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RESEARCH ARTICLE

# The Role of School Engagement in Increasing Vaccination During Measles Mass Vaccination Campaign in Nigeria, 2018: The Lagos State Experience

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## ABSTRACT

**Background:** Schools based vaccination provide opportunity for the delivery of routine vaccines, using the school as the venue of delivery. During the 2017/2018 measles vaccination campaign, the school system stakeholders were systematically engaged for buy-in to vaccinate 9-59 months old children in Lagos State, Nigeria. This paper is a report of how the Lagos state school authority were engaged for the 2018 measles vaccination campaign. It also highlights the contribution of the engagement in the overall performance of the state looking at the vaccination coverage data and comparing that with the previous campaign.

**Method:** We reported on the role of engaging the school health system in improving coverage using a descriptive mixed-method study design. The stakeholders cutting across the government, education sector, public and private schools were identified and engaged through coordination meetings, dialogues, lobby and sensitization to support vaccination in schools. We summarized the outcome of the engagement activities, analyzed the administrative, post-campaign coverage data and compared it with the 2016 measles supplemental activities coverage.

**Results:** A total of 12,903 schools were used as venues (vaccination posts), while 22 sensitization meetings were held with school associations. About 80% of all eligible children vaccinated in the Local Government Areas (LGAs) during the 2018 Measles Vaccination Campaign (MVC), received the vaccine at schools. The lowest proportion of children vaccinated at school was 45.0% in Oshodi LGA. Surulere LGA had the highest proportion of children vaccinated in schools (95.0%). Overall, Lagos state had a weighted average coverage of 93.8% for the post-campaign coverage survey.

**Conclusion:** The implementation of the school engagement process for supplemental immunization activities contributed to achieving high vaccination coverage as most of the children aged 9-59 months were vaccinated in schools.

## INTRODUCTION

Improving measles vaccination coverage and reducing measles-related deaths is a global imperative, particularly as it relates to the Sustainable Development Goals 3 (SDGs), which ensures healthy lives and promotes well-being for all at all

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ages, and aim to reduce the overall number of deaths among children [1].

The risk of the global spread of measles is high, and even countries that eliminated their indigenous transmission remain vulnerable to outbreaks from importations. This risk is exemplified in the World Health Organization (WHO) Region of the Americas, which had successfully eliminated all indigenous transmission of measles viruses in 2002 and rubella viruses in 2009, but has been reporting outbreaks from 2014 to 2019 [2,3].

Immunization is one of the greatest cost-effective public health tools of the 20<sup>th</sup> century, which prevent thousands of illnesses globally, including Nigeria [4]. It is essential to maintain high vaccination coverage to control vaccine-preventable diseases. In the case of measles, approximately 95% of the population needs to be vaccinated to interrupt transmission and prevent outbreaks [5].

The global measles elimination goal is to reduce measles incidence to < 1 case per million population. The strategies to achieve measles elimination include robust routine immunisation coverage; periodic supplemental follow-up campaigns, improved case management including Vitamin A supplementation and optimal measles surveillance performance [6].

Nigeria, including Lagos state, has been conducting follow-up Supplementary Immunisation Activities (SIAs) since the 2005/2006 catch up campaign; however, post-Measles SIA coverage had been suboptimal over the years. For instance, in 2013, the Lagos state post-campaign survey coverage was 59.3%, while in 2016, it was 88.2% [7].

The use of schools for the delivery of vaccination has become increasingly attractive because of the ease of reaching a large number of eligible children in a short period.

Schools based vaccination provide an opportunity for the delivery of routine vaccines, using the school as the venue of delivery [8,9]. School-based vaccination ensures eligible children are reached as part of an accelerated disease control mechanism as well as with other health care interventions. School-related stakeholders such as the school teachers, school nurses, parents and pupils receive appropriate information on vaccination and have increasingly been involved in the vaccination program and implementation processes [10,11]. In general, school health services are geared at preventing, protecting and improving the health status of the school population to enable them to benefit fully from the school system [12]. However, studies show that school health programme implementation is unsatisfactory in Nigeria. A review of vaccination history revealed only 54.3% of children had evidence of completing routine immunisation at 9 months old when measles and yellow fever vaccines are administered, with no evidence of new vaccine introduction activities [13,14]. As a follow up to the 2015/2016 measles vaccination campaign and in line

with the country's 2016–2020 measles elimination strategic plan, a national measles vaccination campaign was planned for 2017/2018. This became more necessary as only one state achieved the post campaign coverage survey target of 95% in the 2015/2016 MVC and measles outbreaks were reported in almost all the states of the country. The 2016/2017 multiple indicator cluster / national immunization coverage surveys reported the national 1<sup>st</sup> Measles-Containing Vaccine (MCV1) coverage as 41.8%, though Lagos state had a coverage of 88% [15,16]. Measles second dose introduction into the routine immunization schedule had not commenced in Nigeria as it was planned for 2019, therefore, the need for a quality campaign was necessary to prevent the rising incidences of measles in the country [17].

As part of the Nigeria measles elimination strategic plan 2016–2020, Lagos State joined the rest states of the country and implemented a Measles follow-up Vaccination Campaign (MVC) in all the 20 Local Government Areas (LGAs) between the 15<sup>th</sup>-29<sup>th</sup> March 2018. The objective of the campaign was to give measles vaccination to the most susceptible cohort of children between the age brackets of 9 months to 59 months. Most of the targeted population were of preschool and school age. Lagos State has a gross enrolment ratio of 70.1% into primary schools and for the campaign, systematically engaged the school health system to reach these eligible children in schools [18].

This article describes the Lagos state school engagement during the 2017/2018 MVC and its impact on improving vaccination coverage in Lagos State. We aimed to measure the effectiveness of this engagement by assessing administrative vaccination coverage from schools in the LGAs, the post-campaign coverage survey data compared with previous campaign coverage's in the state.

## METHODS

### Study setting

Lagos State is the smallest state in Nigeria in terms of landmass, yet has the highest urban population, and a total population of 13,153,807 as projected from the 2006 national census [19]. Lagos is the commercial nerve centre of West Africa and has 20 LGAs. The study on engagement of schools targeted all stakeholders in the education sector both in the public and private schools that had preschool and school-age children enrolled.

The planning and implementation of the measles SIAs 2018, was coordinated by the State Measles Technical Coordination Committee (SMTCC) comprising the Lagos State Ministry of Health and Lagos Primary Health Care Board and development Partner Agencies supporting immunization in the state. Meetings were conducted every week as directed by the National Measles Technical Coordination Committee. The committee identified school engagement as key to the achievement of the goals of the measles vaccination campaign.

## Study design

The study is a descriptive, mixed-method design without a comparison group, describing the engagement of the schools' authorities in the measles vaccination campaign and also assessing the impact of the engagement during measles SIAs. We identified stakeholders from the government, education sector, public and private schools; engaged them through meetings and sensitization to support vaccination in schools. The respective schools were planned to function as venues for vaccination during the MVC 2018. The activity was implemented in the schools and the impact monitored through vaccination coverage and post-campaign coverage survey data.

The school engagement intervention was conducted through the following processes.

**High-level consultative meeting with relevant stakeholders:** The systematic engagement of schools started two months before the campaign dates, which provided ample time to establish a good relationship with stakeholders. The contact persons within the schools ensured delivery of notification letters to the school administration and organization of vaccination for the targeted age group.

The Lagos State Measles Technical Coordinating Committee (SMTCC) which coordinated the 2018 MVC engaged with all relevant ministries, parastatals, boards, and stakeholders on the need to have all eligible children vaccinated using the school system where a greater proportion of the eligible children were found. The engagement made the state ministry of education through the honourable Commissioner for Education to direct all schools authorities (Chief Inspectors of Education, Education secretaries, headmistresses and headmasters of schools, schools proprietors and proprietresses of private schools, headteachers and school health staff) to support the measles campaign efforts. The engagement process also defined the roles of the respective stakeholders in the MVC.

**Sensitisation meeting with school authorities and education stakeholders:** The SMTCC organised sensitisation in four zones, namely: Agege, Badagry, Eti-Osa, and Kosofe. Schools in respective zones were invited to the sensitisation meetings, using the line-list of schools in the wards and local government areas, obtained from the ward focal persons and summarised at the LGA. The participants for the sensitisation meetings included school proprietors, headteachers, board members of schools and contact person of the schools.

Awareness and sensitisation about the MVC were conducted at the 2018 Annual General Meeting of the National Association of Proprietors of Private Schools (NAPPS) Lagos State branch. The Ministry of Education also identified other educational stakeholders and associations for sensitisation and these include; the association of providers of education, accredited private school union, Christ redeemers' school

management, the association of international school educators, Catholic mission schools' council and association of Islamic model schools.

Also, at the sensitisation meetings were the representatives of Lagos Anglican schools, the association of private schools in Lagos, league of Mushin proprietors, the association of formidable education development, Lagos Baptist school conference, Lagos Methodist schools management, Anwar Uddin Islam movement schools and Ansar Ud Deen society schools.

**Communication of the measles vaccination campaign dates to parents and caregiver and conduct of vaccination:** LGA teams sent notification letters with consent forms on the measles vaccination campaign to all schools through the Education Secretaries. The notification letter gave a schedule of the days and time for the vaccination team to visit the schools. The letters were provided to the headteachers, proprietors, directors of schools Parents Teachers Associations and school nurses. The number of days to visit the school during the implementation date depended on the number of targeted children. The workload of the vaccination team is at least 150 children per day.

On the scheduled date of vaccination, the class teachers, the school nurses (where available), collect the consent forms signed by parents and organise the children for vaccination by the visiting team. The written consent for vaccination was obtained from parents/caregivers through signed letters or the PTA WhatsApps platform. Thumb marking with indelible ink and vaccination cards were issued to vaccinated children. The indelible ink was applied to forestall double vaccination as some children will also meet vaccination teams at their places of worship or neighbourhoods and also act as evidence of vaccination when evaluation is conducted by monitors and supervisors during the campaign.

The Lagos state Medical Officers of Health in each of the Local Government Areas convened special sensitisation meetings for known non-compliant schools. The non-compliant schools are schools that had previously rejected the polio vaccination teams from vaccinating children in their schools. The importance of measles vaccination to the targeted age group was stressed, and administrative measures on any non-compliant schools were mentioned as the child right act which makes immunization the right of every child in Lagos state had been passed.

**LGA coordination teams:** The LGA coordination teams had oversight of the measles vaccination campaign activities at the LGA and ward levels. High-level team members from SMTCC supported them, including the Permanent Secretaries from the Ministry of Health and Lagos State primary health care board, directors, state program officers, and development partners. The 20 Medical Officers of Health at the LGAs led the coordination teams across Lagos state, and they visited and supervised vaccination teams in schools, which administered only measles vaccine to the children

and followed up with non-compliant schools. Other LGA team members, such as the apex nurses, apex community health officers, program officers, along with environmental health officers, also visited the schools. The focal person of the Ministry of Education and representatives of key stakeholders followed up on schools with reported non-compliance.

### Data collection

The reports from sensitization meeting of stakeholders, unstructured interviews, dialogues and minutes of weekly coordination meeting of the (SMTCC) were collected and compiled during the campaign planning and implementation. The measles vaccination campaign was implemented for over a period of 14 days, during which all schools in the catchment areas were visited and used as posts to vaccinate all eligible children in the respective schools and any other eligible child presented. The administrative coverage data was obtained by dividing the number of doses administered by the number of children of eligible age, usually at the team level.

All tally sheets of vaccination teams were summarised at ward and LGA levels and analysed to ascertain the number of children vaccinated for measles across all teams in each LGA during the campaign. Additionally, copies of the 2018 MVC micro plans of all the 20 LGAs were reviewed to determine the number of schools planned and the target population for each local government. The data was extracted for posts where the school was used as the venue for vaccination.

### Post-campaign coverage survey

The 2017/2018 Post Campaign Coverage Survey (PCCS) was a cross-sectional household-based survey conducted on a probability sample of 7,700 households in 1,100 enumeration areas across all the 36 states and the Federal Capital Territory [19]. The survey was to provide representative estimates across each of the 37 strata.

Parents and caregivers of all children aged between 9 month and 59 months in the selected households were eligible to participate in the survey. PCCS was also conducted in Lagos state after the phased implementation of the 2017-18 measles SIA and the result used for determining campaign coverage.

### Data analysis

Information and data from coordination meetings, micro plans, implementation and post-campaign coverage were summarised in descriptive statistics. The 2016 Measles campaign data was also extracted and the LGA coverage compared with the 2018 coverage results [20,21].

## RESULTS

### Engagement of education stakeholders

The Lagos State Measles Technical Coordination Committee systematically engaged a total of 12,903 schools through sensitisation meetings, line listing and distribution of letters; 96 (0.74%) declined to receive the letters. Sensitisation meetings were held with 22 school associations. Notification letters were sent from the Ministry of Education to schools and consent letters sent from the schools to parents and caregivers. The outcome of the activities conducted is shown in table 1.

As shown in table 2, the total number of private schools in Lagos State is 10 times that of the public schools. The LGA with the lowest number of schools used as temporary vaccination post during the March 2018, MVC was 186 (Ikeja LGA), while the highest number was 2,742 (Alimosho LGA).

### Vaccination coverage

Of the 20 LGAs of Lagos state that took part in the 2018 MVC about 80% of all eligible children vaccinated, received the vaccine at schools. The lowest proportion of children vaccinated at school was 45.0% in Oshodi LGA. Surulere LGA

**Table 1:** School Engagement process and outcome in Lagos State during the 2017/2018 measles vaccination campaign.

Strategy	Activity	Outcome
High-level consultative meeting with relevant stakeholders	Fifty-five relevant MVC stakeholders attended the meeting. Presentation on Measles and deliberation on needed support for MVC done	Support for the MVC 2017/2018 campaign
Sensitisation meeting with school authorities	Four sensitisation meetings were held with proprietors, headteacher of schools in four zones. Sessions held with representatives of 22 school associations.	Memorandum of Understanding (MOU) to support MVC 2018, Agreement to send consent forms/ WhatsApp message to parents/ caregivers. It was also agreed for the schools to be used as venues for vaccination
Communication of the measles vaccination campaign dates to school authorities, to parents/ caregivers	Notification letters from the Ministry of Education dispatched to schools	12,903 letters, served to schools. Daily implementation plans developed by respective teams showing the day respective schools to be visited
LGA coordination and feedback	Micro plan and daily implementation work plan development. Visit to schools and follow up on issues arising from the engagement process	Ninety-six schools that were hesitant in supporting the campaigns were visited and the issues resolved

**Note:** Activities in the thematic areas and the outcome was extracted from observations, minutes of meetings, field visit and consultation of the coordination teams and stakeholders. The issues arising from the engagement process included hesitancy by few school proprietors, most of the schools not having functional school health service facilities and health personnel. The school health programme did not have records of the vaccination history of each child. This was addressed by high-level advocacy to the hesitant schools and the deployment of trained health workers to the schools during the vaccination campaign days.

**Table 2:** Description of schools used as vaccination post with ownership, Lagos State, 2017/ 2018 Measles vaccination campaign.

LGA	No. of Schools used as vaccination posts during the campaign	School ownership		Types of school*				
		Private	Public	Crèches/Day care (0-35 months)	Nursery (36-59 months)	Primary 60 and above months	Quranic 60 and above months	Other
Agene	475	444	31	144	396	425	42	16
Ajeromi-	222	690	42	305	649	679	29	1
Alimosho	2,742	2,690	52	1,459	2,631	2,468	46	-
Amuwo-	510	473	37	510	510	510	124	-
Apapa	275	244	31	32	195	75	13	-
Badagry	399	572	42	368	613	622	27	-
Epe	365	295	65	60	266	264	22	-
Eti Osa	216	491	36	281	486	478	17	-
Ibeju-Lekki	514	475	37	20	48	31	7	-
Ifako-Ijaiye	246	658	64	278	560	456	23	6
Ikeja	186	413	32	117	281	286	14	1
Ikorodu	1,562	1,445	118	121	1,492	1,516	30	1
Kosofe	1,058	1,024	34	303	994	980	43	-
Lagos Island	272	240	32	83	243	211	4	1
Lagos Mainland	472	472	423	49	86	305	362	18
Mushin	620	572	49	461	570	577	23	56
Ojo	547	502	42	330	486	488	38	3
Oshodi-Isolo	851	684	59	52	412	454	21	-
Shomolu	646	614	32	79	531	519	38	3
Surulere	725	664	59	246	680	682	27	3
State	12,903	13,662	1317	5280	12129	12026	950	109

\*Most of the schools in Lagos integrate early childhood (Crèches, kindergarten and Nursery) with Primary education, as such the numbers in the breakdown of school types do not add to the total number of schools. Early childhood/ pre-primary is an education given in an educational institution (Crèches and kindergarten and nursery) to children before they enter the primary school [29].

had the highest proportion of children vaccinated in schools (95.0%), while Apapa and Mushin LGAs had 94.0% coverage each (Figure 1).

The administrative coverage for MVC 2018 ranged from about 73% in Apapa LGA to 133% in Lagos island. Most of the LGAs had coverages > 100%, with an overall state coverage of 108%. Of the 18 LGAs sampled during the post-campaign coverage survey, Ajeromi had the highest coverage of 96.3% while Ifako-Ijaiye, the lowest with 75.0%. Seven of the LGAs (Ajeromi, Badagry, Eti Osa, Lagos Island, Oshodi Isolo, Shomolu and Surulere), had 95% and above coverage, with the state weighted average coverage of 93.8%. Interestingly, Apapa LGA with the lowest administrative coverage 73%, had a high coverage of 92 % for the post-campaign coverage survey (Figure 2).

In the comparison of the children vaccinated in 2016 and 2018, the 2016 denominator used was the projected population from the 2006 population census, while the 2018 MVC used the walkthrough household enumeration population conducted in 2017 throughout the State.

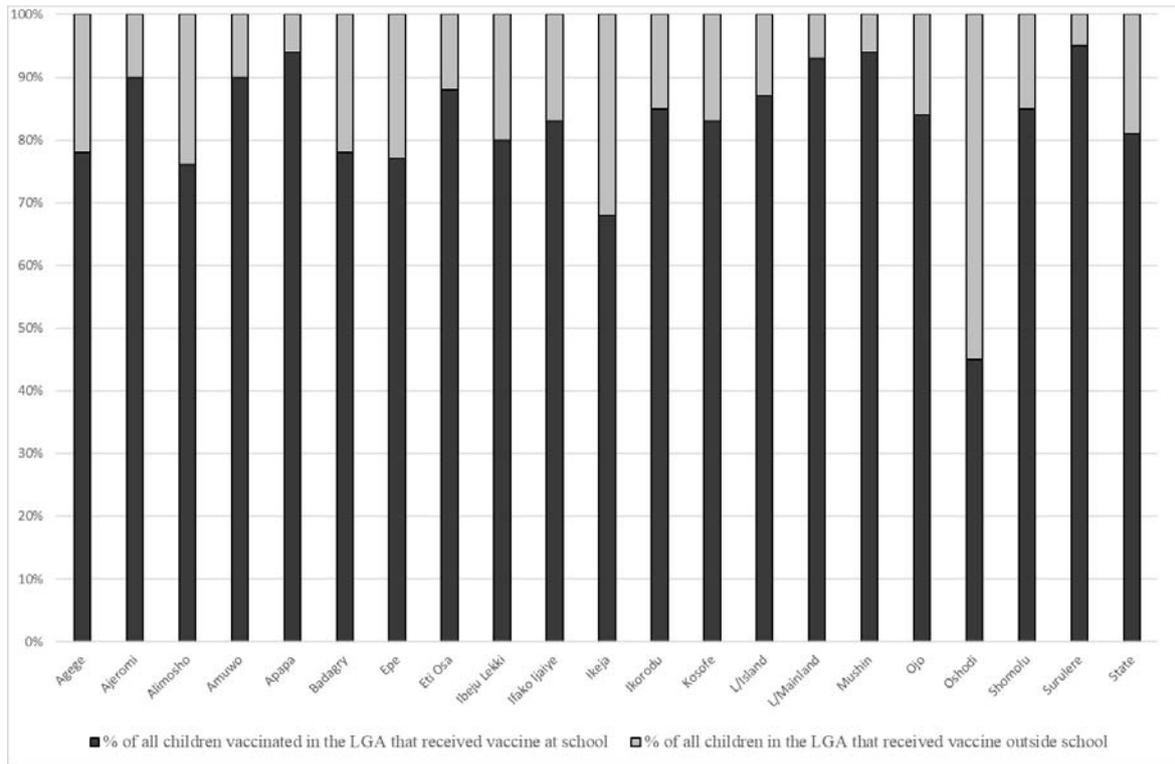
In 2016 MVC, the State achieved 78% administrative coverage with Ojo LGA recording the highest coverage

(156%) and Badagry LGA the lowest (42%). In 2018, the State achieved administrative coverage of 108% having Lagos Island LGA with the highest coverage of 133%, while Apapa LGA had the lowest coverage of 73%.

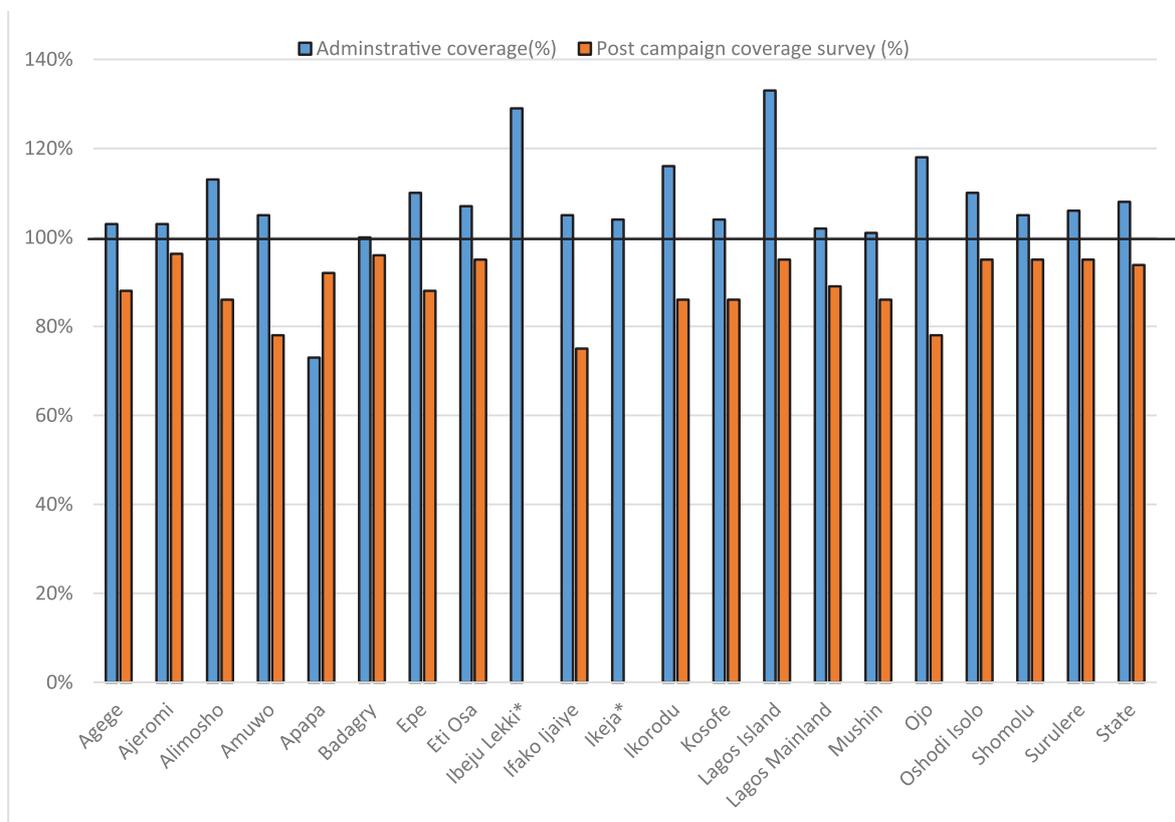
There was a marked percentage increase in the target population between 2016 and 2018 from 18% (Lagos Island) to as high as 271% in Badagry LGA. However, there was a decline in Epe and Kosofe LGAs of 18% and 20% respectively. Furthermore, the percentage increase in administrative coverage between 2016 and 2018 was marked across most LGAs, but with a decline in Mushin (5%) and Ojo (25%) LGAs. The State operational target population used for the 2018 MVC was 3,636,265 against 2,034,517 in 2016 (Table 3).

## DISCUSSION

We found that engaging stakeholders from the education sector and delivering vaccine doses at schools contributed to a high number of schools participating in the campaign with a corresponding increase in the uptake of one dose of measles-containing vaccine by LGA in the State. The engagement facilitated support and ownership as stakeholders, parents and caregivers were mobilised to allow children to be vaccinated in schools. This cooperation



**Figure 1** Proportion of all vaccinated in the LGA that received the vaccine at school versus proportion that received outside school, by LGA, Lagos State, 2017/2018 Measles vaccination campaign.



**Figure 2** Comparison of Administrative and post-campaign coverage survey result by LGA, Lagos State, 2017/2018 Measles vaccination campaign. \*Ibeju Lekki and Ikeja LGAs were not selected for the post-campaign coverage survey as none of the enumeration areas fell into the Sampling unit selected for the survey in these LGAs.

**Table 3:** Comparison of children vaccinated during measles vaccination campaign with the target population for 2016 and 2018.

LGA	2016 measles target population	2018 measles target population	% variance in the target population	Administrative coverage during 2016 measles campaign	Administrative coverage during 2018 measles campaign	% variance in Administrative coverage
Agene	103,817	156,862	51%	73%	103%	42%
Ajeromi	154,195	344,868	124%	54%	103%	91%
Alimosho	288,403	435,421	51%	94%	113%	21%
Amuwo	71,816	98,151	37%	60%	105%	76%
Apapa	49,063	51,443	5%	47%	73%	55%
Badagry	54,419	201,649	271%	42%	100%	136%
Epe	40,947	33,524	-18%	50%	110%	121%
Eti Osa	64,958	74,557	15%	88%	107%	22%
Ibeju Lekki	26,518	29,565	11%	49%	129%	161%
Ifako Ijaiye	96,580	148,781	54%	75%	105%	40%
Ikeja	70,694	115,962	64%	79%	104%	31%
Ikorodu	120,899	381,129	215%	93%	116%	24%
Kosofe	150,191	120,824	-20%	50%	104%	108%
Lagos Island	47,274	55,868	18%	70%	133%	91%
Lagos Mainland	71,715	110,452	54%	85%	102%	20%
Mushin	142,882	284,263	99%	107%	101%	-5%
Ojo	134,995	398,129	195%	156%	118%	-25%
Oshodi Isolo	140,286	321,084	129%	89%	110%	24%
Shomolu	90,891	132,456	46%	73%	105%	43%
Surulere	113,756	165,492	45%	74%	106%	43%
State	2,034,517	3,660,480	80%	78%	108%	39%

is similar to findings from studies by Cooper, et al. [10], on a systematic review of school-based vaccination and parents' perspectives to school-based influenza vaccination by Lind, et al. [22] in which stakeholders and parents, receiving appropriate information and involved in the process for delivering influenza or other vaccines in schools showed higher acceptance.

The Ministry of education communicating directly with schools, complemented the notification letter from the LGA Primary Health Care Department. The consent letters sent to parents and caregivers was not only a committal document, but it also sensitised parents and caregivers about the benefits of receiving the vaccine as well as the consequences of not allowing their children to be vaccinated. This is an important influencer in the outcome of a school-based immunization programme. In the same vein, finding of a systematic review of the process evaluation of school-based vaccination, in 2011, by Cooper et al. showed that specific consent form dissemination procedures demonstrated higher return rates [11]. The finding that most (80%) of all eligible children vaccinated, received the vaccine at school, further reiterates the importance of school engagement in improving the uptake of a vaccine in a time-bound immunization campaign. Lagos State had the highest among all the 36 states and FCT in school being the source of information for the campaign by the interviewed

caregivers in the post-campaign coverage survey, a pointer to the success of the Lagos state school engagement [20]. The post-campaign coverage survey reported that the six LGAs that attained the target 95% coverage for the MVC had > 75% of the children vaccinated in schools, further bolsters the contribution of schools' engagement [20]. However, it is also good to note that high coverage can only be achieved in areas with high school enrolment and attendance [8]. Since the use of post-campaign coverage surveys in assessing the vaccine coverages of states in the 2013/2014 MVC, the best PCCS Lagos has gotten is that of 2018 with 93.8% against the 59.3% and 88.2% of 2013 and 2016 respectively. This modest improvement could be attributed to the successful engagement of schools amongst others since a great majority of the children vaccinated during the campaign were carried out in the school.

We found that engagement was not that easy as bureaucratic bottleneck in some elite schools required high-level management personnel from the LGA, beyond the status of the ward focal person to establish a form of engagement with the school authority. In some cases, it was not until direct communication from the Ministry of Education was received before they gave access to vaccination teams.

There were reported noncompliant schools, that were hesitant in collecting notification letters and reluctant in allowing vaccination to take place in the school. The Medical

Officers of Health and LGA teams, together with senior supervisors from community-based organizations, lobby groups from the state intervened and resolved the reported non-compliance. Active and sometimes passive resistance and hesitancy to vaccination and other public health activities may not be unconnected with the circulating anti-vaccination rumours in Nigeria and globally [23–25].

The limitations of the work include the use of administrative data for vaccination coverage, with attendant errors of incomplete tallying, reporting of the number of doses administered, outdated census data and vaccination of individuals outside the targeted age group. In some instances, coverages above 100% cast doubts on the validity of the reported coverage. Since it is not a probability sample, it would not produce statistically valid estimates of vaccination coverage to conclude on the effect of the engagement process [26]. This informed the use of post-campaign coverage survey in the measles SIAs to complement the administrative coverage as reported by Dunkle, et al. [27] and Zuber, et al. [28].

Secondly, the vaccination tally sheet used did not capture schools as, where children were vaccinated, thereby making it difficult to disaggregate the information. However, since the daily implementation plan designated these schools as vaccination posts; eligible children covered in these posts are considered to be vaccinated in these schools; the data collection tools for subsequent campaigns should indicate the location where children are vaccinated, including schools. The denominators (that is total number of children) in school for previous years are lacking, but since the target population was a projection from previous MVCs, this was applied for comparison. Also, comparing the three post-campaign coverage surveys has its limitation as they were carried out using different methodologies. Thirdly, the study design did not have a comparison group, as such, the interpretation of the outcome of the study should be done bearing this limitation in perspective.

## CONCLUSION

The implementation of the school engagement process for the measles SIA contributed to achieving high vaccine coverage as most of the children aged 9–59 months were vaccinated in schools. The vaccination of the set target age group makes it possible to achieve the high population herd immunity needed for measles elimination. As such, school-based vaccination should be part of a comprehensive school health programme to support other health interventions [10,11]. The database of schools should be used for future SIAs or introduction of the vaccine to school-age children.

School-based vaccination programme should be strengthened, and the LGA Primary health care departments to routinely continue to enhance the relationship with schools by strengthening school health services, school health information system, health promotion talks, supervisory inspection visits and not only during supplemental vaccination campaigns. The WHO has so deemed it important

that a school vaccination readiness assessment tool be developed to enable countries to determine their ability to plan and implement school vaccinations [29].

## PUBLIC HEALTH IMPLICATION OF THE STUDY

Systematic school engagement has the potential for enhancing public health interventions that target school-aged children. The conduct of quality micro plans assists in developing a database of schools, which contained the number and breakdown of the age group of children. This information can be used for planning other health interventions targeting schools and further explored to track vaccination status and defaulters.

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## ETHICAL CONSIDERATION

The consultation of an ethics committee is not required for analyses based solely on secondary data. The data were generated as part of the activities supporting the Measles rubella initiative in Nigeria. The data are kept at the National Primary Healthcare Development Agency and are subject to data protection regulations.

## POTENTIAL CONFLICTS OF INTEREST

All authors: No reported conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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