

doi: <http://dx.doi.org/10.19240/njpas.2016.A28>

## Overview of Poliovirus Surveillance Structures and Assessment of the Quality of Acute Flaccid Paralysis Case Search in Kano state, Nigeria.

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### ABSTRACT

Acute flaccid paralysis (AFP) surveillance is one of the four major strategies being used in the global polio eradication initiative. A good surveillance system is required especially as a country enters the final phase of its polio eradication activities, so as to ensure poliovirus transmission is completely interrupted within its territories. A cross-sectional study was conducted, guided by the world health organizations (WHO) rapid surveillance assessment guidelines in ten local government areas (LGAs) in Kano state. Data was collected using an adapted WHO rapid surveillance assessment guideline tool. Despite the improvements in AFP surveillance performance at the national level, gaps were still found at sub-national levels. The study observed that a lot has been achieved in terms of personnel and operational structures, but more work needs to be done so as to close the gaps noticed to ensure the country eradicates poliovirus.

**Key words:** Acute flaccid paralysis; poliovirus; surveillance.

### INTRODUCTION

Polio eradication has been described as one of the largest global public health efforts in recent times (Aylward and Linkins, 2005). It is aimed at ridding poliovirus from every country, region and from the world. As at November 2016, Afghanistan, Pakistan and Nigeria are the only poliovirus endemic countries in the world ([www.polioeradication.org](http://www.polioeradication.org), 2016).

Monitoring AFP surveillance indicators is key in directing the polio eradication initiative and determining whether the surveillance system is sensitive enough to rapidly detect all AFP cases. Out of these surveillance indicators, two have been

adopted globally to be used in assessing the level of the sensitivity of the surveillance system. The first, being the capacity to report two acute flaccid paralysis cases per 100 000 persons under 15 years of age in endemic countries, while the second is the capacity to collect two adequate stool samples from at least 80% of acute flaccid paralysis cases and processed in a world health organization's accredited laboratory (FMOH-WHO, 2014). Based on those indicators, AFP surveillance performance has improved markedly at the national level (WPU, 2016), however empirical reports indicate that gaps still remain at sub-national levels

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As exemplified by presence of poliovirus compatible cases as a result of gaps in surveillance effectiveness and under performing local government areas (LGAs) due to non-attainment of the targets of the two core indicators. This could be linked to poor access to security challenged, hard to reach and border areas (WPU, 2015).

To this end, at the 30<sup>th</sup> expert review committee (ERC) meeting held in Abuja, members reviewed the progress made so far by the country in polio eradication, and prioritized four polio high risk states (Kano, Sokoto, Katsina and Kaduna) for enhanced surveillance activities. Kano was high risk for poliovirus and was located in a poliovirus high endemicity zone of the country. What was more, Iliyasu *et al.*, (2014) showed that sero-prevalence rate was found to be lower than required for interruption of poliovirus transmission in Kano metropolitan area.

Every country, particularly those that are close to achieving eradication, must maintain a

certification standard AFP surveillance (WHO, 2001) in order to prove to all stakeholders, the interruption of the wild poliovirus (GPEI, 2013). As a criteria, for a country to be certified free of poliovirus transmission, it must be free of the virus for at least three (3) consecutive years in the presence of high quality surveillance (Isibor *et al.*, 2014), which could only be achieved if the surveillance was of good quality (Abubakar *et al.*, 2010). To quickly identify areas of poliovirus transmission and promptly detect possible cases of importation, poliovirus surveillance must be very sensitive (Hamisu *et al.*, 2015) that was why this assessment was embarked upon in one of the high risk states of the federation (Musa *et al.*, 2015; Touray *et al.*, 2015). The overall aim of this study is to rapidly assess performance of the current acute flaccid paralysis/integrated disease surveillance and response (AFP/IDSR) surveillance system in reporting AFP/IDSR priority disease cases from the general and special population groups, additionally;

- i. To determine whether AFP cases are being missed (or likely to be missed) by the surveillance system,
- ii. To identify where AFP cases are being missed,
- iii. To document reasons why AFP cases are being missed,
- iv. To determine level of knowledge/awareness of surveillance focal points, clinicians and informants on case definitions of priority diseases.

## METHODOLOGY

The study was structured as follows:

**Study design:** A cross-sectional study was conducted in November 2015 guided by

WHO rapid surveillance assessment guidelines in ten LGAs in Kano state. National Primary Health Care Development Agency provided ethical clearance for the study.

## Study area



**Figure 1. Map of Nigeria showing the position of Kano state.**

Kano state is located approximately in the centre of Northern Nigeria in the north-western geo-political zone of the country, with Kano city as the capital. The state, which is the most populous in the region is bounded by Katsina state to the north-western, Jigawa state to the north-east, Bauchi and Kaduna state to the south-eastern and south-western axis (figure 1). The state has a total population of 12,568,289 (projected 2006 census figures) and is made up of 44 LGAs (38 rural and 6 urban), 484 political wards and 27, 233 settlements. The state has a total of 1, 246 health facilities (both private and public).

### **Organization of Kano state surveillance system**

The State surveillance system comprises of 276 surveillance focal sites distributed across the 44 LGAs, with an estimated 1, 246 Health Facilities. Surveillance reporting sites constitute just 22% of the total orthodox health facilities in the state. There are also 1, 933 non formal sector practitioners as 'informants'. These informants include traditional healers, bone setters and patent

medicine vendors etc. The key officer responsible for coordinating disease surveillance activities at state level is the disease surveillance and notification officer (DSNO), who is supported by the state epidemiologist. The health facility level is charged with responsibility of AFP case detection and reporting while the DSNOs at LGA level are expected to investigate, initiate specimen collection and transport specimen to the designated laboratory in Maiduguri.

### **Process**

State level desk review was carried out with members of the state's epidemiology unit to select LGAs for the assessment. Key AFP surveillance documents were reviewed including surveillance performance indicators; such as local governments that had wild polioviruses and poliovirus compatible cases in the past three years, trend of zero dose (child not having received any OPV dose) non-poliovirus AFP cases and approximate population densities of these LGAs. Environmental surveillance data was also reviewed. A total of 10 LGAs -Ajingi,

Danbatta, Fagge, Kano Municipal, Rogo, Sumaila, Tarauni, T/Wada, Tofa and Ungoggo -which makes up 23% of the LGAs in the state were selected based on the above mentioned criteria. Dambatta LGA was selected as a best performing LGA to learn possible best practices from it.

### Field Visit

The review team visited 21 reporting sites made up of 9 hospitals and 12 primary care level facilities. The team was divided into 5 sub- teams to ease up the field visits. Each team, was made up of people from the state ministry of health (MOH), WHO state office and officers from the national level. At the LGAs, DSNOs were interviewed using the LGA data collection tool. Three (3) health facilities (HFs) were selected in each LGA: two (2) reporting and one (1) non-reporting site. The sites were chosen based on the

population they served and the patient load. In the focal reporting sites, the focal persons (FPs) were interviewed while key health staff were interviewed in non-reporting sites. Clinicians and other health workers in relevant departments were also interviewed. In the community, informants such as traditional birth attendants (TBAs), patent medicine vendors (PMVs) and community leaders were interviewed. In addition, in each LGA, caregivers of recently investigated AFP cases were interviewed using an AFP case data collection tool.

## RESULTS

### Knowledge about AFP and reporting procedure

The DSNOs and FPs had comparatively better knowledge of AFP standard case definitions than other health personnel as shown in figure 2.

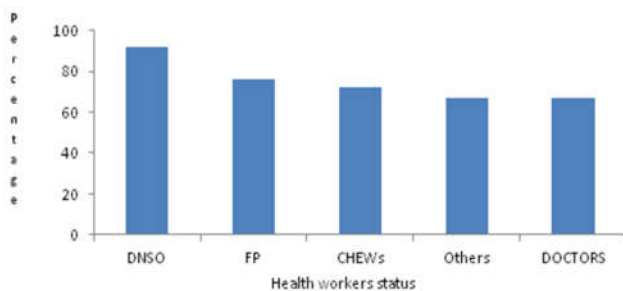


Figure 2. Status of knowledge about AFP and reporting procedure amongst health workers in Kano state.

### DSNOs knowledge of surveillance performance indicators

Not all the DSNOs interviewed had the basic knowledge of surveillance performance indicators of their respective LGAs. For

example only about 60% knew the major AFP surveillance indicators while just about half of the DSNOs knew the current surveillance performance of their LGAs and approximately only 30% could calculate these surveillance indicators as shown in figure 3.

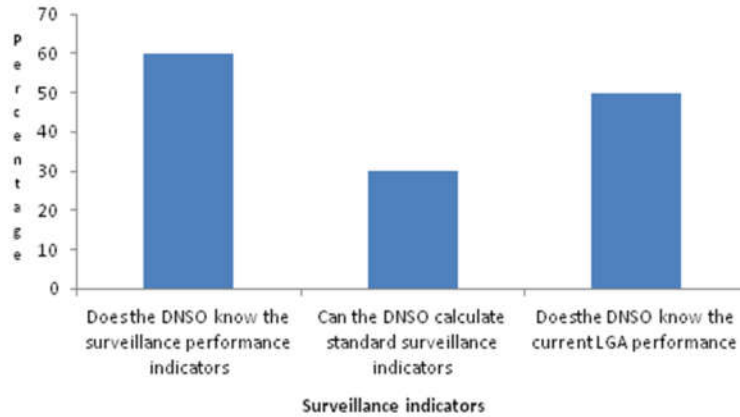


Figure 3. Status of DNSO's knowledge on surveillance performance indicators.

### Functionality of AFP reporting sites

All the focal sites reviewed saw more than 15 children per day (ranging from 15 - 1, 100 children per day), with about 66% of the focal sites reviewed, seeing more than 40 children per day. Approximately 52% of the focal sites visited were in secondary health care facilities. Most facilities visited had registers in the relevant departments. Almost all of these registers had a column for capturing diagnosis. There was also evidence of ongoing active case search within the HFs as evidenced by the presence of signatures of relevant personnel in the registers.

#### Rejected AFP cases

There was no evidence to prove the existence of rejected AFP line list in the LGAs visited.

#### Issues with stool collection and reporting

There were issues in 7% of the houses where stool samples were taken. About 29% of the care givers visited at least one reporting site, before the case was picked by the surveillance network (figure 4).

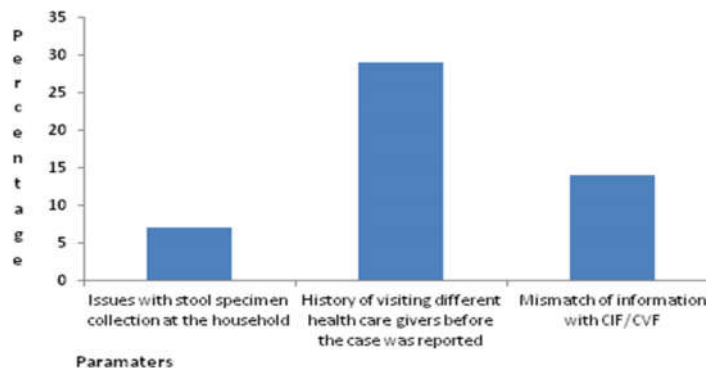


Figure 4. Issues with stool sample collection

### Missed AFP cases

A total of 14 missed potential AFP cases were detected by the review team. Most of the cases were detected in the physiotherapy department of the major hospitals while some were detected in the community during AFP case review.

### DISCUSSION

In surveillance, case definition is the basis of reporting any disease case amongst diseases of interest. Therefore, assessing the knowledge of key surveillance personnel is an important key factor in any surveillance review (Wen *et al.*, 2014). In this regard, the knowledge on standard case definition of AFP as well as differentials was assessed for DSNOs, FPs, clinicians and non-formal sector surveillance informants. It was found out that DNSOs had better knowledge of AFP standard case definitions than FPs, doctors and other health personnel. This has implications for the system since the clinicians and health workers are usually the first point of contact with the AFP patient, as such there is high probability that some cases might be missed.

There was evidence, that most focal persons and all informants had been trained within the last 6 months. Knowledge and understanding of major surveillance indicators had been seen to be a direct pointer, of how surveillance focal points could efficiently perform their duties (Odoom *et al.*, 2015). However, in this study only 60% of DSNOs interviewed knew the major AFP surveillance indicators, and about half of the DSNOs knew the current performance of their LGAs and only about 30% could calculate these surveillance indicators. This

situation if not effectively and consistently addressed, could affect the overall performance of the surveillance system.

It has been said and well established, that for the surveillance system to pick all suspected cases of AFP, the focal sites have to be optimally functional (MMWR, 2004). During the study, the review team assessed the performance of current focal sites in detecting and reporting AFP cases. There was evidence of ongoing active case search (ACS) within the HFs as evidenced by the presence of signatures in the registers. This is an improvement on previous reviews that found minimal evidence of ACS within the registers (Isibor *et al.*, 2014). However, the review team noted the presence of a number of missed cases of AFP and priority disease cases even on pages with multiple signatures, thus querying the quality of the active case search (ACS) conducted. It should be noted that the missed AFP cases seen on this account may be a gap in training and knowledge. It is recommended that the scope of differentials of AFP cases be widened based on common causes seen in the registers in simple terms. Surveillance personnel, as Odoom *et al.*, (2015) put it, have to be trained on how to probe and what to do when such issues are seen.

Most DSNOs had records of case investigations, weekly reporting and active case searches conducted. However, incomplete copies of the HF active case search forms were seen in some LGAs. The review team also noted the fact that this form was only used to document visits to the high priority reporting sites. The review team encouraged the use of this form to document every activity conducted in the search of AFP

cases including clinic visits to non-reporting sites and informants, meetings where AFP is discussed and sensitizations done. In addition, it was noted that AFP line lists though present in the LGAs visited, were compiled using ad-hoc templates. It was recommended that nationally standardized forms should be used for this purpose. At the HF level, most documents were in place and well archived except for the AFP immediate notification forms. Discussion revealed that this was because these cases were not detected at the reporting sites. Efforts should be made to fill out notification forms for all AFP cases detected irrespective of site or source of detection. In the area of archiving, the records for previous years were found to be either incomplete or absent. Record keeping and retrieval will be critical in polio certification process and it is advised that the state devise a means for safe keeping of records at the end each year to avoid loss or destruction.

A Rejected AFP case, is an AFP case which is found upon investigation not to be a true AFP. A line list of such case shows a functional and sensitive surveillance system. It also adds to the evidence that the surveillance system implementers in any given place, are searching for cases. In this assessment, there was little or no evidence of a line list of rejected AFP cases. The review team suggest that, line listing of rejected cases be immediately instituted particularly at this time in the program as similarly suggested by Dietz *et al.*, (1995).

Integrated disease surveillance and response (IDSR) and AFP surveillance are surveillance systems that mutually support each other. Surveillance officers have the opportunity to look for priority IDSR disease while looking for AFP cases and vice-versa.

For case based diseases, there was fairly good knowledge on case definitions of measles, neo-natal tetanus and cerebro-spinal meningitis and yellow fever among DSNOs and focal persons. However, this did not translate into good reporting practices as a number of missed cases of priority diseases were seen in the registers. IDSR reporting and the presence of the relevant tools were found to be sub-optimal in the LGAs visited.

Maintaining high quality stool collection procedures is critical in AFP surveillance particularly as the goal of poliovirus eradication seems within reach. The reverse cold chain which promotes optimal condition for poliovirus survival and final identification must be maintained at all time from the collection of the stool sample to its delivery at the laboratory (Wen *et al.*, 2014). The assessment team noted that all LGAs visited had dedicated stool collection carriers for the purpose of surveillance. However, in a number of places Roche stool carriers were in use instead of the recommended Giostyle stool carriers. The assessment team suggested that all DSNOs should commence the use of the recommended stool carriers and be trained on the importance of maintaining the reverse cold chain.

A total of 14 missed potential AFP cases were detected by the review team. Most of the cases were detected in the physiotherapy department of the major hospitals while some were detected in the community during AFP case review. This raises the question about the capacity of the surveillance officers in understanding some of the more technical differential diagnosis of AFP. It is a fact that these cases may end up as false AFP cases probably based on age or time since onset of paralysis. What is most important is the fact that they should have been picked by the

surveillance system with eligible cases investigated and non-eligible documented as rejected cases.

### Conclusion

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There was evidence of the existence of surveillance system in the state and evidence of AFP case detection in the areas visited. Majority of health staff have a reasonable understanding of AFP surveillance and IDSR. There was evidence of the presence of documentation and archiving at the DSNOs offices and focal sites. In addition, there was some level of availability of surveillance documents. Low awareness amongst some of the key community informants in AFP definition and reporting had been noticed. The study detected some missed potential AFP cases. Inadequate awareness of AFP surveillance and IDSR was observed particularly amongst new clinicians. There was weak supervision of state surveillance team. This shows that a lot need to be done to close the gap noticed and ultimately make Nigeria poliovirus free.

### COMPETING INTERESTS

The authors declare no competing interest.

### ETHICAL CONSIDERATION

Based on WHO guidelines of AFP surveillance for the objective of poliomyelitis eradication, rapid surveillance assessment is routinely conducted by the government and partner agencies. The study was approved by the NPHCDA.

### ACKNOWLEDGEMENTS

We appreciate the State, LGA staff and the various people involved in this work.

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