



Implementing Nigeria's Master Facility List

Results of User Acceptance Testing

June 2019





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ABBREVIATIONS

FMOH	Federal Ministry of Health
HFR	Health Facility Registry
MFL	Master Facility List
SOP	standard operating procedure
UAT	user acceptance testing
USAID	United States Agency for International Development

INTRODUCTION

The development of the Nigeria Health Facility Registry (HFR) was supported by the United States Agency for International Development (USAID). The development of an information system and processes for the management of the national health facility list was a priority of Nigeria's National Health Information System Strategic Plan (2014–2018),¹ but as of 2016, it had not yet been fully achieved. Addressing this gap was prioritized by USAID as part of strengthening the national health information system and after having supported the development of a Master Facility List (MFL) for the country between 2011 and 2013. The MFL is a listing of health facilities with administrative information that can be used to identify and contact the facility as well as services provided at that facility. The MFL's shortcomings included the lack of processes and an associated information system to facilitate the ongoing management of health facility data. The development of the HFR addressed these gaps. The HFR will also facilitate the easy identification of health facilities and will serve as a primary source for different information systems to get data on health facilities.

User acceptance testing (UAT) is a critical phase in the software development process. During UAT, a system's clients test whether the system can handle required tasks under real-world scenarios and according to agreed-on specifications.

The first UAT of the HFR was conducted on December 12, 2017, based on initial system requirements. In 2018, MEASURE Evaluation continued to improve the HFR, making major enhancements and developing the second version of the system (HFR 2.0). In collaboration with the Federal Ministry of Health (FMOH), MEASURE Evaluation also developed standard operating procedures (SOPs) in October 2018 for managing the facilities in the HFR. Following the validation of the SOPs by the MFL technical working group, approval work flows were prepared to ensure the proper addition, update, and deletion of facilities according to the SOPs for the HFR.

Because of the major system improvements, another UAT was needed to ensure that all functionalities worked as expected. MEASURE Evaluation and the FMOH conducted a workshop from March 27–29, 2019, to review the system and perform the UAT.

¹ Federal Ministry of Health (FMOH), Nigeria. (2014). *National health information system strategic plan 2014–2018*. Abuja, Nigeria: FMOH. Retrieved from <http://www.health.gov.ng/doc/National%20HIS%20Strategic%20Plan.pdf>.

OBJECTIVE

The objective of the UAT was to give HFR users an opportunity to test all functionalities, identify any defects or bugs, and check whether the system met the required, agreed-on specifications. The UAT also assessed whether the HFR could support day-to-day real-world scenarios and ensured that the system was sufficient and ready for rollout countrywide.

PROCESS

- The MEASURE Evaluation team—Beatus Kibiti and Zaharani Kalungwa (MEASURE Evaluation, Nigeria), with support and guidance from Jenny Mwanza and Balogun Adeleke (MEASURE Evaluation, Chapel Hill and Federal Ministry of Health, Nigeria)—went through all system specifications, as defined in the specifications document, and developed different test scenarios for each functionality in the system. The scenarios formed the basis of a UAT checklist document (Appendix B).
- During the UAT workshop, participants (Appendix A) were first trained on all system functionalities and were encouraged to come up with more scenarios that they wanted to test.
- Participants were given the UAT checklist and were oriented on how to complete it. Three groups of participants were formed (Table 1). Each group was required to submit one completed UAT checklist at the end of the workshop.
- Although the UAT was done with participants organized into working groups, some scenarios were designed for individual testing, with each participant's findings collected by their assigned group. On the other hand, for example, the approval workflow testing required participants to work as a group because this process required multiple levels of testing at the same time.
- For each scenario, participants were asked to fill “1” if the test passed and “0” if the test failed.
- The completed checklists were collected at the end of the workshop. An analysis of the findings is presented in the next section.

Table 1. UAT workshop participants

No	Group	Full Name	Sex (M/F)	Organization	Current Job Title
1	Group 1	Yetunde Hussein	F	FMOH	Principal Statistical Officer
2	Group 1	Ahmadu Ismaila	M	FMOH	Executive Officer/M&E
3	Group 1	Mbachaga Julius	M	HISP	Information Systems Officer
4	Group 1	Gabriel Ikechukwu	M	FMOH	Principal Executive Officer II
5	Group 1	Mr. John Bisong	M	FMOH	Assistant Chief Population Program Officer
6	Group 2	Orji Ihuoma Vivian	F	FMOH	Scientific Officer 1
7	Group 2	Mbanugo Maduabuchi	M	FMOH	Senior Computer Analyst
8	Group 2	Kalu Achi	M	FMOH	Environmental Health Technician
9	Group 2	James Dominion Chidozie	M	FMOH	Scientific Officer/Strategic Planning
10	Group 2	Nwagbara Eberechi	M	FMOH	Scientific Officer
11	Group 3	Balogun Adeleke	M	FMOH	Deputy Director M&E
12	Group 3	Seldun Austin	M	FMOH	Senior Data Processing Officer
13	Group 3	Abigail Gaadi	F	HISP	Capacity Building Officer
14	Group 3	Dr. Odeyimi Adeyinka	F	FMOH	Senior Medial Officer

RESULTS

The participants tested all scenarios given in the UAT checklist. Ninety-six percent (96%) of the functionalities tested were deemed to perform as expected. The minor errors or software bugs that were observed are documented below and have been corrected. A few system enhancements were also suggested and have been made.

Errors or Software Bugs and Status

- Searching for a facility in the public portal was not working (resolved).
- A chart title had a misspelling: “Facilities with Geo Goordinates” (corrected).
- When editing a facility, if the user failed to identify the ward, the system produced an internal server error (validation rule added).

System Enhancements to the Public Portal

1. Move the “facility updates submenu” to a new menu called “report.”
2. Remove the data labels for Hospitals and Clinics by Level of Care chart because the charts were overly congested.
3. MFL core members to update the content of the “About the Master Facility List.”
4. MFL core members to update the contact details for the HFR.

Results Summary

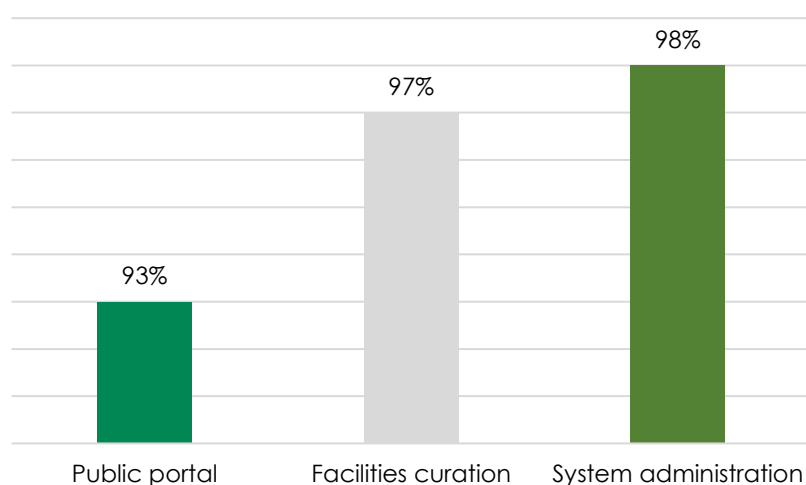
Test scenarios were put in different groups for the different HFR modules (Table 2). The maximum available score indicates the number of scenarios for each scenario group. The score shows how many scenarios passed the test in each group. Table 2 summarizes the overall UAT results. The average score for all scenarios for all groups was ninety-six percent (96%).

Table 2. Summary UAT results

Module	Scenario Groups	Maximum Available Score	Group 1		Group 2		Group 3		Average Score
			UAT Score	% Score	UAT Score	% Score	UAT Score	% Score	
Public portal	Home	9	9	100%	9	100%	9	100%	100%
	Statistics	3	3	100%	3	100%	3	100%	100%
	Facility listing	5	3	60%	3	60%	3	60%	60%
	Data downloads	5	5	100%	5	100%	5	100%	100%
	Resources	2	2	100%	2	100%	2	100%	100%
	About & contacts	3	3	100%	3	100%	3	100%	100%
Facilities curation	Public	9	9	100%	9	100%	9	100%	100%
	Data entry	27	27	100%	27	100%	23	85%	95%
	Verify	22	22	100%	22	100%	15	68%	89%
	Validate	20	20	100%	20	100%	20	100%	100%
	Publish	18	18	100%	18	100%	17	94%	98%
System administrator	System login	6	6	100%	6	100%	6	100%	100%
	Roles	6	6	100%	5	83%	6	100%	94%
	Users	10	10	100%	10	100%	10	100%	100%
	Feedback	4	4	100%	4	100%	4	100%	100%
	Download	2	2	100%	2	100%	2	100%	100%
	Resources	5	5	100%	5	100%	5	100%	100%
	Master data	28	28	100%	23	82%	28	100%	94%

The average UAT scores, by HFR module, are given in Figure 1.

Figure 1. Average UAT scores, by HFR module



CONCLUSIONS

Considerable improvements have been made to the software to incorporate approval workflows; in light of these critical updates to the system, stakeholders reviewed the system functionalities during the UAT to test if new functionalities worked as expected. The review revealed some minor bugs that were subsequently resolved. The UAT process is essential to building transparent stakeholder engagement in the HFR and confirming that the system is ready for pilot testing at the state and local government authority levels.

APPENDIX A. UAT CHECKLIST

Public Portal

No	Test Scenario	Pass (1) or Fail (0)
Home		
1	Shows a map of Nigeria with distribution of health facilities on the map, and shows summary of facilities by level of care and ownership	
2	Displays summary of percentage of facilities with geo coordinates	
3	Map can drill down to states and the summary by ownership, level of care and facilities with geo coordinates reflect the selected state	
4	Map can drill down to LGAs and shows facilities in google map differentiated by public, Private, Primary, Secondary and Tertial	
5	Can see facility details in google map	
6	Click on FMOH Logo take you to Home page from any other screen	
Statistics		
7	View summary tables with distribution by ownership and level of care and filter by facility type and by state	
8	View summary charts with distribution by ownership and level of care and filter by facility type and by state	
9	View population index and filter by state	
Facility listing		
10	View list of facilities and filter by state, LGA, wards, facility with coordinates and without coordinates	
11	Search facility by name	
12	View details of the facility	
Data downloads		
13	Can view facilities created in current month and previous 3 months	
14	Can view facilities updated in current month and previous 3 months	
13	User cannot download list of facilities without fill a form	
14	User cannot download facilities if he/she provide wrong email	
15	user cannot download facilities if he/she does not verify is not a robot	
16	User cannot submit the form if all fields marked mandatory are not completed	
17	User can download the data after providing required details	
Resources		
18	View available resources	
19	Can download resources	
20	About & Contacts	
21	View details about HFR system	
22	Get contact details for FMOH and HFR team	
23	User can send feedback to HFR team	

Facilities Curation

No	Test Scenario	Public	Data Entry	Verify	Validate	Publish
1	User can view a list of hospitals and clinics					
2	User can view details of selected hospital or clinic					
3	User can filter the list by state and LGA					
4	User can search for specific hospital or clinic					
5	User can download hospital list					
6	User can initiate the create request inside LGA					
7	User can initiate the create request only inside assigned LGA					
8	User can view the request initiated					
9	User can modify own request before it has been verified					
10	User can delete own request before it has been verified					
11	User can view and verify the initiated request					
12	User can view the request that have been verified					
13	User can view the request that was rejected by verifier					
14	User can modify own request after it has been rejected by verifier					
15	User can delete own request after it has been rejected by verifier					
16	User can view and validate verified request					
17	User can view the request that have been validated					
18	User can view request that was rejected by validator					
19	User can view and publish validated request					
20	User can view the request that have been published					
21	User can view request that was rejected by publisher					
22	New facility information not visible before it has been published					
23	New facility information is visible after it has been published					
24	User can initiate the delete request within LGA					
25	User cannot initiate the delete request outside of LGA					
26	The facility is deleted from the list after has approved the delete request					
27	User can initiate the update request					
28	User can only see request for his own State or LGA					
29	Facility status chart in dashboard is updated as approvals are done					
30	Facility status report is updated as approvals are done					

System Administration

No	Test Scenario	State Administrator	Administrator	Superuser
System login				
1	User cannot login if no username and password is provided			
2	User cannot login if wrong information is provided			
3	User cannot login if cannot pass robot verification			
4	User can receive verification token to his email			
5	User can verify the token send to email, and allowed to the system if he or she provide correct token or prevented if wrong token is entered			
6	User cannot access admin module without login			
Roles				
7	User can view the list of existing roles			
8	User can define new role and set permissions			
9	User can edit existing role and change permissions			
10	User can delete role			
11	User cannot perform tasks that are not assigned to the role s/he has			
12	User cannot view modules that s/he has not being given permission			
Users				
13	Can view the list of existing uses in the system			
14	Can add a new user, assign roles			
15	Can edit user information			
16	Can block and unblock a user			
17	Blocked user cannot login to the system			
18	User can see his or her profile details			
19	User can update his profile information			
20	User can change his or her password			
21	Cannot update user information from a different state e.g. Abia admin update Niger users			
22	User can reset their own password			
Feedback				
23	User can view all feedback sent to admin team			
24	Feedback submitted in public portal under contact us form is saved and can be viewed by admin			
25	Administrators receive emails once feedback is sent			
26	User can see messages sent, when was sent, and who sent the feedback			

No	Test Scenario	State Administrator	Administrator	Superuser
Download				
27	User can view all download request and reason why person wanted the data			
28	The number of downloads match the summary chart in admin dashboard			
Resources				
29	User can view the list of resources			
30	User can add new document to resources			
31	User can edit the name of the document			
32	User can delete the document in resources			
33	Document added can be downloaded in both admin module and public portal			
Master Data				
34	View the list of all states			
35	User can add a new state			
36	User can edit existing state			
37	User can delete a state			
38	View the list of all LGAs			
39	User can add a new LGA			
40	User can edit existing LGA			
41	User can delete LGA			
42	View the list of all wards by state and LGA			
43	User can add a new ward			
44	User can edit existing ward			
45	User can delete ward			
46	View the list of hospital services			
47	User can add a new hospital service			
48	User can edit hospital service			
49	User can delete hospital service			
50	View the list of imaging services			
51	User can add a new imaging service			
52	User can edit imaging service			
53	User can delete imaging service			
54	View the list of laboratories equipment			
55	User can add a new laboratory equipment			
56	User can edit laboratory equipment			
57	User can delete laboratory equipment			
58	View the list of laboratory certifications			
59	User can add a new laboratory certification			
60	User can edit laboratory certification			

No	Test Scenario	State Administrator	Administrator	Superuser
61	User can delete laboratory certification			

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