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MEASLES CASE-BASED SURVEILLANCE AND OUTBREAK RESPONSE IN NIGERIA; AN UPDATE FOR CLINICIANS AND PUBLIC HEALTH PROFESSIONALS

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SUMMARY

The Federal Ministry of Health recommendations for response during measles epidemics in Nigeria previously focused on case management using antibiotics and Vitamin. A supplements and did not include outbreak response immunization (ORI) campaigns. However, with the revision of the existing national technical guideline on measles case-based surveillance and outbreak response in Nigeria in 2012 in line with the World Health Organization recommendation on response to measles outbreak in measles mortality reduction settings, there is a need to update members of the Nigerian public health community on these revisions to ensure appropriate implementation and compliance. This article therefore seeks to provide clinicians and other public health professionals in Nigeria with updates on recent developments in measles case-based surveillance and outbreak response in Nigeria

Keywords: Measles surveillance, Outbreak response, Clinicians, Nigeria.

INTRODUCTION

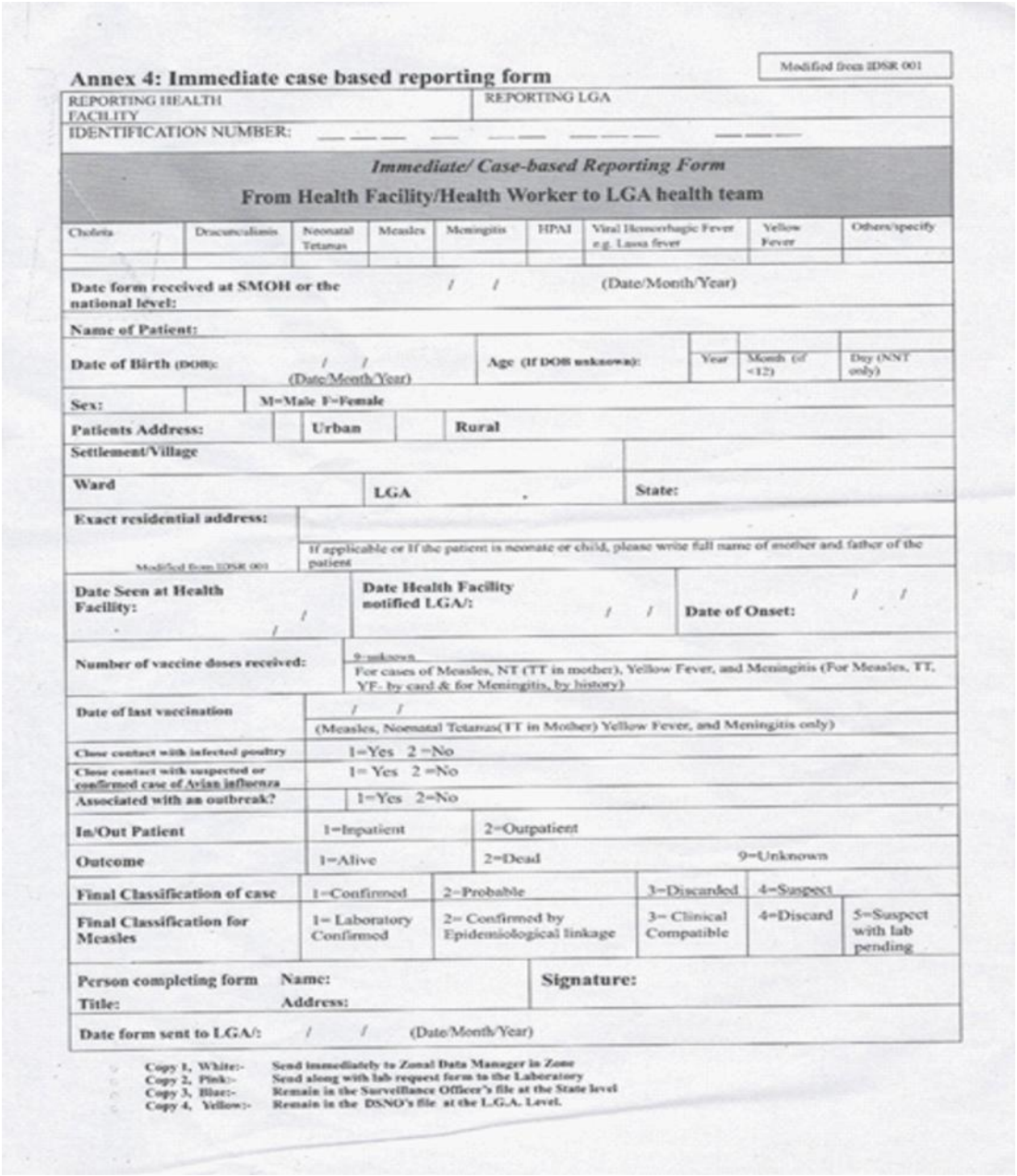
Measles outbreaks pose a continuing public health problem in Africa and other developing nations of the world[1]. Measles case fatality has been estimated to be between 3 to 5% in developing countries and may be as high as 10% during epidemics[2]. Despite the efforts made at increasing immunization, measles remains a leading cause of under-five mortality in Africa[3]. There were about 139, 300 measles deaths globally in 2011 representing nearly 380 deaths every day or 15 deaths every hour[4]. Nigeria presently together with other developing countries accounts for about 94% of global deaths caused by measles annually[5].

In an effort to address the high mortality caused by measles annually in Africa, countries in the World Health Organization, (WHO) African region in 2001 adopted the accelerated measles control activities using the measles mortality reduction strategies recommended by the WHO and the United Nations Children's Fund (UNICEF). These strategies includes ; (1) achieving and maintaining e" 80% coverage with routine measles vaccination of infants, (2) providing a second dose of measles vaccine through supplemental immunization activities (SIAs), (3) intensified measles case-based surveillance with laboratory confirmation and (4) improve measles case management during outbreaks[6-7]. In Nigeria, literatures on measles outbreaks investigation have shown that outbreaks of measles annually are detected too late resulting in either no or late response with minimal impact[8]. This could partly be attributed to poor awareness among clinicians and public health professionals of the measles case based surveillance process and their role in immediate case notification using the standard case definition. Also, between epidemiological weeks 1 to 43 of 2013, about six hundred and forty-three measles outbreaks were confirmed in 83% of the seven hundred and seventy-four Local Government Areas (LGAs) in Nigeria with outbreak response conducted in few of these LGAs according to the revised national measles technical guideline[9]. However, with the strengthening of the measles case based surveillance in the country with laboratory support to enhance early outbreak detection, there is a need to update clinicians and public health professionals on the measles case based surveillance process, their roles and on the recent developments in the conduct of measles outbreak response activities in Nigeria to ensure proper implementation during subsequent measles outbreaks in Nigeria.

Measles Case-based Surveillance in Nigeria

The success of prevention and control programmes in reducing morbidity and mortality from vaccine preventable diseases can only be measured if there is a

reliable disease surveillance system in place[10]. In 2006, measles case based surveillance became operational in Nigeria using the resources and infrastructure of the already established surveillance for Acute Flaccid Paralysis[3,7]. The case-based surveillance system was put in place to detect cases and outbreaks of measles. It involves immediate reporting and investigating any suspected case of measles by clinicians using standard case definition, evaluating immunization efforts and predicting outbreaks through the identification of geographical areas and age group at risk[11]. A suspected measles case is any person with generalized maculopapular rash and fever plus one of the following: cough, coryza (runny nose) or conjunctivitis or in any person in whom a physician suspect measles[8]. For every suspected measles case, an individual case investigation form (Fig. 1 and 2) should be completed and a blood specimen collected and sent to the national reference laboratory for testing for measles-specific immunoglobulin M (IgM) antibody. The designated Local Government Area (LGA) Disease Surveillance and Notification Officer (DSNO) at the LGA Primary Health Care (PHC) Department is responsible for the completion and transportation of the specimen[6, 8]. A laboratory confirmed case of measles is defined as a suspected case with serological confirmation of measles specific IgM antibody in a person who had not received measles vaccination within 30days before the specimen collection[8]. While a measles associated death is defined as any death from illness in a confirmed case of measles within 1month after the onset of rash[8].



Annex 4: Immediate case based reporting form

Modified from IDSR 001

REPORTING HEALTH FACILITY	REPORTING LGA
IDENTIFICATION NUMBER: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___	

Immediate/ Case-based Reporting Form

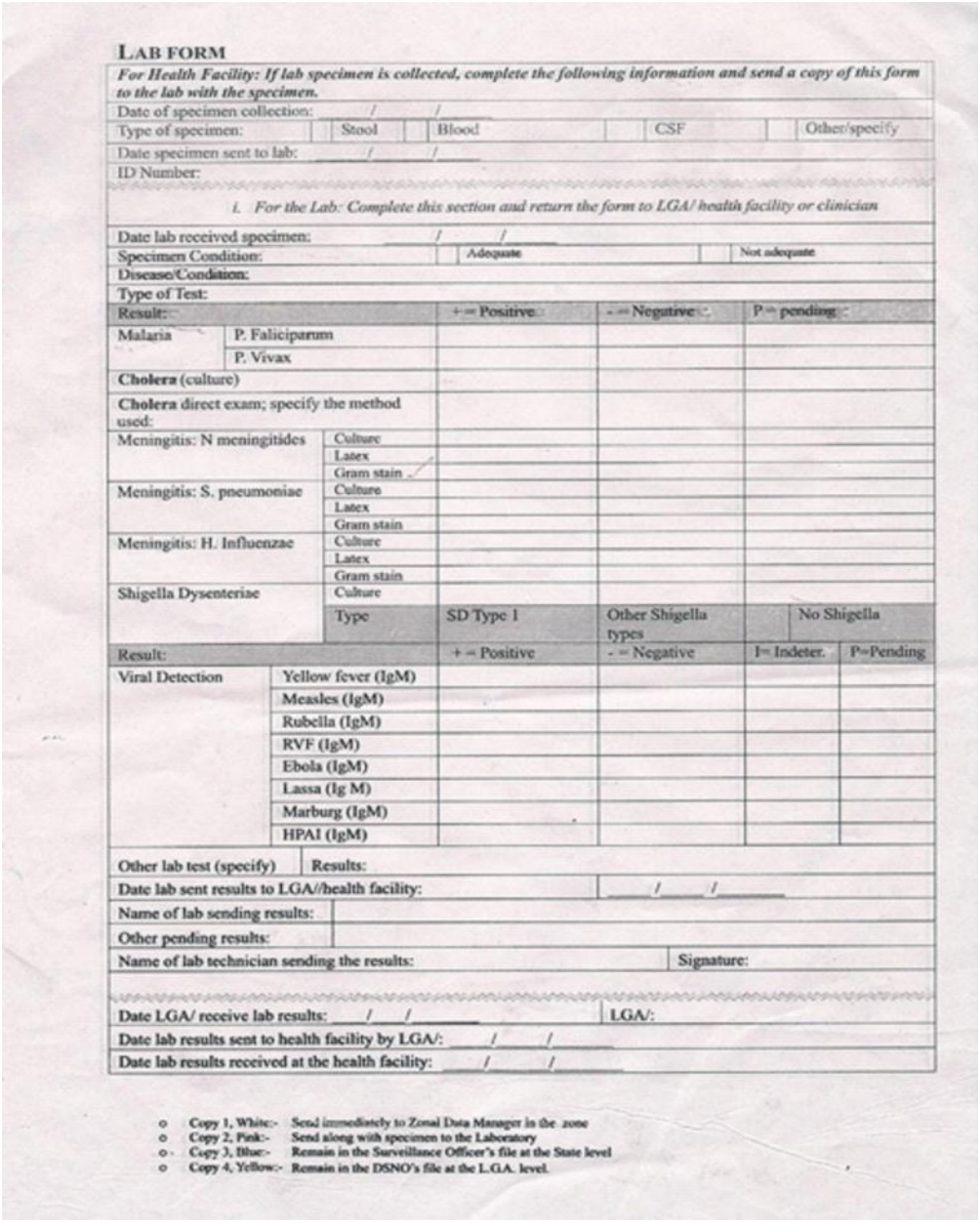
From Health Facility/Health Worker to LGA health team

Cholera	Dracunculiasis	Neonatal Tetanus	Measles	Meningitis	HPAI	Viral Hemorrhagic Fever e.g. Lassa fever	Yellow Fever	Others/specify

Date form received at SMOH or the national level:	/ / (Date/Month/Year)				
Name of Patient:					
Date of Birth (DOB):	/ / (Date/Month/Year)	**Age (If DOB unknown):**	Year	Month (if <12)	Day (NNT only)
Sex:		M=Male F=Female			
Patients Address:		**Urban**		**Rural**	
Settlement/Village					
Ward		**LGA**		**State:**	
Exact residential address:					
Modified from IDSR 001	If applicable or If the patient is neonate or child, please write full name of mother and father of the patient				
Date Seen at Health Facility: / /	**Date Health Facility notified LGA/:** / /	**Date of Onset:** / /			
Number of vaccine doses received:	9=unknown For cases of Measles, NT (TT in mother), Yellow Fever, and Meningitis (For Measles, TT, YF, by card & for Meningitis, by history)				
Date of last vaccination	/ / (Measles, Neonatal Tetanus(TT in Mother) Yellow Fever, and Meningitis only)				
Close contact with infected poultry	1=Yes 2=No				
Close contact with suspected or confirmed case of Avian influenza	1= Yes 2=No				
Associated with an outbreak?	1=Yes 2=No				
In/Out Patient	1=Inpatient	2=Outpatient			
Outcome	1=Alive	2=Dead	9=Unknown		
Final Classification of case	1=Confirmed	2=Probable	3=Discarded	4=Suspect	
Final Classification for Measles	1= Laboratory Confirmed	2= Confirmed by Epidemiological linkage	3= Clinical Compatible	4=Discard	5=Suspect with lab pending
Person completing form **Title:**	**Name:** **Address:**	**Signature:**			
Date form sent to LGA/: / / (Date/Month/Year)					

Copy 1, White:- Send immediately to Zonal Data Manager in Zone
Copy 2, Pink:- Send along with lab request form to the Laboratory
Copy 3, Blue:- Remain in the Surveillance Officer's file at the State level
Copy 4, Yellow:- Remain in the DSNO's file at the L.G.A. Level.

Fig. 1: Immediate case based reporting form[8]



LAB FORM

For Health Facility: If lab specimen is collected, complete the following information and send a copy of this form to the lab with the specimen.

Date of specimen collection: / /

Type of specimen: | Stool | | Blood | | CSF | | Other/specify

Date specimen sent to lab: / /

ID Number:

i. For the Lab: Complete this section and return the form to LGA/ health facility or clinician

Date lab received specimen: / /

Specimen Condition: | Adequate | | Not adequate

Disease/Condition:

Type of Test:

Result:		+ = Positive	- = Negative	P = pending
Malaria	P. Faliciparum			
	P. Vivax			
Cholera (culture)				
Cholera direct exam; specify the method used:				
Meningitis: N meningitides	Culture			
	Latex			
	Gram stain			
Meningitis: S. pneumoniae	Culture			
	Latex			
	Gram stain			
Meningitis: H. Influenzae	Culture			
	Latex			
	Gram stain			
Shigella Dysenteriae	Culture			
	Type	SD Type 1	Other Shigella types	No Shigella

Result:		+ = Positive	- = Negative	I= Indeter.	P=Pending
Viral Detection	Yellow fever (IgM)				
	Measles (IgM)				
	Rubella (IgM)				
	RVF (IgM)				
	Ebola (IgM)				
	Lassa (Ig M)				
	Marburg (IgM)				
	HPAI (IgM)				

Other lab test (specify) | Results:

Date lab sent results to LGA//health facility: / /

Name of lab sending results:

Other pending results:

Name of lab technician sending the results: | Signature:

Date LGA/ receive lab results: / / | LGA/:

Date lab results sent to health facility by LGA/: / /

Date lab results received at the health facility: / /

- Copy 1, White:- Send immediately to Zonal Data Manager in the zone
- Copy 2, Pink:- Send along with specimen to the Laboratory
- Copy 3, Blue:- Remain in the Surveillance Officer's file at the State level
- Copy 4, Yellow:- Remain in the DSNO's file at the L.G.A. level.

Fig. 2: Laboratory investigation form[8]

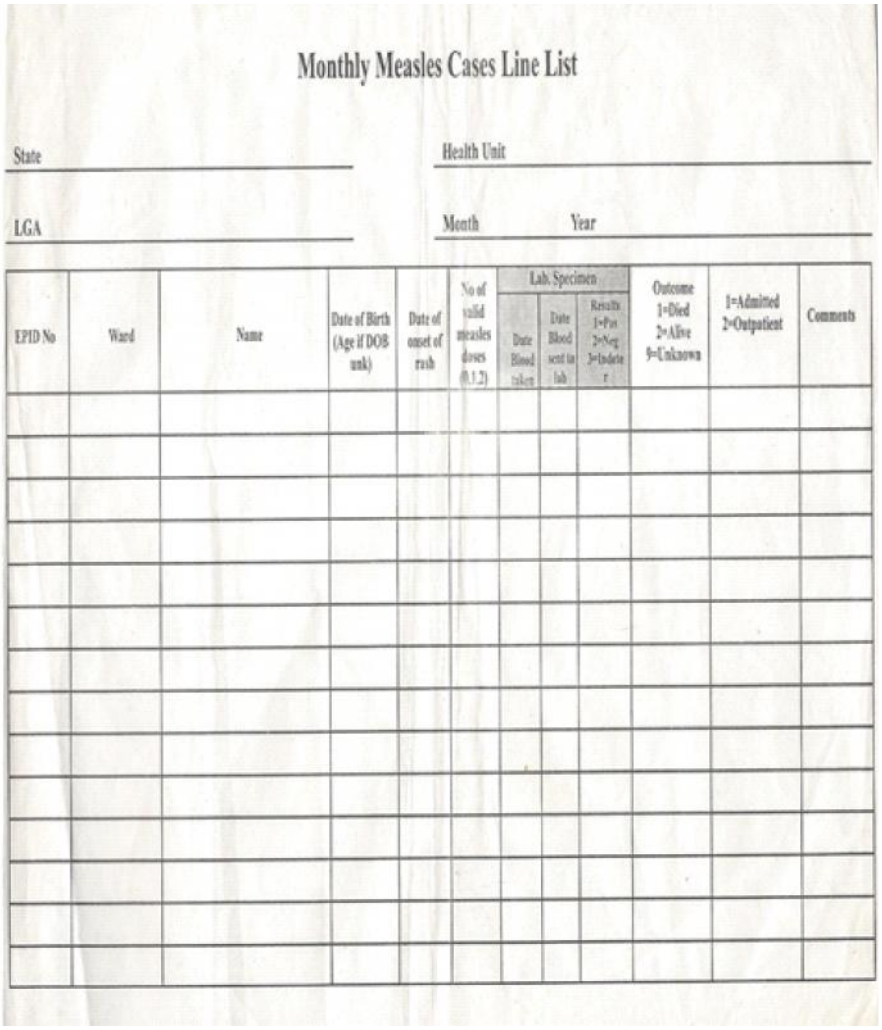
The national guideline on measles surveillance in Nigeria defines a suspected outbreak as the occurrence of ≥ 5 reported suspected cases of measles in a health facility or district in a month and a confirmed outbreak of measles as the occurrence of ≥ 3 laboratory confirmed measles cases in a health facility or district in one month[8]. After an outbreak has been confirmed as measles, subsequent cases are also investigated with serum sample collected alongside nasopharyngeal swabs of at least 5cases identified within 5days of onset of rash for viral isolation[8]. All other new cases from which serum specimens are not collected are linelisted and are confirmed by epidemiological linkage.[6, 8] In the context of a measles outbreak, an epidemiologically linked case is one without a blood specimen collected and is linked in person, place and time to a laboratory confirmed case.[6, 8]

It is paramount to note that the measles case-based surveillance flow of data in Nigeria requires that all measles cases suspected by clinicians in all health facilities must be reported immediately to the LGA DSNO designated in the PHC department in each of the 774 LGAs in Nigeria using the reporting forms shown in (Fig. 1 and 2) for investigation and prompt response. While after reporting the first 5 cases other cases are linelisted using the linelist form shown in (Fig. 3)[8].

Measles Outbreak Response in Nigeria: What's New?

Since the inception of measles case-based surveillance in Nigeria, several outbreaks have been detected. About 30, 194, 254 and 169 outbreaks were detected in 2006, 2007, 2008 and 2009 respectively.[8, 12]

The goals of conducting a measles outbreak response vaccination is to reduce morbidity and mortality by providing appropriate case management and immunize children to limit the spread of the outbreak. Also, outbreak response vaccination provides the opportunity to identify and correct weaknesses in the expanded use of a second opportunity for measles immunization through nationwide mass vaccination campaigns in high burden countries. This has resulted in marked reductions in measles incidence associated with large outbreaks, (2) endorsement of the International Health Regulations in 2005 which highlights the importance of timely detection and response to events that are of potential international public health concerns and (3) recent literatures on the impacts of Outbreak Response Immunization (ORI) during measles outbreaks which shows that measles epidemics in pre catch-up supplementary immunization activities (SIAs) settings can last for 3-9



Monthly Measles Cases Line List

State _____ Health Unit _____

LGA _____ Month _____ Year _____

EPID No	Ward	Name	Date of Birth (Age if DOB unk)	Date of onset of rash	No of valid measles doses (0,1,2)	Lab. Specimen			Outcome 1=Died 2=Alive 9=Unknown	1=Admitted 2=Outpatient	Comments
						Date Blood taken	Date Blood sent to lab	Results 1=Pos 2=Neg 3=Indete r			

Fig. 3: Line list for reporting from health facility to LGA and for use during outbreaks[8]

immunization and surveillance activities in order to monitor the changing epidemiology of measles[8, 13].

Antecedent to 2009, the national guideline on measles outbreak response in Nigeria recommends only case management with antibiotics and Vitamin A supplementation. However, during the past years, three important changes have occurred which includes; (1) months providing adequate time to mount a focused high quality campaign[8,13-14]. Findings from previous studies on measles outbreak investigation and response vaccination have suggested that, (1) outbreaks of measles can last for months in a limited geographical area thereby allowing sufficient time to mount immunization response, (2) outbreaks response immunization was associated with reduced morbidity

and spread of measles particularly if it was started early and (3) a wide age range of children can be vaccinated and high coverage achieved in a measles morbidity and mortality reduction settings[15-19]. Due to these findings, the national guideline on measles outbreak response in Nigeria was revised in 2012 accordance to WHO recommendation in 2009 for the conduct of an ORI during measles outbreaks. However, the nature and extent of the vaccination response should be based on the assessment of the risk of spread, risk of severe outcome, capacity to respond, background vaccination coverage of the affected region, age distribution of cases, population density and rate of migration in the affected area[8, 13]. The aim of recommending the conduct of an ORI campaign during measles outbreaks is to encourage the principle of early detection of measles outbreak, conduct thorough assessment and a rapid response that also includes the expanded use of measles vaccine alongside case management with antibiotics and Vitamin A supplements[8, 13].

When and How should an Appropriate ORI Campaign be Conducted?

The national guideline for response to measles outbreaks in Nigeria recommends two specific strategies to control the outbreak: "selective" and "non-selective" Outbreak Response Immunization (ORI)[8]. Selective ORI includes providing measles vaccination through routine service sites for all unvaccinated children aged 6-59months or an age group based on the measles epidemiology[15]. "Selective" ORI is recommended as soon as an outbreak of measles is suspected (occurrence of ≥5 cases of reported suspected cases of measles in a health facility or district in 1month). During "selective" ORI, the following activities are recommended to be conducted; (1) inform the communities affected about the suspected outbreak with instruction provided, (2) vaccinate all children presenting at the health facilities and immunization post 6months to 5years without a history of measles vaccination (3) re-vaccinate all children receiving measles vaccine before 9months, (4) re-enforce the conduct of routine immunization services to rapidly identify priority areas within the affected district to correct programme weakness (Fig. 4)[8].

"Non-selective" ORI is recommended as soon as a measles outbreak is confirmed (occurrence of ≥ 3 laboratory confirmed case in a health facility or district in 1month)[8]. "Non-selective" ORI refers to a mass vaccination campaign that targets all children in a specific age group and geographical area[8]. However, before the decision to conduct a "non-selective" ORI is reached there is a need to conduct a risk assessment to determine if the risk of a large outbreak is high, availability of the capacity to carry out a high quality large scale immunization campaign with respect to staff strength, financial resources and availability of vaccine and other supplies within the timescale necessary[8]. The

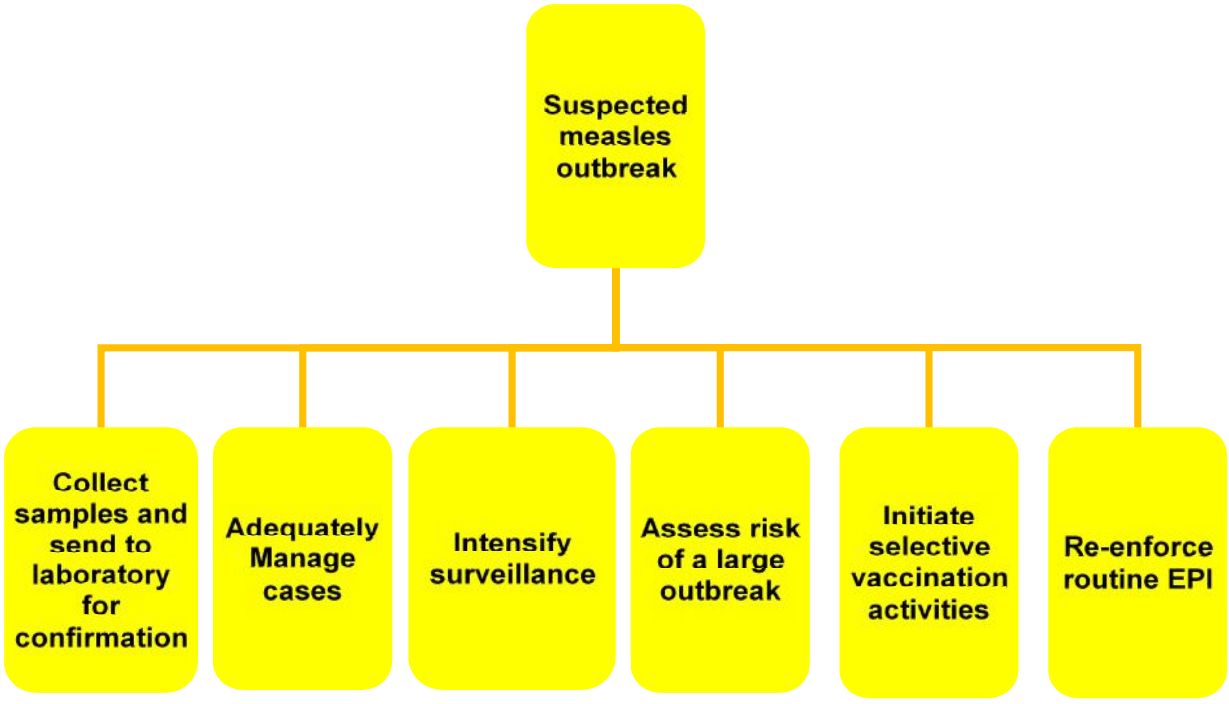


Fig. 4 : Flowchart for suspected measles outbreak response[13]

risk assessment should take into consideration; the susceptibility of the population, potential for spread both in the affected and neighbouring areas, morbidity and mortality.[8] Also, if the outcome of the risk assessment does not indicate a need for a "non-selective" ORI, then "selective" ORI is recommended as outline above and the number of reported cases closely followed to monitor the progression of the outbreak. Flowchart for responding to a confirmed measles outbreak is illustrated in Figure 5 below. For "non-selective" to be effectively carried out, the timing, the target age group and area for vaccination should be defined. Also, an accelerated microplanning exercise should be performed to determine the bundle vaccine logistics, staffing and communications need for the campaign. Furthermore, the current national guideline for conducting mass measles vaccination campaigns should be used to guide the exercise[8].

CONCLUSION

The decision to conduct either a "selective" or "non-selective" outbreak response immunization during measles outbreaks is taken by the Outbreak Coordination Committee which is expected to be at all the three tiers of government (Local Government Areas, State and Federal level) with the target group for the exercise chosen based on the epidemiology of the outbreak, geographical distribution of cases and age specific attack rates. Also, high quality surveillance data and population figures are needed to accurately determine the target group. It is also important to note that outbreak response immunization campaigns are distinct from preventive supplementary immunization activities that targets the whole country and states and therefore it should be limited in scale. High rate of compliance and best practice according to these revisions in the measles case based surveillance and outbreak response are encouraged among public health professionals in Nigeria during subsequent measles outbreaks in Nigeria.

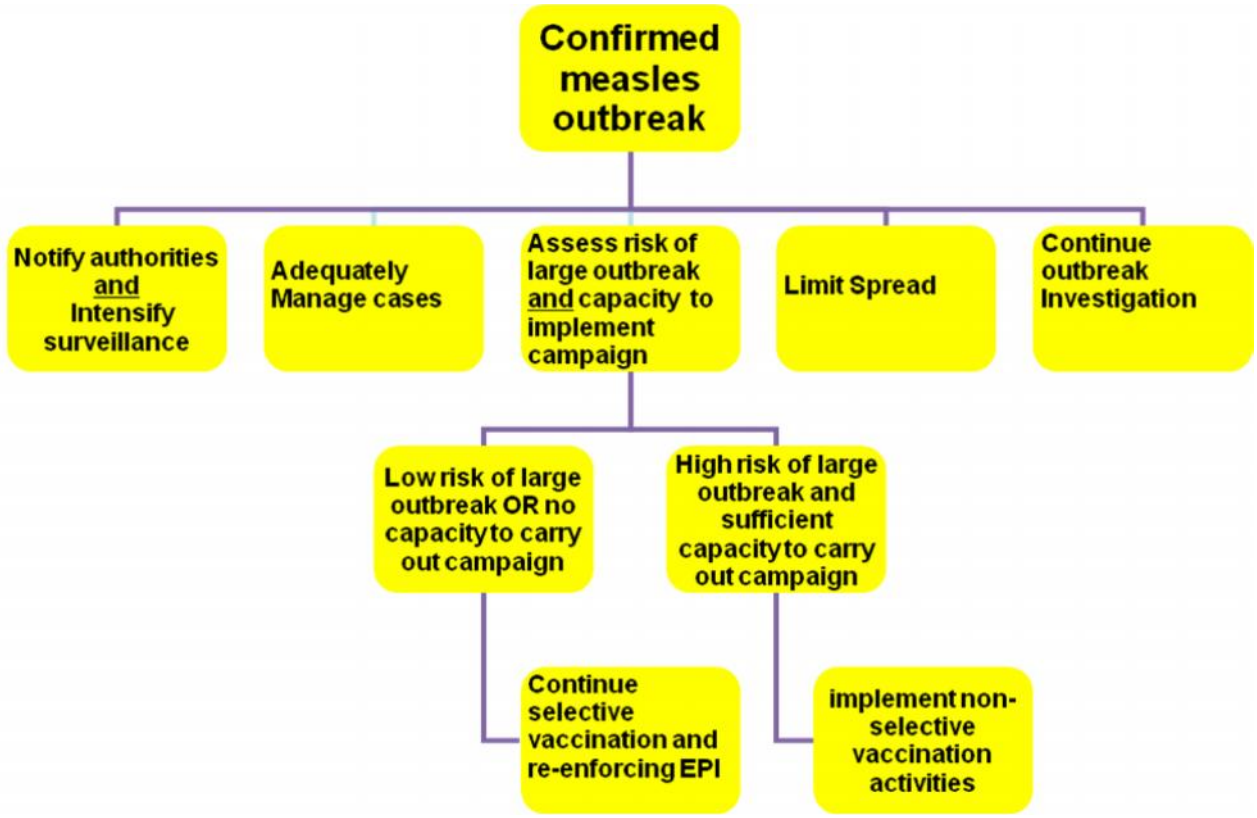


Figure 5: Flowchart for responding to a confirmed measles outbreak

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