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Intent to receive flu vaccine and influenza vaccination coverage among health professionals during 2019, 2020 and 2021 campaigns in Côte d'Ivoire

D. Coulibaly[a], **A. Douba**[a,b,*], **K. N'Guessan**[a], **A.K. N'Gattia**[a], **H. Kadjo**[c], **M.S. Ebama**[d], **M. McCarron**[e], **J. Bresee**[d]

[a]Institut National d'Hygiène Publique, Abidjan, Côte d'Ivoire

[b]Université Félix Houphouët-Boigny, Abidjan, Côte d'Ivoire

[c]Institut Pasteur, Abidjan, Côte d'Ivoire

[d]Task Force for Global Health, Atlanta, GA, USA

[e]United States Centers for Disease Control and Prevention, Atlanta, GA, USA

Abstract

Vaccination of healthcare workers against influenza is a crucial strategy to reduce transmission amongst vulnerable populations, facilitate patient uptake of vaccination, and bolster pandemic preparedness. Globally, vaccination coverage of health workers varied from 10 % to 88 %. Understanding health workers' knowledge and acceptance of the influenza vaccine, particularly among physicians, is crucial for the fine-tuning and continued success of influenza vaccination campaigns.

We conducted a cross-sectional survey of 472 health workers in Abidjan, Côte d'Ivoire, to inform subsequent subnational and national introductions of influenza vaccine and subsequent campaigns targeting health workers in 2019 (14 302), 2020 (14 872), and 2021 (24 473). Using a purposive sample of university hospitals, general hospitals, rural, and urban health facilities, we interviewed a convenience sample of health workers aged 18 years and older. Physicians had the lowest intention to receive the influenza vaccine (58 %), while nurses (78 %) and midwives (76 %) were the most willing. Across all occupations, intention to receive vaccination increased if the vaccine

*Corresponding author at: Institut National d'Hygiène Publique (INHP), Rue du Port, Treichville, BP V14, Abidjan, Côte d'Ivoire. alfreddouba1@gmail.com (A. Douba).

Ethical clearance:

This study was approved by the Comité National d'Ethique des Sciences de la Vie et de la Santé. Informed consent was obtained from all subjects involved in the study.

CRediT authorship contribution statement

D. Coulibaly: Writing – review & editing, Writing – original draft, Supervision, Methodology, Funding acquisition, Conceptualization. **A. Douba:** Writing – review & editing, Writing – original draft, Investigation, Data curation, Conceptualization. **K. N'Guessan:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis. **A.K. N'Gattia:** Writing – review & editing, Writing – original draft, Methodology, Data curation, Conceptualization. **H. Kadjo:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **M. S. Ebama:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization. **M. McCarron:** Writing – review & editing, Writing – original draft, Conceptualization. **J. Bresee:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization.

was offered for free or if recommended by the Ministry of Health. 76 % of respondents believed that the influenza vaccine could prevent illness in health workers.

Communication strategies, including about the benefits of influenza vaccination, could raise awareness and acceptance among health workers prior to vaccination campaigns. Influenza vaccination coverage rates between 2019 and 2021 were on par with rates of intention to receive vaccination in the 2018 survey; in 2019, 2020, and 2021, coverage among physicians was 73 %, 73 %, and 52 % and coverage among nurses and midwives was 86 %, 86 %, and 74 % respectively.

Improving health workers' knowledge and acceptance of the influenza vaccine, particularly among physicians, is crucial for the continued success of influenza vaccination campaigns.

Keywords

Health personnel; Influenza vaccines; Knowledge; Attitude; Perception

1. Introduction

Influenza vaccination is an essential public health intervention to control both seasonal influenza epidemics and pandemic influenza [1]. In 2012, the World Health Organization (WHO) published recommendations for the global use of influenza vaccines, emphasizing vaccination of pregnant women, healthcare professionals, children under five years of age, people aged 65 years and older, people living with chronic diseases, and immunocompromised individuals [2]. WHO prioritizes health workers for seasonal influenza vaccination due to their increased risk of infection and potential for transmission to vulnerable patient populations. Health worker vaccination is also an essential pillar of pandemic preparedness. Furthermore, health workers who have received influenza vaccine are more likely to be knowledgeable about vaccination and promote public acceptance [2,3].

Despite the efficacy of vaccinations and national and international guidelines, influenza vaccination coverage among healthcare professionals face hesitancy worldwide due to a lack of confidence, inconvenience, calculation and complacency [4]. Previous studies showed that influenza vaccination coverage among healthcare workers ranged from 10 % to 88 % [5]. Despite the WHO recommendation, influenza vaccination policies are not widely reported in the African region [6]. Numerous studies have examined knowledge, attitudes, and practices toward influenza vaccines in African contexts and globally through systematic reviews [7–12]. These studies find that drivers of uptake amongst health workers include perceptions of higher susceptibility to disease and protectiveness of the vaccine for self and others, including patients. Factors underlying vaccine hesitancy and low uptake for health workers mirror those of other populations, and include concerns about vaccine safety, lack of information on influenza vaccines, low perception of risks associated with influenza illness, and barriers to access.

In 2017, as part of the policy development process, the Ministry of Health and Public Hygiene sent a referral to the Côte d'Ivoire National Immunization Technical Advisory Group (NITAG), also known as the National Committee of Independent Experts for

Immunization and Vaccines of Côte d'Ivoire (CNEIV-CI), to develop recommendations on influenza vaccination for health workers and other priority groups. In 2018, INHP, in collaboration with the Partnership for Influenza Vaccine Introduction (PIVI), and the US Centers for Disease Control and Prevention (CDC), conducted a survey of health workers' knowledge, attitudes, practices, and intentions related to influenza vaccination to provide CNEIV-CI with national data for decision-making. Influenza vaccination campaigns targeting health workers were conducted following this survey, in 2019, 2020, and 2021 using vaccine from Green Cross; survey results were not used to forecast vaccine uptake.

This article seeks to describe health worker intentions to receive influenza vaccination from the 2018 survey and to compare those findings with the 2019, 2020, and 2021 vaccine coverage of health workers, allowing us to understand the predictive power of the survey results.

2. Methods

2.1. Survey methods

We conducted a cross-sectional survey of 472 health workers in the capital, Abidjan, in April 2018. Using a purposive sample of university hospitals, general hospitals, rural, and urban health facilities we interviewed a convenience sample of health workers aged 18 years and older on duty in the selected facilities about their knowledge, attitudes, and practices about, and intention to receive, influenza vaccine. For the purposes of this study healthcare workers were considered those with direct patient contact. The survey included demographic information (e.g., age, occupation), knowledge of influenza disease and influenza vaccine, reasons for intent or non-intent to receive influenza vaccine, and reasons for recommending influenza vaccine to patients. The protocol and survey were approved by the national ethics committee (Comité National d'Ethique des Sciences de la Vie et de la Santé), and written informed consent was obtained from respondents prior to the start of the interviews.

Vaccination coverage data were collected using 2019, 2020, and 2021 campaign reports for comparison of intention to receive vaccination with recorded vaccine coverage levels in the target population. Due to limited vaccine supplies, 2019, 2020, and 2021 campaigns targeted public healthcare workers in 37, 37, and 60 districts respectively chosen for convenience. Vaccine coverage was calculated by dividing the total number of health workers vaccinated during each campaign (the numerator) by the total number of health workers by public health facility (the denominator), as provided by each facility prior to the campaigns. Data were analyzed using PASW Statistics 18.

2.2. Vaccination campaign preparation and implementation

Vaccination campaigns conducted in 2019 and 2020 targeted health workers in 37 health districts of Côte d'Ivoire; the campaign was expanded to 60 health districts in 2021. Persons targeted for vaccination included administrative staff in health facilities and health workers providing direct patient care, and aged 18 years or older.

National vaccination supervisors were trained centrally at the National Institute of Public Hygiene. District-level vaccinators, vaccination assistants, and staff responsible for

monitoring adverse events following immunization (AEFI) were subsequently trained by national supervisors prior to the start of the campaign. Vaccination staff were trained on general information about influenza and influenza vaccine, organization of vaccination sites, injection safety, AEFI surveillance, and waste management.

Communications and awareness-building activities were undertaken as part of each campaign, with messaging targeted toward physicians, who expressed lower rates of intention to receive vaccination in the 2018 survey. Information and social mobilization activities targeted all health workers, administrative staff, and leadership of health facilities. The Minister of Health officially launched each campaign with the presence of representatives from partners, including the WHO and CDC. Informational letters were distributed to regional and departmental health directors and healthcare institution leadership. Meetings were held with a representative of the Minister of Health with the heads of health facilities and supervisors to identify and organize vaccination sites and officiate campaign launches. Vaccine fact sheets, posters, and pamphlets were distributed at vaccination sites. Information about the vaccination campaign was announced via press, radio, and shared at places of worship.

Health personnel were vaccinated free of charge at their workplaces on a voluntary basis. Nurses and midwives administered the vaccine, and vaccination assistants completed tally sheets, recorded recipient names, and delivered immunization cards. District-level immunization activities were monitored by a local supervisor responsible for compiling and transmitting immunization data to the central level.

The vaccination campaigns were coordinated by the regional health directorates with additional coordination at the central level by a committee composed of the national coordinator and national technical supervisors. The coordination committee met weekly to discuss the course of activities, management of critical points, measurement of campaign objectives, compliance with the cold chain, vaccine wastage rates, and any AEFI.

3. Results

3.1. 2018 Vaccination intent survey

Sociodemographic characteristics of survey respondents are described in Table 1. One-third of survey respondents (33 %) were nurses, and approximately one quarter each were midwives (28 %) or doctors (24 %); the remaining 15 % of respondents included caregivers, stretcher bearers, and paramedics, and others. Most respondents (64 %) had university-level education, and one fifth (19 %) held a professional degree; the remaining 17 % of respondents had completed secondary education. Two-thirds (66 %) of respondents were female, and 34 % were male. Respondents were aged between 20–34 (43 %), 35–49 (47 %), and ten percent (10 %) were over age 50.

Respondents were asked standard questions about their intention to receive influenza vaccine in different scenarios, including if the vaccine was offered free-of-charge vs. self-pay, if it was recommended by the Ministry of Health, among other drivers. Overall intent to receive an influenza vaccine was high across all occupations, at 74 % intended uptake. A

recommendation by the Ministry of Health increased intent to 83 %; Côte d'Ivoire had an existing influenza vaccination policy that included recommendations for healthcare workers, however few respondents were aware that such a policy existed. And a vaccine offered free-of-charge raised intent to 84 % among all health workers. Physicians had the lowest intent to receive influenza vaccine; 58 % stated they would accept the vaccine, while the number increased to 74 % if the vaccine was offered free-of-charge. Nurses and midwives had the highest intention to receive the influenza vaccine, with 76 % and 89 % acceptance if the vaccine was free-of-charge, respectively. Individuals with secondary education, females and individuals aged 20–34 years initial intention to receive influenza were 81 %, 76 % and 81 % respectively (Table 2).

Reasons for accepting influenza vaccine included the vaccine's protective effect for oneself and family members (n = 396, 84 %), perceived vaccine efficacy (n = 347, 74 %), if the vaccine is offered free-of-charge (n = 252, 53 %), and to comply with Ministry of Health recommendations (n = 112, 24 %).

Respondents were also asked their primary reasons for recommending influenza vaccine to patients if it were available. Responses included patient protection (n = 375, 79 %), vaccine efficacy (n = 362, 69 %), vaccine offered free-of-charge (n = 193, 41 %), and to comply with Ministry of Health recommendations (n = 185, 39 %).

Respondents were asked about knowledge, attitudes, and practices related to influenza disease, transmission, and the influenza vaccine (Table 3). Fewer than quarter of respondents (24 %) stated that influenza vaccination would protect an individual against illness, however, a greater percentage (76 %) were somewhat confident, confident, or very confident that the vaccine could prevent influenza in healthcare workers. The majority (85 %) stated that individuals should get the influenza vaccine. However, at the time of the survey only 26 % of respondents had been vaccinated against influenza in their lifetimes.

3.2. Vaccination campaign coverage, strength and challenges 2019, 2020 and 2021

Influenza vaccination coverage among health workers across all occupations decreased from 97 % in 2019 to 84 % in 2021. The largest drop in coverage was among doctors (73 % in 2019 to 52 % in 2021). Vaccination coverage of nurses and midwives decreased from 86 % in 2019 to 74 % in 2021. Other categories of health workers maintained very high coverage in all periods (Table 4).

Strength and challenges during vaccination campaigns have been identified in various areas including planning and coordination, logistics, communication, service delivery, data management, finance, training and post-immunization follow-up (Table 5).

4. Discussion

Influenza vaccination coverage of health workers in Côte d'Ivoire between 2019 and 2021 was on par with reported intentions to receive vaccination observed in the 2018 survey, indicating that the survey was an effective forecasting tool for real-world vaccine uptake. Indeed, coverage was lowest among physicians and highest among nurses and midwives,

which aligned with our survey findings. This finding differs somewhat from previous studies showing that physicians have higher rates of vaccine acceptance, and indicates the need for targeted education and outreach to this population of health workers in Côte d'Ivoire [13–16]. Other studies demonstrate low overall influenza vaccine coverage among healthcare professionals at the global and national levels [4,6,7,17–19]. These findings are consistent with our study of intention to receive vaccination as well as the coverage rates observed during Côte d'Ivoire's influenza vaccination campaigns targeting health workers.

Influenza vaccine coverage amongst health workers in Côte d'Ivoire decreased in 2021 from high levels in 2019 and 2020. The decrease in coverage in 2021 may be due to the COVID-19 pandemic, as has been observed elsewhere; a 2022 systematic review found that the COVID-19 pandemic negatively affected influenza vaccination rates worldwide [20]. Misinformation about the COVID-19 vaccine was widespread on social media in Côte d'Ivoire. Furthermore, a case of thrombosis following COVID-19 vaccination was recorded in Côte d'Ivoire, leading to concerns about COVID-19 vaccines [21]. These events, coupled with systems-level challenges related to the COVID-19 pandemic response, may have played a role in decreased influenza vaccine coverage amongst health workers in 2021.

There is preliminary evidence of gradually increasing influenza vaccine coverage in Côte d'Ivoire following the COVID-19 pandemic. The 2022 influenza vaccine campaign was postponed to early 2023 due to the COVID-19 pandemic. From January to March 2023, an influenza vaccination campaign was conducted targeting health workers and technical and administrative staff in health facilities across 72 health districts, resulting in overall coverage of approximately 90 %. While lower than the highest coverage observed in 2019 and 2020 (97 %), this is an improvement from the lowest coverage level seen in 2021 (84 %). Despite this promising upward trend, more work is needed to increase influenza vaccine coverage of health workers in Côte d'Ivoire, especially among physicians.

Information, education, and communication (IEC) efforts were undertaken following the findings of the 2018 survey to build awareness and acceptance of the influenza vaccine prior to campaigns. Influenza vaccination hesitancy and refusal are complex issues. According to the Independent Expert Advisory Group (IEAG) for health worker influenza vaccination, communication strategies are crucial to the success of any vaccination approach. Message framing is a critical part of communications and will benefit from an understanding of drivers and barriers related to vaccine acceptance. Awareness raising tactics can include peer communications or customized mass communications and proactive media engagements to avoid negative media coverage. Including information on influenza vaccination in the medical and nursing curriculum may help develop a culture of vaccination acceptance [3].

Mandatory vaccination is one potential solution for improving health worker influenza vaccine coverage, and such a policy may be responsible for high coverage rates in countries such as Finland [22]; while there is no national policy in the United States, healthcare facilities with mandates typically reach high coverage among facility staff [23–25]. A review of mandatory vaccination policies or multifaceted campaigns (e.g., policies requiring non-vaccinating health workers to wear a mask, mandatory declination) showed vaccination coverage in health workers over 90 % [26]. However, mandatory vaccination has been

difficult to implement in some countries because of ethical or legal considerations [3]. Seasonal influenza vaccination campaigns organized in Côte d'Ivoire from 2019 to 2021 were voluntary. Rather than implementing mandates, various communication strategies were used to raise health worker awareness about the benefits of being vaccinated against influenza for oneself and others (Table 5). Other means to increase ease of vaccination, such as adding vaccination clinics and times or vaccinating on the wards, might be additional options but were not included in the questionnaires.

WHO's Strategic Advisory Group of Experts (SAGE) has identified multiple interventions with the largest positive effect on vaccine uptake. These include targeting the local community and health workers, engaging religious or other influential leaders to promote vaccination, directly targeting unvaccinated or under-vaccinated populations, increasing knowledge and awareness surrounding vaccination, improving convenience and access to vaccination, and employing reminder and follow-up strategies [27]. In Côte d'Ivoire, several of these interventions were undertaken during campaigns, including community sensitization and advocacy efforts and targeting health workers through information sessions and IEC materials. High-level officials received the influenza vaccination during launch ceremonies to bolster confidence in the vaccine and encourage its uptake amongst health workers. During future campaigns, additional focus should be placed on further strengthening IEC campaigns, awareness-building efforts, and engaging key influencers such as health worker trade unions and professional associations. Additionally, future campaign coverage rates may be improved with adjustments to planning and preparation, coordination, logistics, and implementation strategies (Table 5).

Vaccine supply and financial constraints present challenges to achieving high coverage of health workers, particularly in low- and middle-income countries. Therefore, stratification of health workers by clinical area of work, occupation, or risk could be a realistic part of policy development [3].

The Ministry of Health of Côte d'Ivoire plans to develop an influenza vaccination program that relies on local financial resources. Influenza vaccination could be covered by the national insurance program and target health workers as well as other groups at increased risk associated with influenza illness, including children under 5 years, older adults, pregnant women, and persons with certain underlying conditions. Priority areas for the Ministry of Health include quantification of these populations to inform dose estimates and required inputs, and mobilization of national and external resources to support implementation of a national influenza vaccination program.

While we believe our findings are suggestive of the utility of surveys to forecast uptake, our study was subject to several limitations. Health workers were surveyed only in the capital city of Abidjan; the study participants may have had different intentions to receive vaccination and knowledge, attitudes, and practices from health workers in other parts of the country. We found, however, that coverage observed nationally did not differ substantially from the observations in our survey, suggesting that surveys such as this one may be useful in forecasting uptake. Another limitation is that coverage is only among eligible districts, and does not reflect possible uptake at a national level.

5. Conclusion

In the period following the COVID-19 pandemic, Côte d'Ivoire, like many countries, experienced a decrease in influenza vaccine coverage. Improving health workers' knowledge and acceptance of the influenza vaccine, particularly among physicians, is crucial for the continued success of influenza vaccination campaigns. Future opportunities for the country include covering the costs of influenza vaccination through the national health insurance program and expanding influenza campaigns to cover other groups at increased risk of complications associated with influenza illness.

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Declaration of competing interest

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Data availability

Data will be made available on request.

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Table 1

Sociodemographic characteristics of surveyed health workers.

Variables	Number (N = 472)	Percentage % [95 % CI]
Occupation		
Doctor	113	24 [16—–32]
Nurse	155	33 [26—–40]
Midwife	132	28 [20—–36]
Other	72	15 [07–23]
Education level		
Secondary	79	17 [09–25]
Professional	91	19 [11–27]
University	302	64 [59—–69]
Sex		
Male	159	34 [27—–41]
Female	313	66 [61—–71]
Age groups (years)		
20 to 34	200	43 [36—–50]
35 to 49	223	47 [40—–54]
50 to 62	49	10 [02–18]

Table 2

Distribution of Health workers' vaccination intent by modalities and sociodemographic variables.

Variables	Initial intent to receive vaccination			Intention to receive vaccination if vaccine is free of charge			Intention to receive vaccination if vaccine is recommended by the Ministry of Health		
Overall intent	351 (74 %) [95 % CI: 69—77]			398 (84 %) [95 % CI: 80—88]			393 (83 %) [95 % CI: 79—87]		
Occupation	Yesn (%)	Non (%)	I don' t known (%)	Yesn (%)	Non (%)	I don' t known (%)	Yesn (%)	Non (%)	I don' t known (%)
Physician	66 (58)	31 (27)	16 (14)	83 (74)	20 (18)	10 (09)	78 (69)	25 (22)	10 (09)
Nurse	121 (78)	23 (15)	11 (07)	133 (86)	12 (08)	10 (07)	134 (87)	14 (09)	07 (05)
Midwife	100 (76)	10 (08)	22 (17)	117 (89)	05 (04)	10 (08)	114 (86)	08 (06)	10 (08)
Other	64 (89)	02 (03)	06 (08)	65 (90)	02 (03)	05 (07)	67 (93)	01 (01)	04 (06)
Education level									
Secondary	64 (81)	07 (09)	08 (10)	68 (86)	05 (06)	06 (08)	70 (89)	04 (05)	05 (06)
Professional	67 (74)	13 (14)	11 (12)	77 (85)	07 (08)	07 (08)	76 (84)	07 (08)	08 (09)
University	220 (73)	46 (15)	36 (12)	253 (84)	27 (09)	22 (07)	247 (82)	37 (12)	18 (06)
Sex									
Male	113 (71)	30 (19)	16 (10)	129 (81)	18 (11)	12 (08)	130 (82)	20 (13)	09 (06)
Female	238 (76)	36 (12)	39 (13)	269 (86)	21 (07)	23 (07)	263 (84)	28 (09)	22 (07)
Age groups (years)									
20 to 34	161 (81)	22 (11)	17 (09)	183 (92)	09 (05)	08 (04)	174 (87)	16 (08)	10 (05)
35 to 49	154 (69)	35 (16)	34 (15)	177 (79)	24 (11)	22 (10)	180 (81)	27 (12)	16 (07)
50 to 62	36 (74)	09 (18)	04 (08)	38 (78)	06 (12)	05 (10)	39 (80)	05 (10)	05 (10)

Table 3

Knowledge, attitudes, and practices of health workers about influenza vaccination.

Variables	Number	Percentage [95 % CI]
Knowledge (yes responses)		
Flu is more dangerous for people in your occupation vs. not in your occupation	111	24 [16—–32]
The flu shot helps protect you against the flu	226	48 [41—–55]
You should get the flu shot	400	85 [82—–88]
Attitudes and practices (yes responses)		
Have you been vaccinated against the flu?	121	26 [18—–34]
If you diagnose a patient with the flu, what would you do to avoid getting infected?		
Wash one's hands	334	71 [66—–76]
Avoid direct contact with the patient	313	66 [61—–71]
Wear a mask	296	63 [57—–69]
Avoid touching eyes, nose, mouth	247	52 [46—–58]
See the doctor at the onset of symptoms	206	44 [37—–51]
Avoid crowded places	108	23 [15—–31]
To get vaccinated	104	22 [14—–30]
On a scale of 1 to 5, with 1 being 'not at all' and 5 being 'very much', how confident are you that the influenza vaccine can prevent influenza in healthcare workers?		
1	44	10 [01–19]
2	62	14 [05–23]
3	180	41 [34—–48]
4	82	19 [11–27]
5	73	16 [08–24]

Table 4

Distribution of vaccination coverage among health workers groups by year.

Year	Number of districts	Target population	Number of health workers vaccinated	Crude vaccination coverage (%)	Vaccination coverage among doctorsn (%) [95 % CI]		Vaccination coverage among nurses and midwives n (%) [95 % CI]	
2019	37	14 793	14 302	97	1 277 (73) [71–75]		4 812 (86) [85–87]	
					Abidjan	Out of Abidjan	Abidjan	Out of Abidjan
					827 (65) [62–68]	450 (35) [31–39]	1972 (41) [39–43]	2840 (59) [57–61]
2020	37	15 394	14 872	97	1 277 (73) [71–75]		4 814 (86) [85–87]	
					Abidjan	Out of Abidjan	Abidjan	Out of Abidjan
					787 (62) [59–65]	490 (38) [34–42]	1768 (37) [35–39]	3046 (63) [61–65]
2021	60	29 202	24 473	84	1 576 (52) [50–55]		7 485 (74) [73–75]	
					Abidjan	Out of Abidjan	Abidjan	Out of Abidjan
					743 (47) [43–51]	833 (53) [50–56]	2047 (27) [25–29]	5438 (73) [72–74]

Table 5

Strengths, areas to improve, and recommendations from influenza vaccination campaigns targeting health workers in Côte d'Ivoire, 2019 to 2021.

Strengths	Challenges	Areas to improve / Recommendations
Planning and Coordination		
• Development of a campaign timeline – Establishing a coordinating committee made up of people from various fields of expertise (logisticians, data managers, communication specialists, public health specialists, etc.) – Holding preparatory and daily meetings during the campaign – Identifying solutions to problems encountered during the campaign (e.g.. , measuring progress to reach targets, developing coordination mechanisms) – Conducting regular telephone calls with local supervisors and regional coordinators – Performing regular updates on campaign progress to districts	• Concurrent public health emergencies (i. e., COVID-19 pandemic)	• Estimation of target population (denominators) • Adjusting campaign timing so as not to overlap with busy seasons (i.e., December holidays)
Logistics		
• Availability of vehicles for vaccine delivery and supervision of activities – Implementation of the distribution plan – Quality and preservation of the cold chain – Compliance with the waste management plan	• Transferring unused vaccine doses across districts	• Use one-dose vial or plan for transfer of opened vaccine vials across districts
Communication / Awareness Raising		
• Official launch of the campaign by the Minister of Health – Availability of posters and leaflets containing vaccine information – Information meetings gathering heads of health regions, heads of health districts, and chaired by the representative of the Minister of health – Raising awareness of the population through radio and in places of worship – Transmission of information letters about the campaign to the various health facilities managers who relayed them to the heads of departments.	• Refusal of vaccination by some health workers	• Strengthening awareness and acceptance of the vaccine of health workers through targeted IEC efforts • Involving health worker trade unions, groups, and professional associations
Service Delivery		

Strengths	Challenges	Areas to improve / Recommendations
• Adequate number of vaccinators and vaccinator assistants – Compliance with the vaccination strategy and circuit – Compliance with the injection site – Vaccination of health workers on their working place – Completion of immunization records, cards and tally sheets	• Health worker absences due to sickness, vacation, or training • Vaccinator absences due to sickness or family emergencies	• Share information about vaccination campaign scheduling several months in advance so health workers can adjust their schedules accordingly • Identify replacement vaccinators in advance
Data Management		
• Ease of use of databases – Dissemination of the database tutorial – Adequate number of data entry operators – Daily entering and transmission of data – Good archiving of linear lists and tally sheets	• Incomplete/ inconsistent data entry by some local supervisors • Incomplete/ inconsistent daily communication of data to the data manager	• Participation of district data managers in the management of the campaign data
Finance		
• Vaccination campaign funding agreement between the Minister of Health and the PIVI – Provision of all the funds provided – Good management of financial resources	• Delay in the disbursement of funds by the trust unit (fund manager)	• Rapid disbursement of funds by the trust unit
Training		
• Briefing of stakeholders (vaccinators, vaccinators' assistants, supervisors, AEFI focal points) by the central coordination team on campaign guidelines – Successful cascade training strategy	Postponement of stakeholder briefings due to other public health emergencies	Include at least five people in the coordination team to increase capacity
Post-immunization Follow-up		
• No severe AEFIs reported – District AEFI focal points participated in notification – Funds available to cover AEFI expenses	• Lack of notification of all AEFI to the central level	• Sensitize AEFI focal points to notify central level of all AEFI cases, even minor ones