



employed routinely in endemic countries and countries that are prone to the reintroduction of WPV [6]. The monovalent and bivalent virus strains induce higher levels of immunity than the trivalent vaccine; however, they can only elicit a response for the specific type of virus. This means that monovalent OPV1, OPV2, and OPV3 can only elicit a response for WPV1, WPV2, and WPV3, respectively [4].

Some oral polio vaccine-derived viruses may be genetically altered during replication on excretion, which could then circulate through and cause paralysis in populations with low immunity; these viruses are called circulating vaccine-derived polioviruses (cVDPVs), and there is surveillance in place to detect and test specimens in World Health Organization-accredited laboratories [7, 8]. There are standardized global polio eradication initiative performance indicators that are used to evaluate the quality of acute flaccid paralysis (AFP) surveillance and to identify where WPV transmission might go undetected [9–12]. To interrupt the cVDPV2 that was largely responsible for the cVDPV cases, the strategic group of experts (SAGE) proposed the withdrawal of type 2 OPV by globally

Advocacy

frozen ice-packs, and donkeys or bicycles as the key vehicular movement. Automobile use was not allowed in all cases. The basic resources available to the teams were such that they would last for 5–7 days which was the agreed maximum period they were expected to stay in any of these LGAs.

As a precautionary security measure, information on the exact date and time of the movement was controlled by the military personnel. At the point of departure, there was pre-inspection of all vehicles and the ones that did not meet the required standard were not allowed to em-

The average percentage of missed children decreased in June 2016 and July 2016 when the DOPV was conducted. The average percentage of missed children was 8% in January 2016 while it was reduced to 2 and 3% in June 2016 and July 2016, respectively, after the introduction of DOPV (Fig. 2).

Table 1 shows the percentage coverage with OPV2 in the four LGAs that implemented DOPV in Borno state. The data from the campaigns from January to July 2016

Conclusion

In conclusion, the engagement of security personnel to accompany polio SIA teams was a watershed moment in the quality of polio SIAs in Borno state. There is a need to sustain this approach as it is one feasible way to ensure the safety of teams while serving as a way of improving access to polio vaccines in security-compromised areas of Borno state. We recommend that the lessons learned from this approach should be applied in improving routine immunization in security-compromised areas in conflict-prone areas of Africa.

Abbreviations

AFP: Acute flaccid paralysis; bOPV: Bivalent oral polio vaccine; CJTF: Civilian joint task force; cVPDV: Circulating vaccine-derived poliovirus; DOPV: Directly observed polio vaccination; IPV: Inactivated polio vaccine; LGA: Local Government Area; LOAS: Lot Quality Assurance Sampling; MMC: Maiduguri Metropolitan Council; mOPV: Monovalent oral polio vaccine; NEOC: National Emergency Operation Center; OPV: Oral polio vaccine; SAGE: Strategic group of experts; SEOC: State Emergency Operation Center; SIA: Supplemental immunization activity; TOPV: Trivalent oral polio vaccine; WPV: Wild poliovirus

Acknowledgements

We would like to thank the staff of the Borno State Primary Health Care Development Agency and the National Primary Health Care Development Agency for their relentless support throughout the course of this study. We also wish to thank the reviewers for the selfless service that led to the final product.

Funding

The costs for this publication will be defrayed by World Health Organization, Nigeria.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on request.

About this supplement

This article has been published as part of BMC Public Health Volume 18 Supplement 4, 2018: Experiences and lessons learned in polio eradication in Nigeria. The full contents of the supplement are available online at <https://bmcpublichealth.biomedcentral.com/articles/supplements/volume-18-supplement-4>.

Authors' contributions

LN conceived, designed, and wrote substantial parts of the manuscript. FS, FB, PM, RB, CK, SB, SM, MS, HM, AS, SGT, YGH, and UA contributed to writing the manuscript, while FB, FS, PN, RGV, and WA critically reviewed the manuscript.