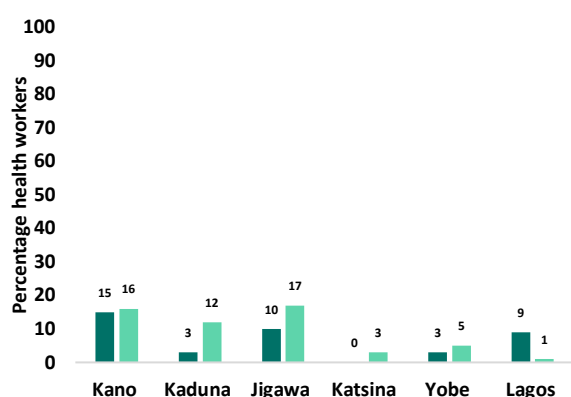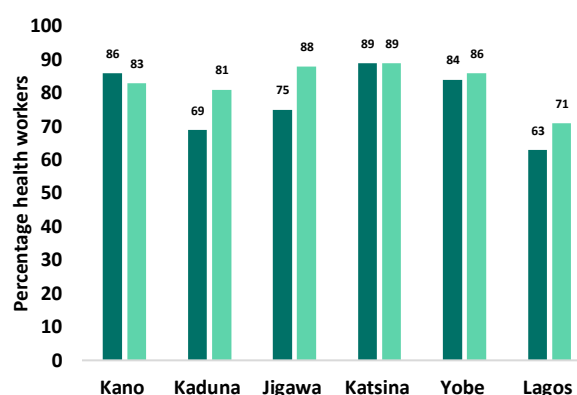Figure 9: Supportive supervision exposure, 2019–2020

Figure 10: Knowledge about treatment policy, 2019–2020

Quality of inpatient malaria case management

The quality of malaria case management was assessed for all patients admitted with suspected malaria in April 2019 (5,502 patients [SR: 521-1,749]) and April 2020 (4,271 patients [SR: 241-1,352]). Figures 11–14 show state-specific trends in key case-management indicators in 2019–2020. Malaria testing on admission increased in four states, with improvements ranging from five percent in Katsina to 11–13 percent in Kano, Kaduna and Yobe. In 2020, testing reached levels ranging from 59 percent in Kano to 70 percent in Kaduna, while RDT use among tested patients ranged from 20 percent in Yobe to 93 percent in Lagos. As seen in 2019, repeat testing was uncommon [SR:1-13 percent]. Major improvements in artesunate use for severe malaria were observed in all states (except in Katsina) with increases ranging from six percent in Kaduna to 51 percent in Lagos. The 2020 findings revealed rates of artesunate-treated severe malaria patients ranging from 51 percent in Katsina to 96 percent in Lagos. In the same period, artemether and arteether use for severe malaria decreased in all states, while ACT treatment for test-positive patients without severe criteria (neither clinically documented nor diagnosed as severe malaria) showed some improvements only in Jigawa (eight percent) and Katsina (10 percent), and remained at low levels in all states [SR: 6–21 percent]. Compliance with no antimalarial treatment recommendations for test-negative patients increased in four states — an increase ranging from nine percent in Jigawa to 14 percent in Kano. Despite these improvements, compliance was still suboptimal [SR: 18–47 percent]. Paediatric patients with severe malaria were more commonly treated with artesunate in all states except

Katsina, while artemether use was higher for adults than children across all states and for all categories of patients. Where artesunate was prescribed, the 2020 findings found nearly standardised practice of three-dose treatment, improvements of 7–16 percent in ACT follow-up prescription in three states and an increase of 10–19 percent in weighing practices in four states (however, the latter pertained exclusively to children in the paediatric wards).

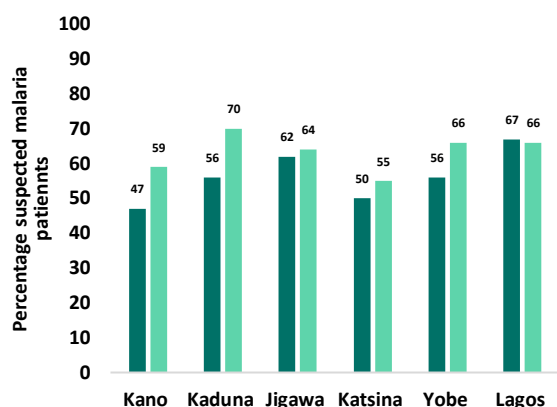Figure 11: Malaria testing rates, 2019–2020

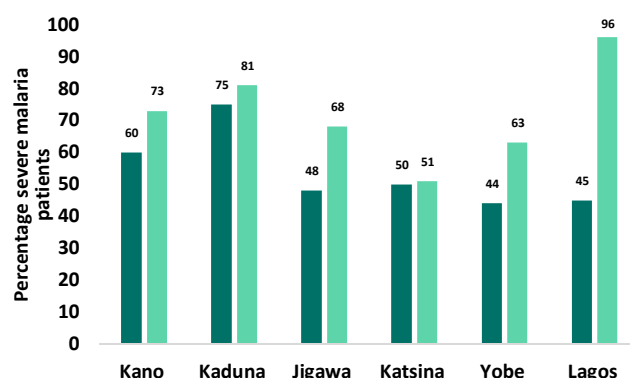Figure 3: Artesunate treatment for severe malaria, 2019–2020

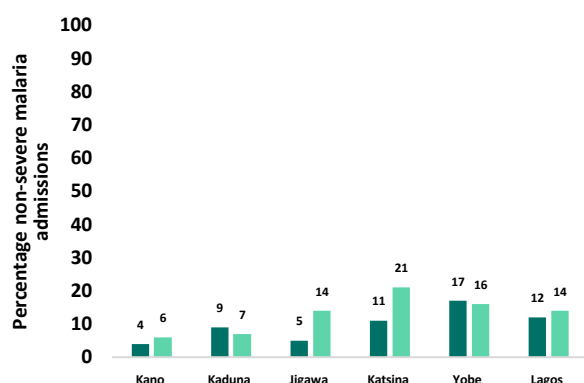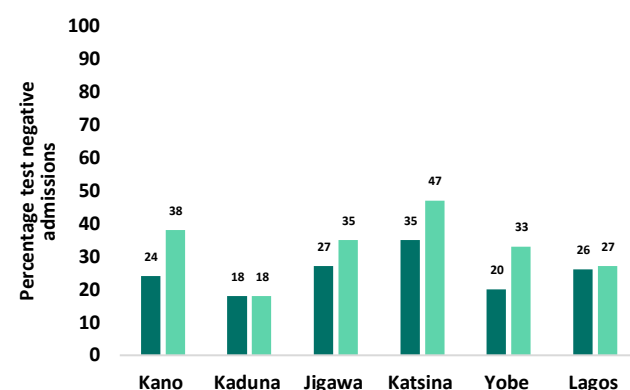Figure 13: ACT treatment for non-severe malaria, 2019–2020

Figure 14: Compliance with test negative results, 2019–2020

Dissemination and hospital feedback

Post-assessment dissemination of the performance results and delivery of feedback to hospital health workers followed a three-step cascade process adapted for different levels of dissemination. First, the findings were disseminated at the national level, at fora such as NMEP's Case Management Technical Working Group meetings and Annual National Severe Malaria Stakeholder Meetings. Second, in each of the programme states, the findings were further presented to the Ministry of Health, the Hospital Management Board and the SMEP managers. Third, previously trained state facilitators supported by Malaria Consortium's service delivery expects and SMEP/hospital management board officers delivered feedback to health workers in each of the participating hospitals. The University of Oxford prepared presentations for different levels of dissemination and provided demonstrations at the national level, as well as during several hospital visits in Lagos. Despite initial intention of high coverage of frontline health workers, selected health workers'

attendance at feedback sessions had to be prioritised to allow for pandemic physical distancing measures within available hospital meeting spaces (Image 5). At most hospitals, the number of invited health workers, including facilitators, was limited to 15 participants. We did, however, ensure the minimum representation of relevant departmental in-charges or their representatives (i.e. heads of pharmacy, laboratory, records, as well as clinical and nursing in-charges for paediatric and adult services) during feedback meetings. Their attendance is considered important not only to filter translation of messages down to other frontline health workers, but also to ensure their participation in separate, smaller groups after feedback meetings, which focus on planning for further quality improvement actions beyond feedback delivery. With respect to the meeting format, state facilitators moderated the feedback meetings using structured, state-specific presentations. These were supported with key individual hospital findings, addressing critical test-and-treat case-management standards (Image 6), acknowledging improvements and highlighting gaps, and, in open-ended discussions, assessing acceptance of the findings, reasons behind the deficiencies and willingness for change. Notably, the findings were accepted in all programme hospitals that received feedback, with unanimous willingness expressed for further improvements in areas where deficiencies had been identified. Following completion of the feedback meetings, the members of the quality improvement teams continued working to develop or update hospital-specific action plans and address systems readiness and case-management issues that had been identified during feedback sessions.

Image 3: Feedback meeting, Geidam general hospital, Yobe

Image 4: Set of standards addressed at feedback meetings

Focus areas

1. Universal availability of AS and ACTs at hospitals?
2. Availability of quality assured microscopy and RDTs?
3. Triage and basic equipment?
4. Malaria testing of all patients with fever on admission?
5. Specifying severity of malaria diagnosis – severe vs non-severe?
6. Artesunate treatment for severe malaria?
7. ACT for non-severe malaria?
8. ACT continuation of AS treatment for severe malaria?
9. Compliance with test negative results?
10. Weighing and dosing based on weight?

Quality improvement teams

Hospital QI teams — or task force teams — were comprised of up to 10 members, each representing department or hospital services of relevance for health systems or clinical domains of performance interest. Heads of pharmacy, laboratory, records office as well as in-charges of clinical and nursing for paediatric and adult services, and whenever possible hospital directors, were essential team members (Images 7 and 8). The QI areas addressed at the meetings included hospital readiness domains, i.e. availability of key test and treat commodities (artesunate, ACT, RDT) and services (triage, microscopy); and 2) case-management domains, i.e. compliance with testing guidelines, artesunate use for severe malaria, use of ACTs for non-severe malaria and follow-up severe malaria treatments, compliance with negative malaria tests including malaria severity diagnosing, weight-based dosing, and minimum routine documentation. The domains addressed during the QI meetings were aligned with national malaria case-management standards, key indicators measured during the annual assessments and focus areas presented during the feedback meetings. State facilitators (trained by the University of Oxford) moderated discussions around specific domains using structured forms serving as action plans and specifying whether performance deficiencies had been recognised by the QI teams — and, if they had, what corrective measures should be taken and by whom. Following completion of the meetings, the signed copies remained with team members and hospital directors. Planned corrective measures were informed by the potential reasons for readiness and case-management deficiencies, which were also discussed at the meetings.

The general impression of the facilitators and QI team members was that domain improvements often require attitude and behaviour changes rather than major capital investments. For instance, potential reasons for stock-outs of commodities may range from simple omissions to make timely orders or ordering of insufficient quantities, delaying of consumption reporting (and therefore resupplying), irrational prescribing of medicines and diverted attention from malaria due to the COVID-19 pandemic, to more complex aspects of restricted local procurements by policy and suspected medicine diversion by hospital personnel. With respect to suboptimal case-management practices, non-compliance with clinical guidelines seems to be strongly influenced by behavioural and organisational aspects of work rather than lack of knowledge of nationally recommended malaria case-management standards. Along these lines, and wherever possible, the QI teams, in collaboration with hospital management (e.g. hospital directors and administrators), focused on internal hospital solutions using existing resources rather than on less realistic expectations around external, higher-level inputs.

Image 5: Quality improvement team, Shomolu general hospital, Lagos

Image 8: Quality improvement meeting, Ringim general hospital, Jigawa

Follow-up visits

Hospital follow-up visits, characterised by their evaluative and interventional nature, were undertaken as a component of the QI cycle. Their aim was to establish whether hospitals' acceptance of the assessment findings, willingness for change, creation of QI teams, and development of action plans had resulted in any point-of-care corrective measures or QI processes. Moreover, the follow-up visits are also used to support and prompt QI teams to start or continue corrective actions, if needed. The visits were undertaken approximately four months after feedback delivery, QI meetings and the development of action plans. We are now exploring the feasibility of additional follow-up visits, comprising QI teams and assessments. The follow-up meetings were held with QI team members (Images 9 and 10). State facilitators moderated discussions about specific areas of improvement interests (seven relating to hospital readiness and nine to case-management domains) using structured forms serving as discussion guides and action plans. The facilitators were medical doctors trained on SOPs for the activity. Facilitator training included lecturing and discussions about the programme background, objectives, orientation on the use of checklists for health systems and case-management domains; and details of the supportive supervision, reporting and operational arrangements for the delivery of activity. In total, nine facilitators undertook hospital follow-up visits. Four of the nine facilitators had prior experience of the feedback delivery and QI meetings, while the remaining five were newly recruited personnel. The University of Oxford provided training and supportive supervision to state facilitators through the ongoing exchange of information and data, daily meetings and reviews of the checklists.

Seven hospital readiness domains were discussed with QI teams, pertaining to availability of commodities (artesunate, ACT, RDT) and services (triage, microscopy). It can be estimated that of 168 readiness deficiencies identified across programme hospitals during the previous QI meetings, corrective measures and improvement processes were initiated for 73 percent of deficiencies across programme states, ranging from 56 percent in Yobe to 85 percent in Lagos. The following are examples of commonly reported actions undertaken to address deficiencies within the readiness domains (i.e. to improve availability of artesunate, ACT, RDTs, triage and malaria microscopy services):

- ✓ Timely and enhanced ordering of antimalarial medicines
- ✓ Local procurement of artesunate, ACTs and malaria RDTs through revolving drug funds
- ✓ Stock-out resolutions by prompt communication through RBM focal points
- ✓ Complementary procurement of medicines and fee exemptions through Maternal and Newborn Child Health scheme
- ✓ Rationalisation of drug use by introduction of artesunate utilisation registers
- ✓ Provision of equipment, on-the-job training and assignment of additional nurses to undertake triage
- ✓ Formal and step-down trainings of laboratory scientists on malaria microscopy
- ✓ Procurement of laboratory equipment, e.g. Giemsa staining and tally counters.

Despite the series of actions undertaken within individual hospitals, the hospital readiness observed during follow-up visits was not without challenges. These differed between programme states, and across commodities or services of the readiness interest. For instance, spot checks during the follow-up visits suggested high availability of malaria microscopy and oral ACTs across all states, but also more common stock-outs of injectable artesunate — and, to some extent RDTs, particularly in

Katsina and Yobe where officially disallowed local procurements by authorities (Katsina) or seriously compromised supply chains due to insurgencies (Yobe) are important factors precluding hospital actions and potential stock-out resolutions.

With respect to recommended case-management practices, a further nine domains within the clinical area of compliance with malaria guidelines were discussed with QI teams. Of 190 case-management deficiencies identified during the previous QI meeting across hospitals, corrective measures and improvement processes were initiated for 86 percent of deficiencies across programme states, ranging from 79 percent in Kano to 95 percent in Yobe. The actions undertaken were aligned with the previous QI team discussions, which suggested that suboptimal clinical practices were less likely to be a consequence of insufficient knowledge (which can be corrected with one-time interventions such as formal in-service training), and more likely to be influenced by behavioural and organisational aspects (for which repeated engagements within local working context would be more beneficial). While formal in-service trainings are still welcomed by the hospitals, QI team members focused on simple, feasible and sustainable improvement pathways, mainly internal hospital solutions. The examples of commonly reported actions undertaken to address deficiencies of the clinical case-management practices included:

- ✓ Establishment of point-of-care RDT testing overseen by nurses, commonly in OPD, accident and emergency units and wards
- ✓ Sensitisation of clinicians on compliance with guidelines during clinical meetings and ward rounds
- ✓ Enhanced ward supervision by nursing and clinical in-charges
- ✓ Continuous on-the-job clinical mentoring on compliance with malaria guidelines by chief medical officers
- ✓ Malaria case presentations and discussions during the clinical meetings
- ✓ Organization of CME sessions on malaria case management standards
- ✓ Regular random checks of inpatient case files for patients admitted with fever
- ✓ Compliance enhancement by dispensing artesunate for test-positive patients only
- ✓ Circular issued by medical directors on compliance with guidelines and rational use of medicines
- ✓ Use of social media to highlight case-management standards and appropriate documentation
- ✓ Procurement of weighing scales for outpatient and inpatient services
- ✓ Continuous dissemination of the feedback messages to frontline health workers
- ✓ Championing of recommended clinical practices by medical director
- ✓ Facilitating malaria testing by subsidising patients' costs.

Finally, while high levels of the locally initiated corrective measures are encouraging findings supporting pathways of change, formal quality-of-care assessments are urgently required to demonstrate whether, and to which extent, reported quality improvement processes, delivery of enhanced feedback, and supportive follow up visits, have truly translated into improved malaria case management practices.

Image 6: Follow up quality improvement meeting, Gaya general hospital, Kano

Image 7: Follow up quality improvement meeting, Ajeromi general hospital, Lagos

Lessons identified, recommendations and sustainability

The initial phase of the programme — which focused on the monitoring and improvement of the quality of severe malaria case management and health systems readiness in hospitals in Nigeria — revealed series of important lessons for future phases, further optimisation of implementation and sustainability of the programme:

- ✓ A major milestone during the initial phase of the programme was quantitative, evidence-based demonstration that improvements in inpatient malaria care are possible, even in markedly complex and support-neglected healthcare settings such as Nigerian hospitals.

- ✓ Monitoring and improving health systems readiness and inpatient malaria case management is an ongoing process requiring a paradigm shift from one-time quality improvement interventions (e.g. in-service training, guideline dissemination) to continuous QI cycles.

- ✓ The focus of quality improvements should be the promotion of critical standards against which deficiencies are recognised by the in-charges and health workers during the feedback delivery, and for which they are willing to change.

- ✓ With respect to the frequency of data collection for action, annual assessment rounds extended to enhance feedback, engagement with QI teams and supportive follow-up visits, the process of reducing external and SuNMaP 2 input should be done gradually so as not to jeopardise the effectiveness of the approach.

- ✓ When quality and coverage gaps are identified, implementers should not be discouraged with findings but pursue understanding of the local context and modifications of the corrective measures, and continue iterative monitoring of the readiness and case-management performance.

- ✓ Rather than relying on heavy external investments, QI teams supported by hospital management should focus on internal corrective measures, addressing behavioural and organisational aspects within the existing hospital resources.

- ✓ National agencies can support local improvement efforts by ensuring adequate and universal supply of essential commodities (e.g. artesunate), promoting use of data for decision-making (e.g. targeted case management interventions), and fostering a stronger culture that emphasises quality.

- ✓ If the global community is to see the extent to which quality is tangibly improving over time, it will be essential for development partners to intensify advocacy for quality-of-care programmes, to continue funding of successful programmes and to serve as a mechanism for accountability.

- ✓ Measuring, monitoring and improving inpatient quality of care is a rather new and complex topic within malaria control that has not yet been embedded in Nigerian health systems. Close external technical input, such as that provided by the University of Oxford, is a critical component of the programme.

- ✓ While feasibility and effectiveness were a focus during the initial reported phase of the programme, ensuring programme sustainability through capacity development of the

NMEP and SMEP technical officers (by the University of Oxford) should receive greater attention in the next phase of the programme.

✓ The feasibility and interest of the hospital departmental in-charges (pharmacy, laboratory, records, paediatric and medical clinical and nursing), QI teams and frontline health workers to carry out the entire quality improvement cycle without programme support should be explored at selected sites.

✓ The long-term effectiveness and sustainability of the programme will be determined by the strong collaborative commitments between the participating hospitals, NMEP/SMEP programmatic involvement, implementation partners such as Malaria Consortium, and technical guidance by reputable experts with proven records in this field such as the University of Oxford.

Conclusions and next steps

Quality improvement interventions based on regular assessments, enhanced dissemination and feedback, identification of the coverage and quality gaps, creation of the QI teams, deployment of corrective measures, and supportive follow-up visits are evidence-based ways not only to provide monitoring indicators, but also to promote data collection for action and improve quality of care. Despite the implementation challenges due to the COVID-19 pandemic, and the consequent diverted attention from fundamental health issues such as malaria, the initial assessments undertaken in 62 Nigerian hospitals across six states have shown improved health systems readiness and case-management trends. However, the assessments have also revealed gaps, often practice and hospital specific, for which continued plan-do-study-act cycles are indispensable. High rates of hospital-initiated QI processes and anecdotal reports of further case-management improvements call for continuation of QI cycles and urgent comprehensive quantitative hospital assessments to establish evidence-based 2021 performance levels of the hospital and health worker readiness and actual quality of inpatient malaria case management. Over the next two years (2022–2023), carefully planned, complete annual cycles of timely hospital assessments, feedback delivery for QI and post-assessment supportive follow-up visits should be undertaken to monitor performance, identify gaps (and not to be discouraged when these are found) and adjust corrective measures accordingly. During this process, on-going capacity development of the NMEP/SMEP personnel including hospital managers and frontline health workers to undertake quality-of-care assessments and deliver optimised post-assessment feedback and follow up support should be an integral part of the programme to ascertain implementation delivery, optimised effectiveness and long-term sustainability.

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